## Latest Products from...

### MSO2000 Series - Ideal for debugging mixed analogue & digital designs

Tektronix



See page 1396

### The Worlds First Organic LED DMM

Agilent Technologies



See page 1362

### 1000A True RMS Clamp Meter

TENMA™



See page 1345

### The New WaveAce - Now you can afford LeCroy

LeCroy



See page 1399

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UKAS calibration certificate
UKAS approved calibration equipment

**Standard Calibration**
Instruments calibrated to manufacturers' specification, complete with:
Full set of calibration results
Calibration certificates
Integrity seals
Electrical safety tests
All records stored and maintained for 4 years
Re-calibration advise
Suitability for **ISO 9000**

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The calibration of your equipment is essential wherever you must ensure accuracy of measurement. To arrange for re-calibration of your equipment contact our Value Added Services on 0870 1200 206.

**Delivery**
We will give you a precise delivery date at the time of your enquiry

**How to Order**
Products highlighted with the C1 symbol should be ordered by their normal order code, followed by the standard of calibration required. Calibration is charged at the stated rate. For all other items displaying the calibration logo, contact Value Added Services and we will supply you with a full quotation

228139

# Component Testers

## Battery Tester

**GOLD-IBT**



- Simulates full battery discharge test in seconds
- Tests 12Volt SLA and Car batteries from 1.2Ah - 200Ah
- Automatically displays Ambient Temperature, DC Voltage and Ampere hour Capacity available
- Warns if battery voltage is too high or low
- Table indicates when batteries need to be recharged or replaced
- Quick, accurate and easy to use

Battery manufacturers recommend to recharge or replace the battery when the rated ampere-hour (Ah) capacity falls below 65% - but multimeters are only capable of measuring terminal voltage.
The new GOLD-IBT Intelligent Battery Tester is designed to simulate a full battery discharge test in seconds. Programmed to test 12Volt SLA and car batteries from 1.2Ah - 200Ah, this product automatically displays ambient temperature, DC voltage and Ampere-hour capacity available in the battery. It's quick, accurate and easy to use and identifies batteries that need to be recharged or replaced according to prevailing conditions - irrespective of how long they have been in use.
The Intelligent Battery Tester works by applying a pulsed frequency to the battery under test. The neutral net software analyses the chemistry of the battery during this process and provides a direct reading in Amps/Hr.

| | | | |
|---|---|---|---|
| Operating voltage | 12VDC(10-15VDC) | Repeat test capability | Up to 15 continuous tests |
| Battery type | SLA (sealed lead acid) and car batteries | Dimensions (HxWxD) | 110x55x35mm |
| Battery size | 1.2Ah - 200Ah | Weight | 400g |

347809.364412

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|
| GOLD-IBT | **782-0097** | 189.63 | 169.13 | 153.75 |

## Sealed Lead Acid Battery Tester

**YSP-117**




- **Simple:** Easy to setup, even easier to use
- **Quick:** Battery voltage and conductance in under 10 seconds
- **Safe:** Utilises patented conductance technology; a passive method that minimises technician risk and battery stress
- **Accurate:** Uses IEEE standard test method with proven correlation to battery capacity. Fully compliant with NIST standard so no need for calibration
- Compact design with integral test leads
- Tests both 6 and 12V batteries from 1.2Ah to 25Ah capacity

The Yuasa SecurePower range of battery testers don't take battery capacity (Ah) readings which can be misleading, instead they use patented conductance testing technology to determine relative battery state of health by comparing the battery under test to "known good" batteries. The conductance test measures the plate surface available in the battery, which determines how much power (or current) the battery can supply. As a battery ages, the plate surfaces can sulphate or shed active material which adversely affects battery performance. In addition conductance testing will also detect cell defects, shorts or open circuiits which will also degrade battery performance. The conductance test does not put any load on the battery making the Yuasa SecurePower tester safe to use anywhere.

| | | | |
|---|---|---|---|
| Voltemeter Operating Range | +6.0 to +19.99 Vdc | Voltage Test Limits | 12.0 V high = 13.80 V |
| Voltmeter Accuracy | ±50mV across operating range | | 12.0 V Low = 12.00 V |
| Siemens Range | 20 to 750 s | | 6.0 V High = 6.90 V |
| Operating Temperature | -18 to 50°C (0 to 120°F) | | 6.0 V Low = 6.00 V |

381126.342319

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| YSP-117 | **838-8717** | 255.00 | 245.00 |

## Battery Tester and Datalogger

**Hioki 3554**




W=192 H=121 D=55mm. Weight 790g

Offers easy maintenance support of UPS batteries via simple, quick accurate testing. Batteries do not have to be disconnected to carry out the battery condition tests. By measuring periodically, your UPS is always assured to be ready in case of a power emergency.

- Accurately measures battery internal resistance for correct battery condition diagnosis
- 4 Terminal testing via specially designed test probes supports greater accuracy
- Auto-hold and Auto-data storage, store up to 4800 data sets into 12 groups of 400 to cover UPS battery banks
- Comparator settings can be set to offer pass, warning and fail conditions
- Up to 10 hours of continuous measurements can be achieved from internal batteries
- Non volatile memory offers extra security for data storage
- Download test results from battery tester to PC via USB interface, data is saved as a CSV file which is easily saved to Excel
- Download data includes: resistance value, resistance limits, voltage value, voltage limits, pass, warning and fail judgments followed by date & time

**Test kit includes:** Carry case containing 3554 Battery Hitester, 9465-10 test lead set, USB lead, data management PC software, 8 AA batteries, one spare fuse & zero adjustment board.

| | Range | Resolution | Accuracy |
|---|---|---|---|
| Resistance Measurement | 3mΩ, 30mΩ, 300mΩ, 3Ω | 1μΩ, 10μΩ, 100μΩ, 1mΩ | ±(0.8%+6d) |
| Voltage Measurement | 0 - 6V & 0 - 60V | 1mV & 10mV | ±(0.8%+6d) |
| Current Measurement | 150mA, 15mA, 1.5mA | Frequency: 1kHz | |
| Max. Battery Test Voltage | 60V dc | | |
| Power | 8x AA (LR6), 10 hours operating time from alkaline batteries | | |

447938

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Battery Tester | 3554 | **127-6494** | 1,281.25 | 1,204.38 | 1,153.72 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | | N C4 | 58.75 | |

## Component Testers - continued

### ATX Power Supply Tester

**72-1086**




W=229 H=38 D=102mm

Designed to provide fast convenient verification of proper operation of both 20 pin and 24 pin ATX style computer power supplies.

- Provides simulated motherboard "ON" condition, with load
- LED indication of power supply operation
- Voltage measurement of all 14 active pins on the main motherboard connector
- Measurement of all applicable pins on the peripheral, floppy, Serial ATA and P4 processor connectors
- Bi-directional analogue meter shows negative and positive measurement
- Rugged steel housing with non-skid rubber feet
- Calibrated -15 ~ 0 ~ 15VDC analog meter
- On/off rocker switch with LED indicator
- Detailed Instructions included

469542.469540

| | Price Each | | |
|---|---|---|---|
| Order Code | 1+ | 5+ | + |
| **132-9277** | 20.91 | 17.82 | – – |

### Capacitance and ESR Meter

**Atlas ESR60**




W=103 H=70 D =20mm

Measuring a capacitors ESR is a great indicator of capacitor condition. The Atlas ESR offers instant results and can be used in-circuit so capacitors don't need to be removed. When testing out of cicuit the meter will also show the capacitance, and can still be used on highly charged capactiors.

- Measure capacitance and equivalent series resistance (ESR)
- Capable of in-circuit testing
- Polarity free, connect any way round
- Protected against highly charged capacitors
- Easy to use; just connect the probes and press test

| Parameter | Min | Typ | Max |
|---|---|---|---|
| Peak test current into S/C | | ±20mA | ±25mA |
| Peak test voltage across O/C | | ±2.5V | ±3.0V |
| Capacitance measurement range | 1µF | | 22 000µF |
| Capacitance accuracy | | ±4% ±0.2µF | |
| ESR measurement range | 0Ω | | 10Ω |
| ESR resolution (ESR < 1Ω) | 0.01Ω | | 0.02Ω |
| ESR resolution (ESR > 1Ω) | 0.1Ω | | 0.2Ω |
| ESR accuracy (ESR < 1Ω) | | ±1.5% ±0.02Ω | |
| ESR accuracy (ESR > 1Ω) | | ±1.5% ±0.2Ω | |
| Abuse voltage (for C < 10µF) | | ±400V | |
| Abuse voltage (for C > 10µF) | | ±40V | |
| Test Frequency | | 100kHz | |
| Dimensions (WxHxD) | | 103x70x20mm | |

347708.348857

| | Mftrs. | | Price Each | | |
|---|---|---|---|---|---|
| Description | List No. | Order Code | 1+ | 5+ | 10+ |
| ESR Meter | ESR60 | **783-0254** | 76.88 | 71.51 | 68.44 |
| Carry Case | ATC55 | **521-5511** | 12.96 | 11.51 | 11.02 |

### LCR Component Tester




- Automatic componemt identification
- Automatic test frequency selection (DC, ikHz, 15kHz, 200kHz)
- Delayed or instant analysis (for hands free operation)
- Auto power-off
- Non-volatile probe and test lead compensation
- Interchangeable probe sets
- Automatic ranging and scaling with REAL units display
- 1% basic accuracy

This is an advanced instrument that greatly simplifies the testing of passive components. The product does everything automatically, it tells you the component type in addition to the component value data. The analyser also automatically selects the best signal level and frequency for the particular component under test. Further component data is also displayed such as the DC resistance of an inductor.

A testers kit is also available which includes the LCR40 Component Tester, carry case and DCA55 semiconductor analyser.

**Semiconductor Analyser DCA55**

Automatically identifies transistors, Darlingtons, diode protected transistors, resistor shunted transistors, enhancement and depletion mode MOSFETs, JFETs, low power thyristors and triacs, diodes, diode networks, LEDs and bicolour LEDs.

| | | Min. | Typ. | Max. |
|---|---|---|---|---|
| Inductance | Range | 1µH | | 10H |
| | Resolution | 0.4µH | 0.8µH | |
| | Accuracy | | ±1% ±0.8µH | |
| Capacitance | Range | 0.4pF | | 10mF |
| | Resolution | 0.1pF | 0.3pF | |
| | Accuracy | | ±1% ±0.3pF | |
| Resistance | Range | 1R | | 2MR |
| | Resolution | 0.3R | 0.6R | |
| | Accuracy | | ±1% ±0.6R | |
| Peak test voltage | | -1.05V | | +1.05V |
| Peak test current | | -3.25mA | | +3.25mA |
| Test Frequency | 1kHz | -11% | | +11% |
| accuracy | 15kHz | -11% | | +11% |
| | 200kHz | -100ppm | | +100ppm |
| Sine purity | | | -60dB 2nd harmonic | |
| Peak test voltage | | 10°C | | 40°C |
| Battery operating voltage | | 8.5V | | 13V |

333710.277355

| | Mftrs. | | Price Each | | |
|---|---|---|---|---|---|
| Description | List No. | Order Code | 1+ | 5+ | 10+ |
| LCR Tester | LCR-40 | **470-5233** | 68.24 | 66.05 | 63.22 |
| Carry Case | ATC55 | **521-5511** | 12.96 | 11.51 | 11.02 |
| Surface Mount Tweezers | SMD03 | **521-5481** | 25.38 | 20.61 | 19.72 |
| Crocodile Clips | CRC01 | **521-5493** | 8.12 | 7.88 | 7.54 |
| Long Grabber Probes | XKM04 | **521-5500** | 6.60 | 6.06 | 5.80 |
| Probes Kit (includes SMD03, CRC01,XKM04) | PTP03 | **783-0262** | 30.54 | 28.70 | 27.46 |
| Testers Kit | LCR40+DCA55+ATC55 | **783-0270** | 112.30 | 109.07 | 104.40 |

### Capacitance & Resistance Meter

**72-8150**




Compact meter is ideal for capacitor measurement in service and assembly applications.
Quickly and accurately measure capacitance values up to 20mF (20,000µF), in nine ranges, and resistance to 2,000MΩ in nine ranges.

- 3-1/2 digit 1999 count display
- Transistor HFE measurement
- Diode test & Audible continuity test
- Low battery display
- Supplied with 9V battery, test clips and owners manual

W=83 H=172 D=38mm. Weight 310g

| | Range | Accuracy |
|---|---|---|
| Resistance | 20R, 200R, 2kR, 20kR, 200kR, 2MR, 20MR, 200MR, 2GR | ±(0.8% + 1d) |
| Capacitance | 200pF, 2nF, 20nF, 200nF, 2µF, 20µF, 200µF, 2mF, 20mF | ±(0.5% + 10d) |

448305.460891

| Mftrs. | | Price Each | | | |
|---|---|---|---|---|---|
| List No. | Order Code | 1+ | 3+ | 5+ | 10+ |
| 72-8150 | **128-3644** | 15.81 | 14.22 | 13.48 | 12.41 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C8 | 45.13 |
| **UKAS Calibration Charge** | N C8 | 73.70 |

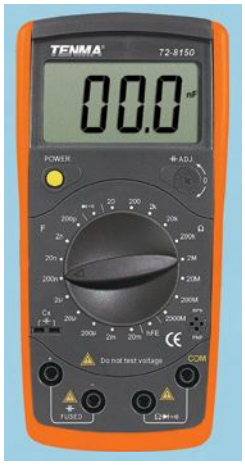
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## LCR Multimeter

**72-8155**




Compact full featured meter provides inductance, capacitance and resistance (LCR) measurements. Quickly and accurately measure capacitance values up to 600µF in seven ranges, resistance to 20MΩ in six ranges and inductance to 20H in five ranges.

- 3-1/2 digit 1999 count display
- Transistor HFE measurement
- Diode test & Audible continuity test
- Low battery display
- Supplied with 9V battery, test clips and owners manual

W=83 H=172 D=38mm. Weight 312g

| | Range | Accuracy |
|---|---|---|
| Resistance | 200R,2kR,20kR,200kR,2MR,20MR | ±(0.8% + 1d) |
| Capacitance | 2nF,20nF,200nF,2µF,20µF,200µF,600µF | ±(1.0% + 5d) |
| Inductance | 2mH,20mH,200mH,2H,20H | ±(2.0% + 8d) |

448304.460890

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | 10+ |
|---|---|---|---|---|---|
| 72-8155 | **128-3643** | 25.45 | 22.51 | 21.35 | 19.66 |
| | | | Price Each | | |
| **Standard Calibration Charge** | | S C8 | 45.13 | | |
| **UKAS Calibration Charge** | | N C8 | 73.70 | | |


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## Component Tester

**LCR55A**




- Inductance, capacitance and resistance meter
- 28 user ranges
- Transistor continuity, diode and microwave diode tester
- 3½ digit display, 1999 count, large 18mm high digits
- Data hold and max hold
- Zero adjustment knob (20Ω range)
- Capacitor measurement slots and dedicated test sockets
- IEC1010-1, Cat II, CE

| | |
|---|---|
| Resistance | 20Ω, 200Ω, 2 kΩ, 20 kΩ, 200 kΩ, 2 MΩ, 20 MΩ |
| Inductance | 200µH, 2 mH, 20 mH, 2 H, 20 H, 200 H |
| Capacitance | 200 pF, 2 nF, 20 nF, 200 nF, 2 µF, 20 µF, 200 µF, 2000 µF |
| Microwave | |
| Diode Test | 0.6 mA approx, 7.0 V DC typical |
| Continuity tone | 2 kΩ range: Tone at R < 30Ω |
| Weight | 311g |

489613.502923

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| LCR55A | **146-6450** | 158.00 | 153.26 | 148.66 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C8 | 45.13 | |
| **UKAS Calibration Charge** | | N C8 | 73.70 | |

## Smart Tweezers

**LCR-Meter and Component Identifier in a pair of Tweezers**



- Efficient and convenient way to test SMD components
- Built-in high-precision LCR probe
- Convenient one-hand operation
- Precise tips for small size devices (ideal for SMDs)
- Automatic component recognition
- Automatic test range selection
- Manual and voltage test modes
- Diode Polarity/Short testing
- Portable and ergonomic design

Smart Tweezers automatically determine the type of component (resistance / capacitance / inductance) and selects the proper range for high accuracy measurements.The display clearly indicates the type of component, measurement result and test conditions.

| | | |
|---|---|---|
| **Physical Specifications** | Operating Temperature: | 0 °C to +55 °C |
| | Battery Type: | 1.5V LR44 (Alkaline or Air Zinc) |
| | Battery Life (continuous): | 80 Hours Alkaline<br>240 Hours Zinc Air |
| | Size: | 14.0 x 2.5 x 3.0 cm |
| | Weight: | 53 g |
| **Basic Specifications** | Measured Parameters: | C+R (ESR), L+R, R |
| | Measuring Frequences: | 100 Hz, 1 kHz, 10 kHz |
| | Measurement Rate: | 4, 2, 1, 0.5 times per second (Default 1) |
| | DC Voltage: | 0 to 800 mV |
| | Resistance: | 0 to 5 MOhm |
| | Capacitance: | 10 pF to 900 µF |
| | Inductance: | 1µH to 999 mH |
| **Accuracy Specifications** | | |
| Resistance | Range: | 0.1 Ohm - 5 MOhm |
| | Accuracy: | 1% in the range 0.1R - 5M |
| | Test Frequency: | 1 kHz |
| Capacity | Range: | 10pF - 499µF |
| | Accuracy: | 5% in the range 20pF - 1000µF |
| | Resolution: | 0.5pF in the range 1pF- 100pF |
| | Test Frequency: | 1 kHz C ≥ 1000pF<br>10 kHz C ≤ 1000pF<br>100Hz C ≥ 1µF |
| Inductivity | Range: | 1µH - 1H |
| | Accuracy: | 10% in the range 1µH - 10µH<br>5% in the range10µH - 100µH<br>5% in the range 100µH - 1H |
| | Resolution: | 0.5µH in the range 1µH - 100µH |
| | Test Frequency: | 10 kHz L ≤ 1µH<br>1 kHz L ≥ 1µH<br>100Hz L ≥ 1mH |

471896.502087

| | Mftrs List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| Smart Tweezers | ST-1 | **136-0343** | 195.00 | 185.00 |
| | | | Price / Set | |
| Standard Spare Tips | ST-IT-T | **158-1059** | 24.65 | 22.20 |
| Hi-Precision Spare Tips | ST-IT-THP | **158-1060** | 29.95 | 26.95 |
| Hi-Precision Spare Tips, Extra Sharp | ST-IT-TSHP | **158-1061** | 36.45 | 32.80 |

## RLC Meter - Automatic measurement

**RLC100**



- Microprocessor controlled, with self test
- Automatic measurement for parameters of passive components
- 4 wire connection for accurate measurement
- 0.5Ω to 1.999MΩ
- 0.1µH to 199.9H
- 0.1pF to 1.999mF
- Measuring frequency 1kHz
- Quattro key operating concept
- RS232 interface

241100

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| RLC Meter | HUC31-00 RLC100 | **413-0900** | 325.38 | 309.06 | 290.70 |
| Labview Software | HUC31 - 10 | **413-0911** | 45.68 | 43.38 | 40.78 |

## Coming soon

Register your interest for items that are 'Coming Soon' at **www.farnell.co.uk** and we'll email you to let you know that they're in stock.

## Component Testers - continued

### LCR Bench Meter

**RLC200**

digimess®



- 0.2% accuracy
- Automatic measurement
- 1mΩ to 100MΩ Resistance measurement
- 0.1µH to 20kH Inductance measurement
- 0.1pF to 20mF Capacitance measurement
- 4 line test cables with Kelvin clamps
- Frequency 100Hz/1kHz
- Microprocessor self test
- RS232 interface with software options
- Supplied with UK and Euro power cords

339895.267595

| Description | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| LCR Meter | RLC200 | **501-9795** | 794.58 |
| Labview Software | HUC31 - 10 | **413-0911** | 45.68 |

### LCR Bench Meter

**RLC300**

digimess®



- 0.1% accuracy
- Automatic measurement
- 20mΩ to 20MΩ Resistance measurement
- 1µH to 20kH Inductance measurement
- 1pF to 20mF Capacitance measurement
- 4 line test cables with Kelvin clamps
- Frequency 50Hz/100Hz/1kHz/10kHz
- Microprocessor self test
- RS232 and IEEE488 interface with software options
- Supplied with UK and Euro power cords

339896.267596

| Description | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| LCR Meter | RLC300 | **501-9801** | 1,171.98 |
| 19" Rack Mount | HUC00-10 MA19 - 1 | **413-1034** | 100.53 |

### LCR-Bridge

**HM8118**

HAMEG Instruments

New



- Basic Accuracy 0.05%
- Measurement functions L, C, R, Z, X, Y, G, B, D, M, N and many more
- Test frequencies from 20 Hz to 200 kHz
- Up to 12 measurements per second
- Parallel and Series Mode
- Binning and limits for parts sorting (optional)
- Internal programmable voltage and current bias
- Transformer parameter measurement
- External capacitor bias up to 40 V
- Kelvin cable and 4 wire SMD Test adapter included in delivery
- Galvanically isolated USB/RS-232 Interface, optional: IEEE-488

526979

| Mftrs. List No. | Order code | Price Each 1+ |
|---|---|---|
| HM8118 | **163-6919●** | 1,023.96 |

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### Precision LCR Bridge

**LCR400**

TTi



The LCR400 is a low cost precision LCR bridge intended for use within goods inward inspection areas, laboratories and production facilities. The measurement accuracy is 0.1% and the maximum measurement frequency is 10kHz. Features include dual displays, a built in limits comparator with binning, and an RS-232 interface for set-up and results logging. A high quality test fixture is incorporated into the body of the instrument

- 0.1% basic measurement accuracy
- Three test frequencies
- Dual 5 digit high brightness displays
- Automatic component recognition
- Built in 4 terminal component fixture
- Switchable bias voltage
- Protection against charged capacitors
- Limits comparator with 8 pass bins plus 2 fail bins
- RS-232 interface
- RS-232 interface (standard) and optional Windows™ based software
- Optional Surface Mount Tweezers, BNC connectors and Kelvin Clips

**Measurement functions**

| | |
|---|---|
| Parameters measured: | R, L, C, D & Q |
| Measurement modes: | Series or parallel equivalent circuit |
| Measurement functions: | Fully autoranging including L, C, R selection, range hold |
| Zero function: | Nulls out up to 100pF at test fixture |
| Measurement frequency: | Selectable as 100Hz, 1kHz or 10kHZ |
| Displayed functions: | R+Q, L+Q, C+D, C+R |

**Measuring ranges**

| | |
|---|---|
| Resistance: | 0.1mΩ to 990MΩ |
| Inductance: | 0.001H to 9900H |
| Capacitance: | 0.001pF to 99mF |
| D: | 0.001 to 999 |
| Q: | 0.001 to 999 |

| Accuracy: | 100Hz | 1kHz | 10kHz |
|---|---|---|---|
| R: 0.1%±1 digit | 2Ω to 1MΩ | 2Ω to 500KΩ | 2Ω to 50KΩ |
| 0.5%±1 digit | 0.4Ω to 5MΩ | 0.4Ω to 2MΩ | 0.4Ω to 200KΩ |
| 2%±1 digit | 0.1Ω to 20MΩ | 0.1Ω to 10MΩ | 0.1Ω-500kΩ |
| L: 0.1%±1 digit | 4mH to 500H | 0.4mH to 50H | 40µH to 5H |
| 0.5%±1 digit | 0.8mH-2500H | 80µ-250H | 8µ-25H |
| 2%±1 digit | 0.2mH to 9900H | 20µH to 1000H | 2µH to 100H |
| C: 0.1%±1 digit | 10nF-1000µF | 1nF to 100µF | 100pF to 10µF |
| 0.5%±1 digit | 2nF-5000µF | 200pF-500µF | 20pF-50µF |
| 2%±1 digit | 500pF to 20000µF | 50pF to 2000µF | 5pF to 200µF |

(R accuracies apply for Q<0.1. L accuracies apply for Q >10.
C accuracies apply for D<10.1 and after Null).

**Limits comparator**

| | |
|---|---|
| Limits set-up: | Multiple upper and lower limits can be set from the keyboard or from the RS-232 interface |
| Binning: | Up to 8 pass bins can be defined plus fail high and fail low. |

**Display**

| | |
|---|---|
| Display type: | Dual 5-digit 0.56" LEDs. Max. count 30,000. Display hold. |
| Annunciators: | LED annunciators for all functions and measurement units. |
| Displayed functions: | R+Q, L+Q, C+D, C+R, PASS/Hi/LO, bin number |

**Inputs**

| | |
|---|---|
| Component connection: | 4-terminal connection via internal fixture for both radial and axial components. Sockets for 4-terminal external connection. |
| Bias voltage: | Switchable 2V polarising voltage. External bias up to 50V. |
| Protection: | Will withstand capacitors charged up to 50V. |

**General**

| | |
|---|---|
| Keyboard: | Full numeric keyboard. |
| Non-volatile memory: | Up to 9 complete set-ups. |
| Interfaces: | RS-232 |
| Input voltage: | 230V or 115V±14%, 50/60Hz, internally adjustable. |
| Safety and EMC: | Complies with EN61010-1, EN55081-1 and EN55082-1. |

**Options**

| | |
|---|---|
| LCR PC link: | Windows™ based software enabling logging of results to a pc as well as extended storage of instrument set-ups |
| LCR BNC: | Adaptor enabling a four terminal connection to be made to any remote test fixture using BNC cable. |
| LCR SMD: | Surface Mount Tweezers of high quality incorporating a four terminal connection. |
| LCR K-clips: | Kelvin Clip ( 4 terminal) remote connection lead set note that this requires option LCR-BNC for connection to the LCR400. |

228164

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| LCR 400 | **351-0906** | 638.00 | 618.86 | 600.29 |
| LCR PC Link | **381-2418** | 50.00 | 48.50 | 47.05 |
| LCR BNC | **381-2388** | 70.00 | 67.90 | 65.86 |
| LCR SMD | **381-2390** | 162.00 | 157.14 | 152.43 |
| LCR K CLIPS | **381-2406** | 81.00 | 78.57 | 76.21 |

### Surface Mount LED Tester

**LED Tester for Surface Mount LEDs**

MENTOR



H=25, W=60, D=100

The Surface Mount LED Tester has been designed for the fast and easy testing of standard SMD (Surface Mount) and THT (Through Hole Technology) LEDs and observation of their properties such as colour, light intensity and their viewing angle. There are 10 current settings ranging from 1mA to 100mA. It has battery low indicator and is supplied with a 9V battery. A 9 volt power supply order code 488-707 (Euro) or 488-653 (UK) are available separately.

There is an automatic polarity check and the unit will test multi-coloured LEDs as well.A lead set is also available separately for testing SMD LEDs and non-SMD LEDs that are already fitted to a board.

A list of the types of surface mount LEDs and their corresponding socket numbers are shown below

1 Power Top LED
2 Top LED, Multi Top LED
3 Side LED
4 Side LED
5 Mini Top LED, Chipled 1206, Chipled 0805
6 Chipled 0603, Smart LED
7 3 - Colour LEDs

228633

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| SMD LED Tester | **366-4120** | 40.71 | 39.08 |
| Test Leads | **366-7005** | 3.98 | – – |

## Component Analyser

**Atlas DCA55**



H=70, W=103,D=20



Testers Kit



Surface Mount Tweezers



Crocodile Clip



Long Reach Grabbers

**Passive component Analyser LCR40**

An advanced instrument that greatly simplifies the testing of passive components, it will identify the type of component (Inductor, Capacitor or Resistor) together with the components main value. Additionally, futher component data is also displayed such as the DC resistance of an inductor.

- Automatically identifies transistors, Darlingtons, diode protected transistors, resistor shunted transistors, enhancement and depletion mode MOSFETs, JFETs, low power thyristors and triacs, diodes, diode networks, LEDs and bicolour LEDs.
- Automatic pin-out identification for all the above components
- Measures transistor gain, MOSFET gate threshold voltage, and forward voltage drop of diodes, LEDs and transistor base-emitter junctions
- 2 line scrollable LCD
- Simple two button control
- Gold plated universal probes
- Battery supplied
- Colour coded, universal clips
- Auto/manual power off

227399.410810

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Red Analyser | DCA55R | **372-7440** | 47.51 | 46.66 | 44.66 |
| Translucent Blue Analyser | DCA55T | **372-7476** | 47.51 | 46.66 | 44.66 |
| Carry Case | ATC55 | **521-5511** | 12.96 | 11.51 | 11.02 |
| Surface Mount Tweezers | SMD03 | **521-5481** | 25.38 | 20.61 | 19.72 |
| Crocodile Clips | CRC01 | **521-5493** | 8.12 | 7.88 | 7.54 |
| Long Grabber Probes | XKM04 | **521-5500** | 6.60 | 6.06 | 5.80 |
| Probes Kit (Includes SMD03, CRC01, XKM04) | PTP03 | **783-0262** | 30.54 | 28.70 | 27.46 |
| Testers Kit | LCR40+DCA55+ATC55 | **783-0270** | 112.30 | 109.07 | 104.40 |

## Thyristor and Triac Analyser

**Atlas SCR100**



H=72, W=103, D=20mm

- Thyristor and triac identification
- Automatic lead identification Gate, Anode, Cathode for thyristors and Gate, MT1, MT2 for triacs
- Gate sensitivity checking (100µA to 100mA)
- Polarity free, connect any way round
- Common fault detection
- Simple to use (just connect thyristor or triac and press test)

Thyristors and triacs vary a great deal in their requirements for gate trigger currents, some can be triggered with just 50µA, others may need up to 100mA. The Atlas SCR will progressively increase gate trigger currents until the device is triggered, it will then display its findings. Even sensitive devices can be tested in safety, test currents last for less than 200µS and levels are limited to safe levels.

| Parameter | Min | Typ | Max | Units |
|---|---|---|---|---|
| Gate test current | 0.1 | | 100 | mA |
| Load test current | 90 | 100 | 120 | mA |
| Gate trigger duration | | 100 | | µS |
| Main current duration | | 200 | | µS |
| Peak O/C test voltage | | ±12 | | V |
| Peak S/C test current | | | 120 | mA |
| Battery type | | GP23/MN21 12V | | |

347707.348855

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Analyser | SCR100 | **783-0246** | 94.16 | 83.63 | 80.04 |
| Carry Case | ATC55 | **521-5511** | 12.96 | 11.51 | 11.02 |

## Handheld Analogue IC Tester

**LinearMaster Compact Pro**



W=100 H=45 D=195mm

A handheld, battery powered IC tester designed to functionally test a variety of analogue devices including comparators, op amps, opto-isolators and regulators.

- Testing by direct entry of device number
- Unknown device identification
- Detects intermittent and temperature related faults
- On-screen display of IC function and pinout
- Tests up to 16-pin devices
- Full range for Surface Mount adapters are available within the Farnell Cat
- Compatible with CompactLink software (129-6494)
- 2 line by 16 character LCD dot matrix display
- Powered by 4x AA batteries or mains adaptor (both included)

**CompactLink Software**

A PC based software package that allows users to add new devices to the internal library and create functional tests to suit special applications. New IC functional tests can be created using PremierLink IC Programming (PLIP), a high-level descriptive test programming language optimised for generation of both analogue and digital IC test programs.Thanks to the RS-232 link (or USB with supplied adapter), firmware updates can be downloaded from the internet and programmed into the Compact unit.

| | | |
|---|---|---|
| Op-amps | Comparators | Transistor arrays |
| Voltage regulators | Analogue switches | Opto couplers |
| DACs/ADCs | Analogue multiplexers | (other devices may be added by future software updates) |
| Voltage references | Opto isolators | |

474079.450207

| Description | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| LinearMaster IC Tester | **129-6493** | 479.50 | 455.53 | 432.75 |
| CompactLink Software | **129-6494** | 315.00 | 299.25 | 284.29 |

## Handheld Digital IC Tester

**ChipMaster Compact Pro**



W=100 H=45 D=195mm

A handheld, battery powered digital IC tester designed to functionally test TTL, CMOS, LSI, memory and interface devices.

- Testing by direct entry of device number
- Analogue output thresholds for increased test integrity
- Unknown device identification
- Detects intermittent and temperature related faults
- On-screen display of IC function and pinout
- Tests up to 40-pin devices
- Full range for Surface Mount adapters are available within the Farnell Cat
- Compatible with CompactLink software (129-6494)
- 2 line by 16 character LCD dot matrix display
- Powered by 4x AA batteries or mains adaptor (both included)

**CompactLink Software**

A PC based software package that allows users to add new devices to the internal library and create functional tests to suit special applications. New IC functional tests can be created using PremierLink IC Programming (PLIP), a high-level descriptive test programming language optimised for generation of both analogue and digital IC test programs.Thanks to the RS-232 link (or USB with supplied adapter), firmware updates can be downloaded from the internet and programmed into the Compact unit.

474078.450206

| Description | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| ChipMaster Compact Pro IC Tester | **129-6492** | 413.50 | 392.83 | 373.18 |
| CompactLink Software | **129-6494** | 315.00 | 299.25 | 284.29 |

# Decade Boxes

## Resistance Decade Box

**72-7270**



Ideal for service, prototype and experimental use, this useful tool may be set at any value from 1~11,111,110ohm, in one ohm increments. Twenty eight individual slide switches allow the user to quicklyand easily select resistor values.Wave soldered, two layer PC board utilises high quality 1 tolerance ⅓W resistors.

- Maximum stray internal resistance is ⅓ohm
- Colour coded binding posts provide resistor and ground connections
- Passive device requires no power source
- Dimensions (WxHxD): 146x114x32mm

## Decade Boxes - continued

### Resistance Decade Box - continued

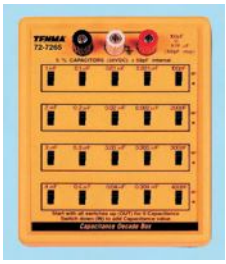
**72-7270 - continued**

336768.343652

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 5+ |
|---|---|---|---|
| 72-7270 | **490-8454** | 53.44 | 50.25 |

### Capacitance Decade Box

**72-7265**



Ideal for service, prototype and experimental use, this useful tool may be set at any non-polarised capacitor value from 100pFto 11,111μF, in 100pF increments. twenty individual slide switches allow the user to quickly and easily select capacitor values. Wave soldered, two layer PC board utilises high quality 5% tolerance mylar capacitors.

- Maximum internal residual capacitance is 50pF
- Colour coded binding posts provide capacitor and ground connections
- Passive device requires no power source

336766.343911

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 5+ |
|---|---|---|---|
| 72-7265 | **490-8442** | 71.64 | 67.36 |

### Decade Resistors

**R1-1000 SAB and R1-3000 SAB**




H=170 W=110 D=23mm

**R1-1000 SAB:**
28 series-connected 1 W resistors which can be activated individually by slide switches. The staggering of the resistance values in 1_2_3_4 steps allows continuous variation of resistance values in 7 decades.

**R1-3000 SAB:**
A higher maximum power, of 3 W, than R1_1000 SAB. The decade can also be protected against overloading by the use of a miniature fuse.

| | | | |
|---|---|---|---|
| Range: | 1Ω-11MΩ | Power rating | 1W |
| Rest resistance | 125mΩ< | | according IEC1010-1 KAT I |
| | | Tolerance | 1'1. |

240612

| Type | Order Code | Price Each 1+ |
|---|---|---|
| R1-1000 SAB | **876-562** | 136.55 |
| R1-3000 SAB | **876-574** | 169.00 |

### Decade Capacitance

**C1-250 SAB**



H=170 W=110 D=30 mm

Provides capacitance values in a range covering 5 decades. Staggering of the capacitors allows continuously variable adjustment by means of slide switches. The Spcce setting value is the sum of the connected capacitance values. A capacitor is automatically discharged on being disconnected. The connection is made via 4 mm safety sockets.

| | |
|---|---|
| Range: | 11.111μF 100pF to |
| Accuracy: | 1.0% |
| Rest capacity | <75pF |
| | according IEC1010-1 KAT I |
| Max. operation voltage: | 100V AC/DC |

240625

| Type | Order Code | Price Each 1+ |
|---|---|---|
| C1-250SAB | **876-549** | 165.17 |

### Decade Resistance Boxes - 1%

**DR Series**



- High precision decade resistance boxes capable of taking high currents
- Good long-term stability
- The assembly is mounted on the front panel which fits into a 19" standard subrack
- DR boxes use metal film resistors offering 0.5% accuracy and a temperature coefficient of 50 ppm/°C
- Indispensible for teaching and test and calibration laboratories
- Output of each decade on safety socket

| Type | Decades | Multiplier Ω 1 | 10 | 100 | 1K | 10K | 100K | 1M | Total Resistance |
|---|---|---|---|---|---|---|---|---|---|
| DR 05 | 5 | ● | ● | ● | ● | ● | — | — | 111,110KΩ |
| DR 06 | 6 | ● | ● | ● | ● | ● | ● | — | 1111,110KΩ |
| DR 07 | 7 | ● | ● | ● | ● | ● | ● | ● | 11,111110MΩ |
| Imax. | | 700mA | 200mA | 70mA | 20mA | 7mA | 2mA | 0.7mA | |

| Weight Kg | DR 04 | DR 05 | DR 06 | DR 07 |
|---|---|---|---|---|
| | 1 | 1.4 | 1.44 | 1.52 |

Dimensions (mm) L=68.5, W=427, D=96

244502

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| DR 05 | **334-6699** | 83.00 |
| DR 06 | **334-6705** | 94.55 |
| DR 07 | **334-6717** | 104.01 |

### Resistance Box 0.01Ω to 1MΩ

**1051**



The 1051 is a wide range low ohm resistance box designed for general laboratory work including platinum resistance thermometry.

W=200, H=75, D=110mm Weight=0.6 kg

- **Switch Contacts:** Special attention has been given to the reliability of operation. A special multiple gold contact arrangement ensures low contact resistance and continued operation even if a contact fails.
- **Safety Terminals:** Fully compatible with 4mm shrouded plugs, as well as standard plugs, bare wires, and spade terminals.
- **Clear Visual Indication:** To enhance reading the setting, the 1051 has colour coded digits as shown in the above image; Kohms (red), ohms (white), and 0.1 ohms (yellow).
- **Added Protection:** The 1051 comes fitted with an ergonomic rubber boot providing increased protection and durability. The boot has a textured grip for comfortable handling and a raised edge so the 1051 angles slightly upward when resting horizontally. This improves visibility as well as gripping the surface allowing no movement when thumbwheel switches are pressed. It is easily removable if required.

| Range / Ω | 0.01 | 0.1 | 1 | 10 | 100 | 1k | 10k | 100k |
|---|---|---|---|---|---|---|---|---|
| Accuracy / % | ±10 | ±5 | ±1 | ±0.5 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Max Current / A | 1 | 1 | 1 | 0.3 | 0.1 | 33m | 10m | 3m |

339583

| Description | Mftrs. List No. | Order Code | Price Each 1+ | Price Each 2+ | Price Each 5+ |
|---|---|---|---|---|---|
| Resistance Box | 1051. | **505-8302** | 399.00 | 367.50 | 358.08 |

### Resistance Box 1Ω to 100MΩ

**1040**



W=200, H=110, D=75mm Weight=0.6kg

The 1040 is an accurate hand held decade resistance box designed to meet the needs of industry and education.
Excellent accuracy is achieved by using high stability metal film resistors. Mid-scale accuracy is 0.1%. The 8-digit thumbwheel switch enables precise setting with a clear unambiguous indication of the resistance value.
The temperature coefficient is better than 50 ppm per C. Each resistor has a power rating of 1 watt.
To prevent misreading, the 1040 incorporates a colour coding system to divide the display into 3 groups to indicate ohms, Kilohms, and Megohms.
Special attention has been given to reliability. A special multiple gold contact switch arrangement ensures that back-up contacts are always available to take over should a contact fail.
The 1040 has safety terminals that are fully compatible with 4mm shrouded plugs, as well as standard plugs, bare wires, and spade terminals. The unit is supplied fitted with an ergonomic rubber boot providing increased protection and durability. The boot has a textured grip for comfortable handling and a raised edge so the 1040 angles slightly upward when resting horizontally. This improves visibility as well as gripping the surface allowing no movement when thumbwheel switches are pressed. It is easily removable if required.

- High accuracy and precision
- Clear visual indication
- High stability and low temperature coefficient
- Compact and robust
- One of Time Electronics resistance boxes range

| | | | |
|---|---|---|---|
| Resistance Range | 1Ω to 100MΩ in 1Ω steps | Temp Coeff | Less than 50 ppm per °C |
| Power Rating | 1 watt per resistor. Metal film resistors | Connections | 4mm terminals |
| Voltage Rating | Max 300V | Construction | Robust metal construction |
| Zero Residual | Less than 250mΩ | | |

| Range / Ω | 1-9 | 10-90 | 100-900 | 1-9k | 10-90k | 100-900k | 1-9M | 10-90M |
|---|---|---|---|---|---|---|---|---|
| Accuracy / % | ±1 | ±0.5 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±1 |
| Max Current / A | 0.5 | 0.3 | 100m | 30m | 3m | 0.3m | 30µ | 3µ |

339582

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Resistance Box | 1040. | **505-8284** | 395.00 | 338.55 | 324.64 |

## Precision Resistance Box 10mΩ - 12kΩ

**1067**



W=355, D=87, H=63mm Weight=1.1Kg

The Time Electronics 1067 Precision Decade Resistance box is suitable for a wide range of simulation work. It is particularly suitable for simulating and calibrating precision PT100 sensors and temperature indicators/meters that use resistive sensors. Special care has been taken in the construction of the 1067 to ensure that the residual end resistance is as low and as stable as possible. Multiple self wiping silver alloy contacts are used for each position to ensure outstanding performance and long life.

- Precision PT100 Simulation
- 6 Digit Resolution
- 10mΩ - 12kΩ
- 0.01% Accuracy
- Better than 20 ppm/year stability
- Robust metal case, fully screened with low thermal emf terminals

| | |
|---|---|
| Resistance Range | 10mΩ to 12kΩ |
| No. of Decades | 6, each decade settable from 0 - 11 |
| Increment | 10 milliohms steps |
| Accuracy | ±0.01% of setting ±2mΩ, At 22°C |
| Rating | 10mΩ range: 3A<br>100mΩ range: 2A<br>1Ω range: 600mA<br>10Ω range: 200mA<br>100Ω range: 60mA<br>1kΩ range: 20mA |
| Temperature Coefficient | <10 ppm per °C (>1Ω)<br><20 ppm per °C(<1Ω) |
| Residual Resistance | <10mΩ |
| Maximum voltage | 200V at maximum resistance setting |
| Insulation | Case to resistance terminals 2kV / 50Hz max |
| Operating torque | <0.1 Nm |
| Stability | Better than 20 ppm per year (>1Ω)<br>Better than 100 ppm per year (<1Ω) |

339585

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 1067 | **505-8326** | 712.98 | 611.12 | 586.01 |

## Decade Capacitance Box - 1%

**DC 05**



- Box with 5 very high precision capacitance decades
- Low temperature coefficient (125ppm/°C)
- Very high insulation resistance
- 19" standard rack size front panel
- Uses polystyrene and polypropylene capacitors
- Robust switches

| Range | Quality | Accuracy | Max Voltage | |
|---|---|---|---|---|
| 100pF | Polystyrene | 1% | 300V dc | 230V to 50Hz |
| 1nF | Polystyrene | 1% | 300V dc | 230V to 50Hz |
| 10nF | Polystyrene | 1% | 300V dc | 230V to 50Hz |
| 100nF | Polystyrene | 1% | 300V dc | 230V to 50Hz |
| 1µF | Polypropylene | 1% | 300V dc | 230V to 50Hz |

| Connection | Capacitance | Dimensions | W=427, D=96, H=68.5 |
|---|---|---|---|
| Top socket to screen socket: | 25pF | Weight | 1.61kg |
| Bottom socket to screen socket: | 20pF | | |

244424

| Order Code | Price Each 1+ | + | + |
|---|---|---|---|
| **334-6729** | 152.34 | – – | – – |

## Capacitance and Resistance Decade Boxes

**TEK903 & TEK905**




**Resistance:** The TEK903 is a very reliable decade resistance box with high quality rotary switches providing in-line readouts. Ideal for laboratory, educational and calibration applications. The extra terminal forms an accurate potential divider. **Capacitance:** The TEK905 is a 5 decade capacitance box giving a useful range of capacitance values.

| | TEK903 - Resistance | TEK905 - Capacitance |
|---|---|---|
| | 1% Grade 0.6W per resistor | ±5% Grade 100V DC |
| Ranges | 10 - 100 - 1k - 10k - 100k - 1M per step<br>± 1% (variable from 10Ω) to 10Ω ±1%) | 10pF - 1nF - 10nF - 100nF - 1µF - 3µF<br>± 5% (variable from 100pF to 3µF ± 5%) |
| Dimensions | 306 x 70 x 80mm | 306 x 70 x 80mm |
| Weight | 404g | 425g |

341612

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Resistance | TEK903 | **505-8004** | 98.40 | 90.20 | 84.56 |
| Capacitance | TEK905 | **505-8016** | 117.88 | 110.70 | 102.50 |

# Current Probes

## AC Current Probe



- Extends the current ranges for all multimeters
- 200A AC current
- Clamp-on adaptor with voltage output

| | | | |
|---|---|---|---|
| Range | 200A | Sensitivity | 1A/mV DC |
| Output | 1mV/A | Accuracy | ±2% |

W=70 H=190 D=40mm. Weight 200g

414751.403922

| Description | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| AC Current Probe | **100-3036** | 10.09 | 9.56 | 8.94 |

## AC/DC Current Clamp

**Fluke i30**

FLUKE

LATEST PRICING



A current clamp based on Hall Effect technology for use in measurement of both DC and AC current. The i30 may be used in conjunction with multimeters, recorders and other suitable recording instruments for accurate non-intrusive current measurement.

- Maximum conductor diameter 19 mm
- 1.5m cable with shrouded banana plug connectors

| | Range | Accuracy |
|---|---|---|
| **AC Current** | 20 A | 1% rdg + 2mA |
| Output Sensitivity | 100mV/A | |
| Frequency Range | DC to 20kHz | |
| Max. Current | 30A AC RMS | |
| Max. Working Voltage | 300V AC RMS | |
| Max. Conductor Diameter | 19mm | |
| Cable Length | 1.5m | |
| Safety | CAT III 300V | |
| Battery life | 209V Alkaline hours typical from battery | |
| Weight | 250g | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

460568.460564

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Current Clamp | I30 | **132-7556** | 219.00 | 212.43 | 206.06 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | | N C4 | 58.75 | |

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**Please recycle after use.**

## Current Probes - continued

### AC/DC Current Clamp

**Fluke i30s**

FLUKE

LATEST PRICING



A current clamp based on Hall Effect technology for use in measurement of both DC and AC current. The i30s may be used in conjunction with oscilloscopes and other suitable recording instruments for accurate non-intrusive current measurement.

- Maximum conductor diameter 19 mm
- 2m cable with BNC connector

| | Range | Accuracy |
|---|---|---|
| **AC Current** | 20 A | 1% rdg + 2mA |
| **General Specifications** | | |
| Output Sensitivity | 100mV/A | |
| Frequency Range | DC to 100kHz | |
| Max. Current | 30A AC RMS | |
| Max. Working Voltage | 300V AC RMS | |
| Max. Conductor Diameter | 19mm | |
| Cable Length | 2m | |
| Safety | CAT III 300V | |
| Battery life | 309V Alkaline hours typical from battery | |
| Weight | 250g | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

460577.460569

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Current Clamp | I30S | **132-7557** | 311.00 | 301.67 | 292.62 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C8 | 45.13 | |
| **UKAS Calibration Charge** | | | N C8 | 73.70 | |

### AC Current Clamp

**i200s**

FLUKE



A dual range 20A and 200A ac current clamp with voltage output via a safety insulated BNC connector. A dual banana to BNC adapter is supplied to allow the i200s to be connected to multimeters with banana inputs.

- Two ranges: 20 A & 200A, 10 or 100 mV/ Amp output
- Take accurate current readings without breaking the circuit
- Max. conductor ∅ 20 mm
- CAT III 600V safety rating

**FLUKE Compatibility:**

27, 43B, 77 IV, 83V, 87V, 88V, 114, 115, 117, 120 Series, 190 Series, 175, 177, 179, 187, 189, 430 Series , 741B, 743B, 744, 787, 789, 1577, 1587, 8845A, 8846A,

| | |
|---|---|
| Nominal Current Range(s) | 20A, 200A |
| Continuous AC Current Range | 0.1 - 24A, 0.5 - 200A |
| Highest Current | 240A |
| Lowest Measurable Current | 0.5A |
| Basic Accuracy (48-65Hz) | 1.5% +0.5A |
| Useable Frequency | 40Hz - 10kHz |
| Max. Working Voltage | 600V AC |
| Max. Conductor Dia. | 20mm |
| Output Levels | 100mV/A, 10mV/A |
| Output Cable (m) | 2m |
| BNC Adaptor | ✓ |
| Safety | CAT III 600V |

489307

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| I200S | **142-2694** | 157.00 | 152.29 | 147.72 |
| | | | Price Each | |
| **Standard Calibration Charge** | | | S C5 | 39.11 |
| **UKAS Calibration Charge** | | | N C5 | 61.97 |


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### AC/DC DMM Current Clamps

FLUKE



- AC and DC Current measurement
- 30mm jaw openings
- 400A range
- Hall sensor operation
- 4mm shrouded safety plug connections with 1.6m lead
- Zero error adjustment
- 60hr battery life (9V PP3 battery supplied)
- IEC1010 CAT III 600V rating

**i1010 Additional Features:**

- 600/1000A ranges

Two high quality current clamps for use with any DMM with 10MΩ inputs.

| | I410 | I1010 |
|---|---|---|
| AC/DC Current Range | 1A to 400A | 1A to 600A/1A to 1000A |
| Lowest Measureable Current | 0.5A | |
| Basic Accuracy | 3.5% | 2% |
| Working Voltage (max.) | 600V | |
| Conductor Size (max.) | 30mm or 2x 25mm | |
| Output Level | 1mV/A | |

248512

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| I410 | **431-4232** | 158.00 | 153.26 |
| I410-KIT + Carry Case | **491-7250** | 165.00 | 160.05 |
| I1010 | **431-4256** | 256.00 | 248.32 |
| I1010-KIT + Carry Case | **491-7261** | 262.00 | 254.14 |
| | | | Price Each |
| **Standard Calibration Charge** | | S C4 | 34.10 |
| **UKAS Calibration Charge** | | N C4 | 58.75 |

### AC Current Clamp

**i400s**

FLUKE



- CAT IV 600 V / CAT III 1000 V safety rating.
- Soft non-slippery overmold handle.
- Two ranges: 40 A & 400 A, 10 & 1 mV/Amp output.
- Max. conductor ∅ 32 mm.

**FLUKE Compatibility:**

43B, 120 Series, 190 Series, 430 Series (No adaptor needed)
To work with the models shown below a dual banana plug 4mm male to female BNC adaptor is required
27, 77 IV, 83V, 87V, 88V, 114, 115, 117, 175, 177, 179, 187, 189, 741B, 743B, 744, 787, 789, 1577, 1587, 8845A, 8846A

| | |
|---|---|
| Nominal Current Range(s) | 40A, 400A |
| Continuous AC Current Range | 0.5 - 40A, 5 - 400A |
| Highest Current | 1000A |
| Lowest Measurable Current | 0.5A |
| Basic Accuracy (48-65Hz) | 2% +0.15A |
| Useable Frequency | 45Hz - 3kHz |
| Max. Working Voltage | 1000V |
| Max. Conductor Dia. | 32mm |
| Output Level(s) | 10mV/A, 1mV/A |
| Output Cable (m) | 2.5m |
| BNC Adaptor | ✓ |
| Safety | CAT IV 600V, CAT III 1000V |

489308.503195

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| I400S | **142-2695** | 155.00 | 150.35 | 145.84 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

### AC Current Clamp

**i1000s**

FLUKE



A clamp-on ac current probe designed to expand oscilloscope applications in industrial and power environments.

- Ideal for measuring distorted current waveforms and harmonics.
- Allows accurate measurement of currents from 100 mA to 1000 A rms, 5 Hz to 100 kHz without breaking into the circuit
- A passive filter eliminates noise and ring on rapidly rising di/dt waveform, ensuring accurate screen displays
- Connects directly to an oscilloscope through a reinforced coaxial cable and an insulated BNC connector

**FLUKE Compatibility:**
43B, 120 Series, 190 Series, 430 Series (No adaptor needed)
To work with the models shown below a dual banana plug 4mm male to female BNC adaptor is required
27, 77 IV, 83V, 87V, 88V, 114, 115, 117, 175, 177, 179, 187, 189, 741B, 743B, 744, 787, 789, 1577, 1587, 8845A, 8846A

| | |
|---|---|
| Nominal Current Range(s) | 10A, 100A, 1000A |
| Continuous AC Current Range | 0.1 - 10A, 0.1 - 100A, 1 - 1000A |
| Highest Current | 2000A |
| Lowest Measurable Current | 0.1A |
| Basic Accuracy (48-65Hz) | 1% +1A |
| Useable Frequency | 5Hz - 100kHz |
| Max. Working Voltage | 600V AC |
| Max. Conductor Dia. | 54mm |
| Output Level(s) | 100mV/A, 10mV/A, 1mV/A |
| Output Cable (m) | 1.6m |
| BNC Adaptor | ✓ |
| Safety | CAT III 600V |

489309.503194

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| I1000S | **142-2696** | 363.00 | 352.11 | 341.55 |
| **Standard Calibration Charge** | | SC8 | 45.13 | |
| **UKAS Calibration Charge** | | NC8 | 73.70 | |

## Current Probe
**i310s**



The i310s current probe is based on Hall Effect technology for use in measurement of both DC and AC current. The i310s may be used in conjunction with oscilloscopes and other suitable recording instruments for accurate non-intrusive current measurement.

- i310s connects to oscilloscopes via safety BNC, to multimeters via BNC-4mm adaptor supplied
- Dual range 30/300 A
- Wide bandwidth - 20kHz (-3dB)
- Output sensitivity of 10/1 mV / A
- 10 kΩ Load Impedance
- Accuracy of +/- 1% of reading ±50/300 mA
- Maximum jaw conductor 19mm (0.75 in)
- Battery life - 30 hours with low battery indicator
- Superior noise rejection for power electronics applications
- Typical applications include inverters, switch mode power supplies, industrial controllers requiring current measurement and/or waveform analysis, automobile diagnostics.

**Safety Standards**
- BS EN 61010-1: 2001, BS EN 61010-2-032: 2002, BS EN 61010-031: 2002
- 300 $V_{RMS}$, Category III, Pollution Degree 2
- Use of the probe on uninsulated conductors is limited to 300 V $AC_{RMS}$ or DC and frequencies below 1kHz

**EMC Standards**
- BS EN 61326 : 1998 +A1, A2, & A3

488176.502130

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| I310S | **144-1502** | 191.00 | 185.27 | 179.71 |
| **Standard Calibration Charge** | | SC8 | 45.13 | |
| **UKAS Calibration Charge** | | NC8 | 73.70 | |

## AC Scope Current Probe 50MHz
**i50s**



Designed for use with all types of oscilloscopes, the i50s current probe offers an ergonomic, robust and high performing solution for the measurement of DC and AC currents up to 50 MHz. With a permanent nominal current of 30A RMS and a measuring capacity of 50A for 10s. The i50s considerably widens the possibilities of accurate measurement of commutation currents

- Connects to oscilloscopes via safety BNC, to multimeters via BNC-4mm adaptor supplied
- Dual range 3/50 A
- Exceptional immunity to high common mode voltages (dv/dt = 5kV/_s,) amplitude = 1,5kV, error <0,05 % of IPN
- Auto Zero Function and Auto Degauss functions for optimal performance
- 30A continuous, 50A for 10 seconds
- Wide Bandwidth - 50MHz (-3dB)
- Output Sensitivity of 1 V/A (3A range) 100 mV/A (50A range)
- Rise Time < 7 ns
- Rejection Rate of fast dv/dt (5kV/μs) < 15 mA t
- External magnetic field rejection rate AC and DC 60 dB
- Typical Accuracy of +/- 0.5% of range
- Maximum jaw conductor 5mm
- Typical applications include inverters, switch mode power supplies, industrial controllers requiring current measurement and/or waveform analysis, automobile diagnostics

**Safety Standards**
- BS EN 61010-1: 2001, BS EN 61010-2-032: 2002, BS EN 61010-031: 2002- 300 $V_{RMS}$, Category I, Pollution Degree 1

**EMC Standards**
- BS EN 61326 : 1998 +A1, A2, & A3

488178

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Current Probe | I50S | **144-1503** | 1,858.00 | 1,802.26 | 1,748.19 |
| Power Supply | PSI50S | **144-1505** | 441.00 | 427.77 | 414.94 |

## Flex AC Current Probes
**i6000s Series**



The i6000sflex is an AC current probe utilising the Rogowski principle. It can be used to measure currents up to 6000A when used in conjunction with oscilloscopes, multimeters, recorders or data loggers. The flexible and lightweight measuring head allows quick and easy installation in hard to reach areas. Two versions are available to accommodate conductor diameters up to 170mm or 275mm.

- Connects to scopes via BNC connector and DMM's via adaptor (supplied)
- Measures multiple ranges: 60A, 600A or 6000A AC
- Output sensitivity of 50mV, 5mV, 0.5mV per A
- 100kΩ load impedance
- Permanent data logging (via external power supply)
- Accuracy of ± 1% of range
- Low battery indication
- Available in 24" or 36" head cable length

| | |
|---|---|
| Phase Error | ± 1° (45 to 65 Hz), ± 10° (at 5 kHz) |
| Linearity | ± 0.2% of reading from 10% to 100% of range |
| Position Sensitivity | ± 2% of range, cable >25mm from coupling |
| External Field | ± 1% with cable > 200mm from head |
| Noise Level | 0.1mV rms (0.03% of range) |
| Operating Temperature | -20°C to 85°C |
| Gain Variation | ± 0.08%/°C |
| Common Mode | Voltage between the Output and Earth must not exceed 30V |
| Power Supply | 2 x AA MN1500 (1.5V) LR6 batteries |
| External Power | Battery eliminator, via 2.1mm connector, 3V DC |
| Socket Type | A16M500 |
| Safety | BS EN 61010-1: 1993, 600V CAT III Pol. Deg 2EMC EN61326: 1998 |
| Enclosure | IP5X, Flame retardant UL94 -V0 rated |
| Output Connections | Hypotronics connector type D01EEB306FST |
| Weight | 0.19 kg |

488181

| Head Cable Length | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| 24" | I6000S FLEX-24 | **144-1506** | 336.00 | 325.92 | 316.14 |
| 36" | I6000S FLEX-36 | **144-1507** | 385.00 | 373.45 | 362.25 |

## Coming soon

Register your interest for items that are 'Coming Soon' at **www.farnell.co.uk** and we'll email you to let you know that they're in stock.

## Current Probes - continued

### AC Current Clamp

**Fluke i2000 flex**

FLUKE



W=69 H=116 D=30mm. Weight 180g

LATEST PRICING

An AC current probe utilizing the Rogowski principle. It can be used to measure currents up to 2000A when used in conjunction with multimeters, recorders or data loggers. The flexible and lightweight measuring head allows quick and easy installation in hard to reach areas.

- Three ranges: 20A, 200 A & 2000 A, 1 mV, 10 mV & 100 mV/A output
- Ideal for current measurement on thick and hard to reach conductors without breaking the circuit
- 0.5m cable to shrouded banana plugs

| | Ranges | Accuracy |
|---|---|---|
| **AC Current** | 20A, 200A, 2000A | 1.0% |
| **General Specifications** | | |
| Output Sensitivity | 100mV, 10mV, 1mV per A | |
| Frequency Range | 10Hz to 20kHz | |
| Max. Current | 2500A AC RMS | |
| Max. Working Voltage | 600V AC RMS | |
| Max. Conductor Diameter | 178 mm | |
| Cable Length | 0.5m | |
| Safety | CAT III 600V | |
| Battery life | 200 hours typical from 2x AA batteries | |

Prices where indicated by a ⬍⬆ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

460561.460559

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Current Clamp | I2000 FLEX | **132-7553** | 170.00 | 164.90 | 159.95 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | | S C5 | 39.11 | |
| **UKAS Calibration Charge** | | | N C5 | 61.97 | |

37

### AC Current Clamp

**Fluke i3000 flex Series**

FLUKE



W=69 H=116 D=30mm. Weight 180g

LATEST PRICING

AC current probes utilizing the Rogowski principle. They can be used to measure currents up to 3000A when used in conjunction with multimeters, recorders or data loggers. The flexible and lightweight measuring head is available in two sizes and allows quick and easy installation in hard to reach areas.

- Three ranges: 30A, 300 A & 3000 A, 1 mV, 10 mV & 100 mV/A output
- Ideal for current measurement on thick and hard to reach conductors without breaking the circuit
- 0.5m cable to shrouded banana plugs

| | Ranges | Accuracy |
|---|---|---|
| **AC Current** | 30A, 300A, 3000A | 1.0% |
| **General Specifications** | | |
| Output Sensitivity | 100mV, 10mV, 1mV per A | |
| Frequency Range | 10Hz to 50kHz | |
| Max. Current | 3500A AC RMS | |
| Max. Working Voltage | 600V AC RMS | |
| Max. Conductor Diameter | 178 mm (flex-24) / 275mm (flex-36) | |
| Cable Length | 0.5m | |
| Safety | CAT III 600V | |
| Battery life | 400 hours typical from 2x AA batteries | |

Prices where indicated by a ⬍⬆ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

477829

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| 178mm Current Clamp | I3000 FLEX-24 | **132-7554** | 262.00 | 254.14 | 246.52 |
| 275mm Current Clamp | I3000 FLEX-36 | **132-7555** | 312.00 | 302.64 | 293.56 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | | S C5 | 39.11 | |
| **UKAS Calibration Charge** | | | N C5 | 61.97 | |

## Troubleshooting tips

WWW

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

## Current Clamp Meters

### Low Current AC/DC Clamp Meter

AMPROBE

New



The compact size of these two meters make them ideal for taking general measurements on small conductors. Their excellent accuracy and resolution offer exceptional performance.

- Measures AC and DC current into the low milliamp range up to 40A
- Auto Zero DC for correct measurement every time
- High 1 mA current resolution for quick circuit comparison on sensor and control circuits B Auto power off function
- Jaw opening 20 mm
- Safety acc. EN 61010, CAT III/300 V

525717

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| LH41A | **167-1220** | 249.00 | 241.53 |

### 200A Mini Clamp Meter

**CM51**

MARTINDALE ELECTRIC



The Martindale CM51 is a low cost 200A mini clamp meter with autoranging, display hold and auto power down. This small current clamp will fit into your shirt pocket for maximum convenience. The small jaws make it easy to use and the autoranging 200A AC capability accurately covers the majority of applications.

- 200A range
- Compact size 150 x 52 x 24mm
- 24mm jaw capacity

| | |
|---|---|
| Display | 3½ digit LCD display with annunciators |
| AC A | 10mA to 200A, autoranging (2 ranges) (40Hz to 500Hz) |
| Max conductor | 27mm∅ |
| Overvoltage | Category II, 300V |
| Dimensions | 150 x 52 x 24mm |
| Weight | 110g |
| Includes | Battery, carry case and user manual |

339549

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| MARCM51 | **505-7930** | 60.48 | 56.38 | 52.28 |
| | | | **Price Each** | |
| **Standard Calibration** | | S C4 | 34.10 | |
| **UKAS Calibration** | | N C4 | 58.75 | |

### Digital Clamp Meters







New

| Model | 3340 | 3341 | 3343 |
|---|---|---|---|
| Digital Display Counts | 2000 | 4000 | 4000 |
| 25mm Backlit Display | ● | ● | ● |
| Overload Protection | ● | ● | ● |
| Continuity Buzzer | ● | ● | ● |
| Diode Check | ● | ● | ● |
| Data Hold | ● | ● | ● |
| DCA Zero | | | ● |
| MAX Hold | ● | | |
| Auto Power Off | ● | ● | ● |
| Low Battery Indication | ● | ● | ● |
| AC/DC Current | | | ● |
| Safety Category | CATIII 600V | CATIII 600V | CATIII 600V |

| Function | Max. Range 3340 | 3341 | 3343 | Basic Accuracy | Best Resolution |
|---|---|---|---|---|---|
| DC Current | | | 1000A | ±(2.5%+5d) | 1mA |
| AC Current | 1000A | 1000A | 1000A | ±(3%+4d) | 10mA |
| DC Voltage | 600V | 600V | 600V | ±(0.8%+2d) | 0.1mV |
| AC Voltage | 600V | 600V | 600V | ±(1.0%+4d) | 0.1mV |
| Resistance | 20MΩ | 40MΩ | 40MΩ | ±(1%+4d) | 0.1Ω |
| Capacitance | | 100nF | 100nF | ±(3%+5d) | 10pF |
| Frequency | | 10MHz | 100kHz | ±(1.2%+3d) | 0.001Hz |
| Duty Cycle | | 99.9% | 99.9% | ±(1.2%+3d) | 0.1% |
| Temperature | | 1000°C | 1000°C | ±(3%+3d) | 0.1°C |

**Physical Specifications**

| | |
|---|---|
| Power | 9V dc PP3 (2x 1.5V AAA for 3340) |
| Dimensions (WxHxD) | 80 x 229 x 49mm |
| Weight | 303g |

**Includes:** batteries and two test leads. K-type bead temperature probe (3341 and 3343 only).

480636.465222

| Model | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| 3340 | **143-0680** | 26.40 | 21.75 | 20.09 |
| 3341 | **143-0681** | 30.62 | 25.55 | 23.59 |
| 3343 | **143-0682** | 47.51 | 41.74 | 38.52 |
| **Standard Calibration Charge** | | S C4 | Price Each 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## 400A Current Clamp Meter

New



A general purpose, compact digital current clamp meter with auto ranging for ease of use. Ideal for electrical applications.

- 3999 Count LCD
- Full icon display
- Auto ranging
- AC current measurement
- AC/DC voltage, resistance, frequency and duty cycle measurement
- Data hold
- 23mm jaw size
- Low battery warning
- Supplied with test leads, battery, carry case and user manual

| | Range | Accuracy |
|---|---|---|
| DC Voltage | | |
| AC Voltage | | |
| AC Current | | |
| Resistance | | |
| Frequency | | |
| Input Impedance | 10MΩ | |
| Dimensions | 53x210x27mm (WxHxD) | |

510041.509498

| Description | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| Clamp Meter | **156-3722** | 35.66 | 33.36 |

## True RMS Digital Clamp Meters

True RMS

New





- True RMS measurements
- Large 4000 count backlit LCD display
- 41 segment bargraph
- Auto power off and low battery indication
- 30mm Clamp
- Data Hold

| Model | 3345 | 3347 |
|---|---|---|
| True RMS Measurements | ● | ● |
| Digital Display Counts | 4000 | 4000 |
| 25mm Backlit Display | ● | ● |
| Overload Protection | ● | ● |
| Continuity Buzzer | ● | ● |
| Diode Check | ● | ● |
| Data Hold | ● | ● |
| DCA Zero | | ● |
| MAX Hold | ● | ● |
| AC/DC Current | AC Only | ● |
| Safety Category | CATIII 600V | CATIII 600V |

| Function | Max. Range 3345 | 3347 | Basic Accuracy | Best Resolution |
|---|---|---|---|---|
| DC Current | | 1000A | ±(3.0%+4d) | 10mA |
| AC Current | 1000A | 1000A | ±(2.5%+5d) | 10mA |
| DC Voltage | 600V | 600V | ±(1.0%+4d) | 0.1mV |
| AC Voltage | 600V | 600V | ±(0.8%+2d) | 0.1mV |
| Resistance | 40MΩ | 40MΩ | ±(1%+4d) | 0.1Ω |
| Capacitance | 40mF | 40mF | ±(3%+5d) | 10pF |
| Frequency | 10MHz | 10MHz | ±(1.2%+3d) | 0.001Hz |
| Temperature | 1000°C | 1000°C | ±(3%+3d) | 0.1°C |

**Physical Specifications**

| | |
|---|---|
| Power | 1x 9V PP3 |
| Dimensions (WxHxD) | 80 x 229 x 49mm |
| Weight | 303g |

**Includes:** 9V battery, two test leads, K-type bead temperature probe and carry case

480637.465282

| Model | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| 3340 | **143-0684** | 41.18 | 35.90 | 33.75 |
| 3341 | **143-0685** | 51.74 | 47.34 | 44.51 |
| **Standard Calibration Charge** | | S C4 | Price Each 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## 400A Digital AC/DC Clamp Multimeter

AMPROBE

New



- AC/DC Current up to 400A
- AC/DC Voltage up to 600V
- Resistance measurement
- Continuity test
- Data Hold
- MAX/MIN recording
- Relative measurement
- Backlight
- Analog bargraph
- Auto or Manual range selection
- "Third hand" - test probe holder
- Jaw opening 30 mm
- Safety acc. EN 61010, CAT III/600 V

525709

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| ACDC-400 | **167-1214** | 125.00 | 121.25 |

## Mini Digital Clamp Meter

New



- Large 4000 count LCD display
- 1mA, high resolution
- Wide measuring range from small to large currents
- Diode check and Continuity buzzer
- 12.5mm jaw capacity
- Data Hold and Max hold functions
- Auto power off
- Safety Category: CATIII 600V

**Includes:** 9V battery, test leads and carry case

| Function | Range | Basic Accuracy | Best Resolution |
|---|---|---|---|
| DC Current | 4A, 80A | ±(2.5%+4d) | 1mA |
| AC Current | 4A, 80A | ±(2.5%+5d) | 1mA |
| DC Voltage | 400mV - 600V | ±(1.5%+3d) | 0.1mV |
| AC Voltage | 400mV - 600V | ±(2.0%+4d) | 0.1mV |
| Resistance | 400Ω - 40MΩ | ±(1.5%+2d) | 0.1Ω |
| Frequency | 5Hz - 10MHz | ±(1.2%+3d) | 0.001Hz |
| Duty Cycle | 5% - 99.9% | ±(1.2%+3d) | 0.1% |

**Physical Specifications**

| | |
|---|---|
| Power | 1x 9V PP3 |
| Dimensions (WxHxD) | 70 x 210 x 37mm |
| Weight | 200g |

480638.465569

| Model | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| 3340 | **143-0687** | 42.18 | 38.27 | 35.32 |
| **Standard Calibration Charge** | | S C4 | Price Each 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

Over 480,000 products online QGO

## Current Clamp Meters - continued

### Clamp Meter with Temperature

**72-7222**



Perfect for general purpose applications including HVAC and appliance repair, this compact clamp meter measures AC/DC voltage, AC current, resistance and temperature.

- 1999 count autoranging display
- 10MΩ input impedance
- Diode test and Continuity buzzer
- Max hold and Data hold
- Sleep mode and Low battery indicator
- Powered from 2x AAA batteries (included)
- Supplied with zipper case, test leads, owners manual

| | Range | Accuracy |
|---|---|---|
| DC Voltage | 200mV, 2V, 20V, 200V, 600V | ±(0.8% + 1d) |
| AC Voltage | 2V, 20V, 200V, 600V | ±(1.2% + 5d) |
| AC Current | 2A, 20A, 200A, 400A | ±(1.5% + 5d) |
| Resistance | 200R, 2kR, 20kR, 200kR, 2MR, 20MR | ±(1.0% + 2d) |
| Temperature | -40°C to 1000°C | ±(1.0% + 3d) |

W=76 H=210 D=30mm.
Weight 220g

448299.460895

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | 10+ |
|---|---|---|---|---|---|
| 72-7222 | **128-3639** | 16.95 | 15.10 | 14.32 | 13.18 |
| | | | **Price Each** | | |
| **Standard Calibration Charge** | | S C4 | 34.10 | | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | | |

### Current Clamp Meter

**72-6130**



- Autorange and manual
- AC/DC voltage and AC current measurement
- Resistance and Frequency measurement
- Large 3.75 digit, 3999 count LCD display with bar-graph
- Peak/data hold
- MAX/MIN mode
- Zero adjustment
- 46mm jaw opening
- Diode test
- Audible continuity test
- Auto power off
- Meets IEC 1010 600V CAT III
- Supplied with 9V PP3 battery, test leads, carry case and owners manual
- Dimensions (WxHxD): 67x229x38mm
- Weight 0.45kg

| | Range | Max Resolution | Basic Accuracy |
|---|---|---|---|
| AC Current | 400A, 1000A | 0.1A | ±(2% + 10 digits) |
| DC Voltage | 400mV, 4V, 40V, 400V, 600V | 0.1mV | ±(0.75% + 2 digits) |
| AC Voltage | 4V, 40V, 400V, 600V | 1mV | ±(1.2% + 5 digits) |
| Resistance | 400Ω, 4KΩ, 40KΩ, 400KΩ, 4MΩ, 40MΩ | 0.1Ω | ±(1% + 3 digits) |
| Frequency | 100Hz, 1KHz, 10KHz, 100KHz, 800KHz, | 0.01Hz | ±(0.1% + 2 digits) |

337146

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 72-6130. | **490-8314** | 69.96 | 65.79 |
| | | | **Price Each** |
| **Standard Calibration Charge** | | S C4 | 34.10 |
| **UKAS Calibration Charge** | | N C4 | 58.75 |

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### Clamp Meters with Frequency

**72-7224 and 72-7226**



Perfect for general purpose applications, this compact clamp meter measures AC/DC voltage, AC/DC current, resistance, frequency and duty cycle.

- 3999 count autoranging display
- 10MΩ input impedance
- 25mm clamp diameter
- Relative mode
- Diode test and Continuity buzzer
- Data hold
- Sleep mode and Low battery indicator
- Powered from 1x 9V battery (included)
- Supplied with zipper case, test leads, owners manual

**Additional Features: Model 72-7226**

- True RMS AC measurements

W=90 H=260 D=45mm. Weight 530g

| | Range | Accuracy |
|---|---|---|
| DC Voltage | 400mV, 4V, 40V, 400V, 600V | ±(0.8% + 1d) |
| AC Voltage | 4V, 40V, 400V, 600V | ±(1.0% + 5d) |
| DC Current | 40A, 400A | ±(2.0% + 3d) |
| AC Current | 40A, 400A | ±(2.5% + 5d) |
| Resistance | 400R, 4kR, 40kR, 400kR, 4MR, 40MR | ±(1.0% + 2d) |
| Frequency | 10Hz to 100MHz | ±(0.1% + 3d) |
| Duty Cycle | 0.1% to 99.9% | |

448301.460896

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | 10+ |
|---|---|---|---|---|---|
| 72-7224 | **128-3640** | 27.49 | 24.88 | 23.59 | 21.73 |
| 72-7226 | **128-3641** | 40.75 | 35.55 | 33.71 | 31.03 |
| | | | **Price Each** | | |
| **Standard Calibration Charge** | | S C4 | 34.10 | | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | | |

### Mini Current Clamp Meter

**72-6614**



A compact multi-function clamp meter featuring AC/DC voltage and current, temperature, capacitance, resistance and frequency measurement. Clear controls and a large LCD display provide an ideal solution for a range of measurement applications.

- Auto/manual ranging
- AC/DC voltage and current measurement
- Temperature, Capacitance, resistance and frequency measurement
- High accuracy and resolution
- Large 3.75 digit, 3999 count LCD display
- Min/Max and relative function
- Data hold
- 23mm jaw capacity
- Audible continuity tester
- Meets IEC1010 CAT II 600V
- Supplied with 2x AA batteries, K-type thermocouple, test leads, carry case and user instructions

| | Range | Max Resolution | Basic Accuracy |
|---|---|---|---|
| AC/DC Current | 40A, 200A | 10mA | ±(1.5% ± 2 digits) |
| DC Voltage | 600V | 0.1mV | ±(1.5% ± 3 digits) |
| AC Voltage | 600V | 1mV | ±(1.5% ± 5 digits) |
| Resistance | 40Ω to 40MΩ | 0.1Ω | ±(1.5% ± 2 digits) |
| Capacitance | 4nF to 4μF | 1pF | ±(3% ± 2 digits) |
| Temperature | -40°F to 1800F | 0.1°F | ±(0.5% ± 4°F) |
| Frequency | 100Hz to 100KHz | 0.01Hz | ±(0.5% ± 2 digits) |

337214

| Mftrs List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 72-6614 | **490-8302** | 96.90 | 88.74 |
| | | | **Price Each** |
| **Standard Calibration** | | S C4 | 34.10 |
| **UKAS Calibration** | | N C4 | 58.75 |

### Mini True RMS AC/DC Clamp Meter

**72-6185**



- High accuracy and resolution
- Large 3¾ digit, 3999 count LCD with bargraph
- Frequency
- Max/Min, auto zero
- Display hold
- Overload protection
- **CE** marked
- Includes two 1.5V 'AA' batteries, carrying case and owners manual

| | | | |
|---|---|---|---|
| AC current range | 4A,400A | Jaw opening | 23mm |
| DC current range | 4A-400A | Dimensions | 63.5 (L) x 184.15 (W) x 38.1 (H) |
| Frequency | 40Hz to 1KHz | | |

231087

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| 72-6185 | **342-1545** | 101.95 | 93.84 | 91.96 |
| | | | Price Each | |
| **Standard Calibration** | | S C4 | 34.10 | |
| **UKAS Calibration** | | N C4 | 58.75 | |

## Mini Clamp Meters

AMPROBE

**AD40B/AC40B**



AD40B

**AD40B AC Current Clamp Meter**

- 3¾digit, 4000 count LCD with bargraph
- AC current measurement up to 400A
- Data hold
- Auto power off
- 25.4mm maximum conductor size
- 300hrs battery life from 2x AAA batteries
- Low battery indication
- IEC1010 CAT III 600V rated
- Supplied with carry case

**AC40B AC Clamp Meter - Additional Features**

- AC/DC Voltage measurements
- Resistance measurement
- Audible continuity test
- Supplied with test leads

| | AC40B |
|---|---|
| Range | 40A, 400A |
| Resolution | 0.01A |
| Accuracy | ±(2%+10dgts) |
| Range | 400V, 600V |
| Resolution | 0.1V |
| Accuracy | ±(1.5%+10dgts) |
| **DC Voltage** | |
| Range | 400V, 600V |
| Resolution | 0.1V |
| Accuracy | ±(1.2%+5dgts) |
| **Resistance** | |
| Range | 400Ω |
| Resolution | 0.1Ω |
| Accuracy | ±(1%+5dgts) |
| **Dimensions (WxHxD)** | 64x190x36mm. Weight 280g |

489616.503513

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Digital TRMS Clamp Meter | AC40B | C4 **146-6464** | 73.00 | 70.81 | 68.69 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | S C4 | | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | | 58.75 | |

## AC/DC TRMS 600A Clamp Meter

True RMS AMPROBE



- Measures non-linear load current
- True RMS reading
- Autoranging for frequency measurement
- Data Hold button, holds the display reading for all functions and ranges
- Measures freqency through jaws or test leads
- Low battery indicator
- DC current (Zero adjustment button)
- Peak Hold, converts and displays the peak value for AC volts and amps readings
- Jaw opening 40 mm
- Carrying case included
- Safety acc. EN 61010, CAT III/600 V

525708

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ |
|---|---|---|---|
| AC68C | **167-1213** | 150.00 | 145.50 |

## Automatic 600A AC Clamp Multimeter

AMPROBE



Automatic AC clamp meter with two unique features: AutoTect™ and automatic backlight. The AutoTect feature senses what type of measurement is being made across the test leads. The automatic bright blue backlight has a sensor that recognizes when the ambient light becomes dim and turns itself on.

- AutoTect™ Function - automatically selects AC volts, DC volts or resistance
- Automatic bright blue backlight
- Easy one-button control
- AC current to 600 A
- AC volts to 750 V
- DC volts to 1000 V
- Resistance and Continuity Beeper
- Data Hold
- Jaw opening 32 mm
- Safety acc. EN 61010, CAT III/600 V, CAT II/1000 V

525711

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| AC71B | **167-1216** | 77.00 | 74.69 |

## 600A AC Clamp Meter, Multimeter and Thermometer

AMPROBE

**Three tools in one**



Custom designed to make HVAC/R Service, Electrical, and Industrial maintenance tasks faster and easier.

- 600A AC Current
- Digital thermometer 400 °C, Type K probe included
- AC/DC 750 V/1000 V
- 40 MΩ Resistance
- Low DC Amps for flame rod detector testing
- Capacitance to 4000 µF for motor run/start testing
- Continuity beeper
- 4000-count large digit display
- Auto power off
- Full overload protection
- Jaw opening 35 mm
- Safety acc. EN 61010, CAT III/600 V, CAT II/1000 V

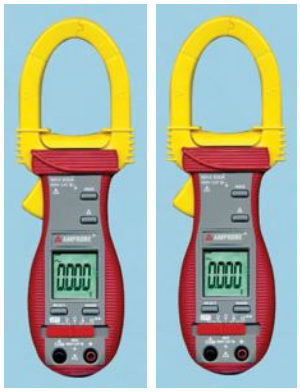
525712

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| AC75B | **167-1217** | 93.00 | 90.21 |

## 1000A Clamp-On Multimeters

True RMS AMPROBE

**ACD-6 PRO and ACD-6 TRMS-PRO**



- Simple to operate and well-suited for most basic applications
- True RMS (TRMS) **(ACD-6 TRMS Pro only)**
- Auto and manual ranging
- Relative zero mode
- Auto power off
- Data hold
- Carrying case included
- Large, easy to read LCD display
- Diode Test
- Audible continuity
- Accommodates conductors up to 45mm in diameter
- Safety CAT III 600V

Supplied with test leads, carrying case, batteries and user manual

| | Ranges | Accuracy |
|---|---|---|
| AC Voltage | 4V, 40V, 400V, 600V | ±(2%+5) |
| DC Voltage | 400mV, 4, 40, 400, 600V | ±(1.7%+3) |
| AC Current | 400A, 1000A | ±(1.5%+5) |
| DC Current | N/A | |
| Resitance | 400Ω, 4, 40, 400kΩ, 4, 10MΩ | ±(1%+4) |

488732.502917

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| ACD-6, PRO | **146-1574** | 59.00 | 57.23 | 55.51 |
| ACD-6 TRMS PRO | **146-1575** | 59.00 | 57.23 | 55.51 |
| | | | Price Each | |
| **Standard Calibration** | | S C8 | 45.13 | |
| **UKAS Calibration** | | N C8 | 73.70 | |

## Current Clamp Meters - continued

### Clamp-On Multimeters
**ACD-10 PLUS and ACD-10 TRMS PLUS**




The ACD-10 PLUS meters offer thinner jaws over standard clamp meters allowing access to tight measurement areas but still accommodating conductors up to 25mm. Both meters measure capacitance and frequency. Frequency is measured by either jaws or test leads.

- True RMS (TRMS) measurement **(ACD-10 TRMS PLUS only)**
- AC and DC Voltage to 600V
- AC Current to 600A
- Resistance to 40MΩ
- Continuity buzzer
- **Capacitance** and **frequency** measurement
- Hold and maximum reading functions
- Auto ranging
- In rush current
- Safety CAT III 600V

| | Ranges |
|---|---|
| AC Voltage | 4, 40, 400, 600V |
| DC Voltage | 400mV, 4, 40, 400, 600V |
| AC Current | 40A, 400A, 600A |
| DC Current | N/A |
| Resitance | 400Ω, 4, 40, 400kΩ, 4, 40MΩ |
| Capacitance | 500nF, 5, 50, 500, 3000µF |
| Frequency | 40 - 400Hz with jaw, 10Hz - 100kHz with test leads |

488734.502919

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| ACD-10 PLUS | **146-1579** | 67.00 | 64.99 | 63.04 |
| ACD-10 TRMS PLUS | **146-1580** | 67.00 | 64.99 | 63.04 |
| | | | Price Each | |
| **Standard Calibration** | | S C8 | 45.13 | |
| **UKAS Calibration** | | N C8 | 73.70 | |

### Clamp-On Multimeters
**ACD-14 PLUS and ACD-14 TRMS PLUS**




- 3¼ digits, 4000 counts, dual LCD displays
- True RMS (TRMS) measurement **(ACD-14 TRMS PLUS only)**
- Dual Displays - Permits simultaneous reading of Amperage & Voltage
- µA measurement for testing Flame Sensors
- Capacitance to 3000 µF
- Temperature with Type-K Thermocouple
- AC and DC Voltage to 600V
- AC Current to 400A
- Resistance to 40MΩ
- Continuity buzzer
- Frequency measurement
- Diode test
- Hold and Maximum reading functions
- In rush current

Supplied with test leads, carrying case, bead type K thermocouple with banana plug, user manual

- Accommodates conductors up to 26mm (1") in diameter
- Auto ranging
- Auto power off and low battery indication
- Rubber over-moulded case
- Overload protected
- Powered by 2 x 3V button cells (CR2032)
- Safety: CE, cULus, CAT III 600V

| | Ranges | Accuracy |
|---|---|---|
| AC Voltage | 4V, 40V, 400V, 600V | ±(1.5%+5) |
| DC Voltage | 400mV, 4, 40, 400, 600V | ±(0.3%+4) |
| AC Current | 40A, 400A, 600A | ±(1.5%+8) |
| DC Current | N/A | |
| Resitance | 400Ω, 4, 40, 400kΩ, 4, 40MΩ | ±(1%+4) |
| Capacitance | 500nF, 5, 50, 500, 3000µF | ±(3.5%+6) |
| Frequency | 10Hz to 100kHz | ±(0.5%+4) |
| Temperature | -20°C to 537°C | ±(3%+3°C) |

488735.502920

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| ACD-14 PLUS | **146-1581** | 70.00 | 67.90 | 65.86 |
| ACD-14 TRMS PLUS | **146-1582** | 100.00 | 97.00 | 94.09 |
| | | | Price Each | |
| **Standard Calibration** | | S C8 | 45.13 | |
| **UKAS Calibration** | | N C8 | 73.70 | |

### Clamp-On Multimeters
**ACDC-100 and ACDC-100 TRMS**




Supplied with test leads, carrying case, batteries and user manual

- True RMS (TRMS) and display backlight **(ACDC-100 TRMS only)**
- **Resitance** and **Capacitance** ranges
- Auto and manual ranging
- Relative zero mode
- Auto power off
- Data hold
- MAX capture function for in rush current measurements (30ms response)
- Large, easy to read LCD display
- Diode test
- Audible continuity
- Accommodates conductors up to 50mm in diameter
- 'Third hand' - test probe holder
- Rubber over-moulded case with built-in probes storage
- Powered by 2 x AAA batteries
- Safety CAT III 600V

| | Ranges | Accuracy * (TRMS Version) |
|---|---|---|
| AC Voltage | 400mV, 4, 40, 400, 600V | ±(1.5%+4) |
| DC Voltage | 400mV, 4, 40, 400, 600V | ±(0.5%+3) |
| AC Current | 400A, 800A | ±(1.5%+5) |
| DC Current | 400A, 1000A | ±(1.5%+4) |
| Resitance | 400Ω, 4, 40, 400kΩ, 4, 10MΩ | ±(0.6%+4) |
| Capacitance | 500nF, 5, 50, 500, 3000µF | ±(3.5%+6) |

488733.502918

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| ACDC 100 | **146-1577** | 115.00 | 111.55 | 108.20 |
| ACDC 100 TRMS | **146-1578** | 116.00 | 112.52 | 109.14 |
| | | | Price Each | |
| **Standard Calibration** | | S C8 | 45.13 | |
| **UKAS Calibration** | | N C8 | 73.70 | |

### 1000A Data-Logging Clamp-On Multimeters
**ACD-16 TRMS-PRO**



These clamp-on multimeters provide a full range of measurements, enhanced with data logging capabilities.

| | Ranges |
|---|---|
| AC Voltage | 600V |
| DC Voltage | 600V |
| AC Current | 40A, 400A, 1000A |
| DC Current | N/A |
| Resitance | 999.9Ω |
| Frequency | 5Hz to 500Hz |
| Temperature | -50°C to 30°C |

- Measurements: AC/DC Voltage up to 600V, AC Current up to 1000A, **resistance, frequency** and **temperature**
- True RMS (TRMS) and backlight screen
- Data Logging 5400 points
- Audible continuity
- Auto power off
- Automatic polarity
- Data hold
- Max. conductor size of 45mm
- 'Third hand' - test probe holder
- Safety CAT III 600V

488731.502906

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| ACD-16 TRMS-PRO | **146-1573** | 109.00 | 105.73 | 102.56 |
| | | | Price Each | |
| **Standard Calibration** | | S C8 | 45.13 | |
| **UKAS Calibration** | | N C8 | 73.70 | |

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**www.global-legislation.com**

## 1000A Current Clamp Meter

New



A digital current clamp meter with extensive multimeter features and functions.

- 4000 count LCD
- Full icon display with backlight
- Analogue bargraph
- Auto / manual range selection
- AC/DC current measurement
- AC/DC voltage, resistance, frequency measurement
- TRMS AC voltage measurement
- Peak/Min/Max modes and data hold
- Continuity buzzer and diode test
- 56mm jaw size
- Sleep mode and low battery warning
- Supplied with test leads, 9V battery, tool box and user manual

| | Range | Accuracy |
|---|---|---|
| DC Voltage | | |
| AC Voltage | | |
| DC Current | | |
| AC Current | | |
| Resistance | | |
| Frequency | | |
| Input Impedance | 10MΩ | |
| Dimensions | 105x286x45mm (WxHxD) | |

510040.509496

| | | Price Each | |
|---|---|---|---|
| Description | Order Code | 1+ | 5+ |
| Clamp Meter | **156-3721** | 67.34 | 63.00 |

## Digital 1000A AC/DC Clamp Multimeter

True RMS AMPROBE

New



- TRMS Measurement
- AC/DC Voltage up to 1000V, AC/DC, Current up to 1000A, Resistance, Capacitance, Temperature, and Continuity Buzzer
- Dynamic Min/Max/Avg recording
- In-rush Peak Current capture (1 ms response)
- Temperature measurement
- Dual Display of °C & °F readings
- Continuity Buzzer
- Reading Hold function
- Auto/Manual Ranging and Auto Power Off
- Analog Bar Graph indicator
- Jaw opening 52 mm
- Safety acc. EN 61010, CAT III/600 V

525710

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| ACDC-620T | **167-1215** | 193.00 | 187.21 |

## 1000A Clamp Meter with Frequency

True RMS TENMA™

New



**Model:** 72-7228
A digital clamp meter that is perfect for applications where a higher current needs to be measured or higher accuracy is required.

- 5999 count LCD
- Full icon display with backlight
- Auto/Manual range selection
- AC/DC current measurement
- AC/DC voltage, resistance, frequency and duty cycle measurement
- TRMS AC voltage measurement
- Min/Max modes and data hold
- Continuity buzzer and diode test
- 56mm jaw size
- Sleep mode and low battery warning
- Supplied with test leads, 9V battery, tool box and user manual

| | Range | Accuracy |
|---|---|---|
| DC Voltage | | |
| AC Voltage | | |
| DC Current | | |
| AC Current | | |
| Resistance | | |
| Resistance | | |
| Frequency | | |
| Input Impedance | 10MΩ | |
| Dimensions | 105x286x45mm (WxHxD) | |

510038.509492

| | | Price Each | |
|---|---|---|---|
| Description | Order Code | 1+ | 5+ |
| | **156-3720** | 40.32 | 37.72 |

## True RMS 1000 A AC/DC Clamp Meter

True RMS AMPROBE

New



A clamp meter designed for electrical contractors, electricians, and industrial plant maintenance personnel. The AD105A measures AC and DC current up to 1000 Amps. Frequency is measured by jaw up to 10kHz. Max Conductor of 50 mm.

- TRMS when measuring in noisy AC environments
- Wide range to 1000 Amps, AC and DC
- Measures frequency through the jaws or test leads
- Autoranging
- 4000-count
- Belt-clip sleeve case included
- Jaw opening 50 mm
- Safety acc. EN 61010, CAT III/1000 V

525716

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| AD105A | **167-1219** | 168.00 | 162.96 |

## 1000A Clamp-On Power Meter

**ACD-31P**

True RMS AMPROBE



The ACD-31P combines the standard features of a professional clamp-on meter, with full Power analysing capabilities. Measure: Active (W), Reactive (VAR) and Apparent (VA) Powers along with dual display Power Factor readout.

- TRMS sensing (True RMS)
- Back light display
- AutoVA - Auto Selection of AC Volts, DC Volts or AC Amps
- AC/DC Voltage up to 600V, AC Current up to 1000A
- Resistance, Frequency
- Active (W), Reactive (VAR) & Apparent (VA) Power with dual-display Power Factor readout
- Temperature
- Audible continuity
- Auto power off
- Automatic polarity
- Low battery indication
- Peak/Data hold
- Large, easy to read LCD display
- Accommodates conductors up to 45mm in diameter
- Voltage overload protection for all functions up to 600V AC/DC
- Safety CAT III 600V

Supplied with carrying case, test leads, batteries, thermocouple and user manual

| | Ranges | Basic Accuracy |
|---|---|---|
| AC Voltage | 600V | ±(0.5%+5) |
| DC Voltage | 600V | ±(0.5%+5) |
| AC Current | 40A, 400A, 1000A | ±(1.0%+5) |
| DC Current | N/A | |
| Resitance | 999.9Ω | ±(1%+6) |
| Frequency | 5Hz to 500Hz | ±(0.5%+4) |
| Temperature | -50°C to 300°C | ±(2%+3°C) |
| Active Power (W) | 0 to 600kW | ±(2.0%+6) |
| Reactive Power (VAR) | 0 to 600kVAR | ±(2.0%+6) |
| Apparent Power | 0 to 600kVA | ±(2.0%+6) |
| Power Factor | 0.10 to 0.99 | |

488736.502905

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| ACD-31P | **146-1583** | 147.00 | 142.59 | 138.31 |
| | | | **Price Each** | |
| **Standard Calibration** | | S C18 | 89.27 | |
| **UKAS Calibration** | | N C18 | 123.00 | |

## Troubleshooting tips

WWW

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

## Current Clamp Meters - continued

### 2000A AC Digital Clamp Multimeter

True RMS AMPROBE



New

The AC-15 clamp meter for when you need to measure high current. Measures up to 2000A AC. Plus it measures AC and DC voltage, resistance and offers audible continuity. Additional feature is a built in non-contact voltage detector. Choose the True RMS version when working in noisy AC environments. Large digital display.

- TRMS & Backlight Screen
- Measurements: AC/DC Voltage up to 600V, AC Current up to 2000A, Resistance, Frequency and Capacitance
- Non-contact Voltage Level Detection
- Audible continuity
- AutoTect™ feature automatically selects DCV, ACV or Resistance
- Auto and manual ranging
- Auto power off
- Data hold
- Carrying case, test leads, batteries (installed) and manual included
- "Third hand" - test probe holder
- Jaw opening 45 mm
- Safety acc. EN 61010, CAT III/600 V

525714

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| ACD-15 TRMS-PRO | **167-1218** | 109.00 | 105.73 |

### Flip Clamp Meters

HIOKI

**3291 and 3293**



New

A unique compact pocket design that flips open when required, allowing greater access to difficult locations while at the same time keeping the display visible.

- Analogue bar graph display
- Automatically switches on when jaws open
- Backlight display
- Auto power off for display and backlight
- Display hold
- Max - Captures max current on fluctuating loads
- Supplied with carry case
- Complies with EN61010 safety standard

**3291 Flip Clamp**

- True RMS AC current measurement over the range 6 - 1000A with a large 30mm clamp jaw opening.
- Auto ranging

**3293 Earth Leakage Flip Clamp**

- True RMS AC current measurement is suitable for both accurate earth leakage and load current measurements up to 1000A.
- 24mm jaw opening.
- Auto range across all six ranges covering earth leakage: 0 - 30.00mA/300.0mA and load

| | **3291** | **3293** |
|---|---|---|
| | Load | Leak and Load |
| Measurable Conductor Size | ∅ 30mm | ∅ 24mm |
| Max. Rated Voltage | AC 600Vrms | AC 300Vrms |
| Measurement Ranges | 60A, 600A, 1000A | 30mA, 300mA, 6A, 60A, 600A, 1000A |
| Accuracy | ±(1.5%rdg + 5d) (50Hz - 60Hz) / ±(5%rdg + 5d) (1mA to 2.7mA) | |
| Crest Factor | 2.8 max. (1.6 when current exceeds 600A) | |
| Response Time | 1.5s (max.) | |
| Display Refresh Rate | Approx. 2 times per second | |
| Safety Category | CATIII 600V | CATIII 300V |
| Battery | 1x CR2032 button type lithium battery, 10 hours operation | |
| Dimensions (mm) | 50 x 136 x 26 | 50 x 130 x 26 |
| Weight | 90g | 120g |

491679.503432

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 3291 | **150-1060** | 70.73 | 66.63 | 63.85 |
| 3293 | **150-1061** | 203.98 | 193.73 | 183.48 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

### Split Jaw™ Multi-Tester & Clamp Meter

IDEAL

**61-096**



- Open split-jaw configuration
- Measures voltage, current and resistance
- 200A AC current capability
- Compact and lightweight
- Audible continuity
- Data hold
- Integral lead storage
- Replaceable test leads
- Auto power off
- Low battery indication
- CAT IV 600V
- CAT III 1000V

**61-096**

- 0-750V AC
- 0-1000V DC
- 0-2000Ω
- Automatic sensing and display

The Split Jaw™ Multi-Tester allows for quick current measurements, measures voltage, current and resistance and included continuity test and data hold.

339520

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 10+ |
|---|---|---|---|---|
| 61-096 | **851-9838** | 119.79 | 117.64 | 105.89 |
| | | | Price Each | |
| **Standard Calibration** | | S C4 | 34.10 | |
| **UKAS Calibration** | | N C4 | 58.75 | |

### Multi-core AC Digital Clamp Meter

Megger

**MMC850**



DURACELL Ultra M3 9V

A unique solution to current measurement in multi-core cables, without the need to split cores. Simply clamp the MMC850 to a multicore cable and read the current flowing. Conventional current clamp meters can only measure current in a single core cable, requiring multicore cables to be split before a core can be measured. Unlike conventional clamp meters, the MMC850 has a complex array of Planar magnetic sensor coils to calculate the current flowing in the conductors of multicore cables with either 2 or 3 cores. The convenience and potential time saving from using the multi-core clamp is considerable. A single button switches the clamp between multi-core and single core operation, ensuring the MMC850 is the onlyclamp meter you need to carry. The MMC850 has a tough and lightweight clamp head, allowing good access to awkward locations and cables.

W=94, H=227, D=44.5mm

- Single, two or three core cable measurement
- Current measurement to 200A on single core and 100A on multiple cores
- 0.1A resolution
- Flat or round section cables
- No need to split wires
- Cable centralising clamp for best accuracy
- Backlit display
- Suitable for supply frequencies from 45Hz to 400Hz
- **IEC 61010-1 CATIII 600 V**

419244.428559

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Clamp Meter | MMC850-EN | **108-6233** | 175.00 | 171.50 | 168.07 |

### Digital Clampmeters with IR Thermometer

True RMS EXTECH INSTRUMENTS

**EX800 Series**



W=110 H=270 D=50mm. Weight 386g

Clamp-on multimeters with built-in non-contact InfraRed thermometer

- Non-contact InfraRed Temperature measurements with laser pointer
- Models with True RMS Current and Voltage measurements
- Peak hold captures inrush currents and Transients
- 43mm jaw opening for conductors up to 750MCM or two 500MCM
- Diode and continuity tests

- Backlit dual display
- Features include Data Hold and Min/Max
- Autoranging with manual range button
- Auto Power off
- Supplied with test leads, belt holster and 9V battery
- Models EX820 and EX830 additionally supplied with Type K temperature probe

| | EX810 | EX820 | EX830 |
|---|---|---|---|
| Max. Reading | 3999 | 3999 | 3999 |
| True RMS | | ● | ● |
| Basic Accuracy | 3% | 3% | 3% |
| AC/DC Voltage | | 0.1mV to 600V | |
| AC Current | 1000A | 1000A | 1000A |
| DC Current | | | 1000A |
| Resistance | | 0.1Ω to 40MΩ | |
| Capacitance | | 0.001nF to 40mF | |
| Frequency | | 1Hz to 4kHz | |
| Temperature (IR) | | -50 to 270°C | |
| Temperature (Type K) | | -20 to 1000°C | -20 to 1000°C |
| Safety | | Cat III 600V | |
| Power | | 9V PP3 Battery | |

446760.437858

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| EX810 | **127-1512** | 84.56 | 73.29 | 60.11 |
| EX820 | **127-1513** | 101.42 | 89.07 | 75.14 |
| EX830 | **127-1515** | 123.97 | 111.62 | 90.17 |
| | | | Price Each | |
| **Standard Calibration Charge** | S C4 | | 34.10 | |
| **UKAS Calibration Charge** | N C4 | | 58.75 | |

## Clamp Meter with Bottom Display

### 61-760 Series







The 760 series brings function and ease-of-use together. The 61-764 is great for basic current measurements, but also has an array of features such as backlit display and auto power off. The 61-766 also offers True RMS and frequency measurement, and the 61-768 is ideal for those who work with DC motors and circuits.

- Measures up to 600AAC
- TightSight™ bottom display
- Voltage-presence warning on all functions
- Tapered jaws with hook tip
- Peak, Hold, Max and Min
- Audible continuity
- Auto power off (selectable)
- Low battery indicator

**61-766 extra features**

- True RMS
- Capactitance
- Frequency

**61-768 extra features**

- 600A DC current measurements

| | 61-764 | Range and Resolution 61-766 | 61-768 | Accuracy |
|---|---|---|---|---|
| AC current | 400.0 / 600 A | 40.00 / 400.0 / 600 A | 400.0 / 600 A | 1.7% |
| DC current | - | - | 400.0 / 600 A | 1.5% |
| AC voltage | | 400.0m / 4.000 / 40.00 / 400.0 / 750V | | 1.2% |
| DC voltage | | 400.0m / 4.000 / 40.00 / 400.0 / 750V | | 0.5% |
| Resistance | | 400 / 4k / 40k / 400k / 4M / 10MΩ | | 1.0% |
| Capacitance | - | 4µ / 40µ / 400µ / 4mF | - | 3.0% |
| Frequency | - | 0.02k to 0.04kHz | - | 0.1% |

381619.381845

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|---|
| Clamp Meter | TIGHTSIGHT764 | **851-9781** | 83.03 | 79.40 |
| Meter + True RMS | TIGHTSIGHT766 | **851-9790** | 95.48 | 91.32 |
| Meter + DC Measurements | TIGHTSIGHT768 | **851-9803** | 113.12 | 108.21 |

**FREE global legislation support**

RoHS, REACH, WEEE, EuP, Batteries Directive - we've got it covered at:
**www.global-legislation.com**

## Clamp Meter with Bottom Display

### 61-770 Series







The 770 series provides electricians with True RMS backlit display and a large 2-inch jaw for measuring in 1000A. A unique backlit display in the bottom of the clamp is an industry first. The 61-772 is for testing large AC current and the 61-774 for AC/DC testing capabilities.

- Measures up to 1000AAC
- TightSight™ bottom display
- Voltage-presence warning on all functions
- Tapered jaws with hook tip
- True RMS
- Data hold, Max / Min and Peak
- Audible continuity
- Auto power off
- Low battery indicator

**61-774 extra features**

- 1000A DC current measurements
- Capacitance

| | 61-772 | Range and Resolution 61-774 | Accuracy |
|---|---|---|---|
| AC current | | 400.0 / 1000 A | 1.7% |
| DC current | - | 400.0 / 1000 A | 1.5% |
| AC voltage | | 400.0m / 4.000 / 40.00 / 400.0 / 750V | 1.2% |
| DC voltage | | 400.0m / 4.000 / 40.00 / 400.0 / 1000V | 0.5% |
| Resistance | | 400.0 / 4.000k / 40.00k / 400.0k / 4.000M / 10.00MΩ | 1.0% |
| Capacitance | - | 4µ / 40µ / 400µ / 4mF | 3.0% |

381209

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| TIGHTSIGHT772 | **851-9811** | 133.88 | 128.06 |
| TIGHTSIGHT774 | **851-9820** | 154.64 | 147.91 |

## Fluke 320 Series Clamp Meters



- Precise measurements better than 2% basic accuracy
- Measures ac current to 400A with 0.1A or 100mA resolution
- 400A current range with 0.01A or 10 mA resolution (Model 322)
- Measures ac volts to 600V with 0.1V resolution to 400V
- Measures dc volts to 600V with 0.1V resolution to 400V (Model 322)
- Resistance to 400 Ohms with 0.1Ω resolution continuity test function

| | | 389-0510 | 389-0521 |
|---|---|---|---|
| | | FLUKE 321 | FLUKE 322 |
| Aac | Range | 0 to 400A | 0 to 400A |
| | Accuracy | 1.8% ± 5 counts(50/60Hz) | 1.8% ± 5 counts(50/60Hz) |
| | | 3% + 5 counts ( 60 Hz - 400 Hz) | 3% + 5 counts ( 60 Hz - 400 Hz) |
| | AC Response | Averaging | Averaging |
| Vac | Range | 0 to 400V, 400 to 600V | 0 to 400V, 400 to 600V |
| | Accuracy | 1.2% ± 5 counts | 1.2% ± 5 counts |
| | | (50/400Hz) | (50/400Hz) |
| | AC Response | Averaging | Averaging |
| Vdc | Range | - | 0 to 400V, 400 to 600V |
| | Accuracy | - | 1% ± 5 counts |
| Ω | Range | 0 to 400Ω | 0 to 400Ω |
| | Accuracy | 1% ± 5 counts | 1% ± 5 counts |
| Continuity | | ≤30Ω | ≤30Ω |
| Display Hold | | Yes | Yes |
| Dimensions | | 184 x 62 x 35 | |
| Dimensions | | 227gms | |

Operating Temperature: -10°C to +50°C
Battery Life: 2 x AAA carbon zinc
Safety Rating: IEC 1010-2-031, 600V CAT III

## Current Clamp Meters - continued

### Fluke 320 Series Clamp Meters - continued

232271

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 2+ |
|---|---|---|---|
| FLUKE 321 | C8 389-0510 | 85.00 | 82.45 |
| FLUKE 322 | C8 389-0521 | 95.00 | 92.15 |
| | | | Price Each |
| Standard Calibration Charge | S C8 | | 45.13 |
| UKAS Calibration Charge | N C8 | | 73.70 |

### Fluke 330 Series Clamp Meters

True RMS FLUKE



- Small body and jaws fit perfectly in your hand and into tight places
- Handy Display Hold button keeps measurements on the display
- Meter controls are positioned so current measurements can be done with one hand (index finger on clamp opening lever and thumb on rotary switch)
- Improved low current measurement accuracy from new microprocessor technology
- Auto shut-off maximizes battery life so the meter works when you need it
- In-rush current function (on most models) for measuring starting current for motors, lighting,etc.

| | | 369-3053 | 369-3065 | 369-3077 | 369-3089 | 369-3090 |
|---|---|---|---|---|---|---|
| | | FLUKE 333A | FLUKE 334A | FLUKE 335A | FLUKE 336A | FLUKE 337A |
| Aac | Range | 0 to 400A | 0 to 600A | 0 to 600A | 0 to 600A | 0 to 999.9A |
| | Accuracy | 2% ± 5 counts | 2% ± 5 counts | 2% ± 5 counts | 2% ± 5 counts | 2% ± 5 counts |
| | | (50/60Hz) | (50/60Hz) | (50/60Hz) | (10-100Hz) | (10-100Hz) |
| | | | | | 6% ± 5 counts | 6% ± 5 counts |
| | | | | | (100-400Hz) | (100-400Hz) |
| | Crest factor | - | - | 2.4@500A | 3@500A | 3@500A |
| | (50/60Hz) | | | 2.0@600A | 2.5@600A | 3@600A |
| | | | | +2% for C.F2 | +2% for C.F2 | 1.42@1000A |
| | | | | | | +2% for C.F2 |
| | AC Response | Averaging | Averaging | True rms | True rms | True rms |
| | Integration time | - | 100mS | 100mS | 100mS | 100mS |
| Adc | Range | - | - | - | 0 to 600A | 0 to 999.9A |
| | Accuracy | - | - | - | 2% ± 3 counts | |
| Vac | Range | 0- 600V | 0- 600V | 0- 600V | 0- 600V | 0- 600V |
| | Accuracy | 1% ± 5 counts | 1% ± 5 counts | 1% ± 5 counts | 1% ± 5 counts | 1% ± 5 counts |
| | | (50/60Hz) | (50/60Hz) | (50/60Hz) | (20-100Hz) | (20-100Hz) |
| | | | | | 6% ± 5 counts | 6% ± 5 counts |
| | | | | | (100-400Hz) | (100-400Hz) |
| | AC Response | Averaging | Averaging | True rms | True rms | True rms |
| Vdc | Range | 0 - 600V | 0 - 600V | 0 - 600V | 0 - 600V | 0 - 600V |
| | Accuracy | 1% ± 5 counts | 1% ± 5 counts | 1% ± 5 counts | 1% ± 5 counts | 1% ± 5 counts |
| Ω | Range | 0 - 600R | 0 - 600R | 0 - 600R | 0 - 600R | 0 - 600R |
| | | | 601-6000R | 601-6000R | 601-6000R | 601-6000R |
| | Accuracy | 1% ± 5 counts | 1% ± 5 counts | 1% ± 5 counts | 1% ± 5 counts | 1% ± 5 counts |
| Continuity | | 30R | 30R | 30R | 30R | 30R |
| Hz | Range | - | - | - | - | 5-400Hz |
| | Accuracy | - | - | - | - | 0.5% ± 5 counts |
| | Trigger Level | - | - | - | - | 10-100Hz≥5A |
| | | | | | | 5-10Hz |
| | | | | | | 100-400Hz ≥10A |
| MIN/MAX | | No | No | No | No | Yes |
| Backlight | | No | Yes | Yes | Yes | Yes |
| Display Hold | | Yes | Yes | Yes | Yes | Yes |
| Height | | 240 | 240 | 240 | 250 | 250 |
| Width | | 80 | 80 | 80 | 80 | 80 |
| Depth | | 40 | 40 | 40 | 40 | 40 |
| Weight | | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 |

Operating Temperature: -10°C to +50°C
Altitude: 2,500 metres
Battery Life: Alkaline, approximately 150 hours continuous, Automatic low-battery indicator
Safety Rating: IEC 1010-2-031, 600V CAT III
Temperature De-rating: Add 0.1 x specified accuracy for each °C above 28°C or below 18°C
Storage Temperature: -40°C to +60°C
Three-year warranty

230979

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 2+ |
|---|---|---|---|
| FLUKE 333A | C8 369-3053 | 133.00 | 129.01 |
| FLUKE 334A | C8 369-3065 | 149.00 | 141.55 |
| FLUKE 335A | C8 369-3077 | 184.00 | 178.48 |
| FLUKE 336A | C8 369-3089 | 274.00 | 265.78 |
| FLUKE 337A | C8 369-3090 | 329.00 | 319.13 |
| H3(Holster) | 369-3107 | 24.00 | – – |
| | | | Price Each |
| Standard Calibration Charge | S C8 | | 45.13 |
| UKAS Calibration Charge | N C8 | | 73.70 |

### Electrical / HVAC Test Kit

FLUKE

LATEST PRICING




**Fluke 62/322/1AC**
IR Thermometer, Electrical Tester and Voltage Detector Kit.

Lit includes:
- Fluke 62 mini IR Thermometer
- Fluke T5-600 Voltage, Continuity and Current Tester
- Fluke 1AC-II Voltage Detector
- Nylon carrying case

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

460641.460638

| Description | Mftrs. List No. | Order Code | Price Each 1+ | Price Each 3+ | Price Each 5+ |
|---|---|---|---|---|---|
| Electrical Test Kit | 62/322/1AC | 132-7564 | 160.00 | 155.20 | 150.54 |
| | | | | Price Each | |
| Standard Calibration Charge | | S C4 | | 34.10 | |
| UKAS Calibration Charge | | N C4 | | 58.75 | |

### MilliAmp Process Clamp Meter

**Fluke 771**

LATEST PRICING

FLUKE






W=59 H=212 D=38mm. Weight 260g

Measure 4-20 mA signals without breaking the loop with this new, compact clamp meter for PLC and control systems analogue I/O. The detachable clamp with extension cable allows you to take measurements in tight locations, and the built-in spot light illuminates hard to see wires in dark enclosures.

- Measure mA signals for PLC and control system analogue I/O
- Measure 4 to 20 mA output signals from transmitters without breaking the loop
- Best in class 0.2% accuracy
- Resolution and sensitivity to 0.01 mA
- Hold function captures and displays changing measurements
- Dual backlit display with both mA measurement and percent of 4 to 20 mA span

- Measurement Spotlight illuminates hard to see wires in dark enclosures
- Detachable clamp with extension cable for measurements in tight locations
- Measure 10 to 50 mA signals in older control systems using the 99.9 mA range
- Automatic power off after 15 minutes and 2 minute automatic off for backlight and spotlight

| | Range | Accuracy |
|---|---|---|
| **Process Loop** | 4mA - 20mA | 0.2% rdg + 5 counts |
| **Older Systems** | 21mA to 99.9 mA | 1% rdg + 5 counts |
| Battery life | 20 hours typical from 2x AA batteries | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

460588.460578

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Process Clamp Meter | 771 | **132-7558** | 301.00 | 291.97 | 283.21 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | | S C5 | 39.11 | |
| **UKAS Calibration Charge** | | | N C5 | 61.97 | |

## TRMS HVAC Clamp Meter

**902**

True RMS

FLUKE



W=108 H=273 D=62mm. Weight 700g

Delivers all the features necessary to diagnose and repair HVAC systems. Combined with True RMS technology and a CAT III 600 V rating, the Fluke 902 helps technicians do their jobs safely and accurately.

LATEST PRICING

- Designed for HVAC applications with capacitance, DC Current (µA), and temperature measurements
- Capture flue gas temperatures
- Conduct flame rod testing
- Measure start and run motor capacitors
- Measure supply side current and voltage as well as load side current and voltage
- Measure current and voltage phase balance on 3 phase systems
- Troubleshoot compressor electrical motor faults
- Small body and jaws fit perfectly in your hand and into tight places
- Handy "Display Hold" button keeps measurements on the display
- Meter controls are positioned so current measurements can be done with one hand (index finger on clamp opening lever and thumb on rotary switch)
- Large, backlit display
- Auto shut-off maximizes battery life

| | Range | Accuracy |
|---|---|---|
| DC Voltage | 0 - 600V | ±(1% + 5 digits) |
| AC Voltage | 0 - 600V | ±(1% + 5 digits) |
| DC Current | 0 - 200µA | ±(1% + 5 digits) |
| AC Current | 0 - 600 A | ±(2% + 5 digits) |
| Resistance | 0 - 9999R | ±(1.5% + 5 digits) |
| Capacitance | 1 - 1000µF | ±(1.9% + 2 digits) |
| Continuity Test | <30Ω | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

447119

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| 902 | **127-2832** | 161.00 | 156.17 | 151.49 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## TRMS Clamp Meters

**Fluke 350 Series**

FLUKE

True RMS



W=98 H=300 D=52mm. Weight 814g

LATEST PRICING

Confidently take reliable readings with the true-rms, Fluke 353/355 Clamp Meters; the tools of choice for high current measurement up to 2000 A. The extra-wide jaw easily clamps around large conductors, typically found in high current applications.

- Rugged design
- Safety to and CATIV 600 V, CAT III 1000 V
- Accurate peak measurements can be taken using the in-rush current mode - ideal for motors and inductive loads
- Low-pass filter to smooth out noisy loads and stablise readings

| | 353 | 355 |
|---|---|---|
| True RMS Measurements | ● | ● |
| Backlit Display | ● | ● |
| Motor Start-Up Current | ● | ● |
| Min / Max / Average | ● | ● |
| Voltage AC/DC | | ● |
| Resistance Measurement | | ● |
| Continuity Test with Beeper | | ● |

| | Range | 353 Accuracy | 355 Accuracy |
|---|---|---|---|
| AC/DC Current | 0 - 2000Adc (1400A ac) | ±(1.5% + 5 counts) | ±(1.5% + 5 counts) |
| AC/DC Voltage | 0 - 1000Vdc (600V ac) | | ±(1.0% + 5 counts) |
| Resistance | 0 - 400kΩ | | ±(1.5% + 5 counts) |
| Frequency | 5Hz - 1MHz | | ±(0.2% + 2 counts) |
| Continuity Test (355 only) | <30Ω | | |

**Included Accessories:**
**Fluke 353:** C43 Soft Meter Case, 6 AA batteries, users manual
**Fluke 355:** C43 Soft Meter Case, 6 AA batteries, TL224 SureGrip Silicone Test Lead Set, TP2 Slim Reach Test Probe Set (2 mm), AC285 SureGrip® Alligator Clip Set, users manual.

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

492376.502117

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| 353 | **150-3749** | 329.00 | 319.13 | 309.56 |
| 355 | **150-3750** | 449.00 | 435.53 | 422.46 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## Leakage Current Clamp Multimeter

**AC50A**

AMPROBE



W=64 H=183 D=36mm. Weight 190g

Ideal for applications requiring measurement of leakage and fault currents, and current pick-up of instruments in service and maintenance areas, (DIN VDE 0701/0702 measurements). Supplied with a user manual, heavy-duty test leads and carrying case.

- 3¾ digit, 4000 count LCD display
- 40 segment bargraph
- AC current measurement to 60 A
- Leakage current measurements with resolution of 0.01 mA
- AC voltage to 400 V
- Resistance measurement and continuity beeper
- Min/Max control to see largest and smallest values in a series of measurements
- Relative value measurement to determine differentials
- Data Hold to freeze measurement value on the display
- Digital display with analogue bargraph
- Jaw opening 30 mm (1.2 inch)
- Auto-Power-Off to save battery life
- CAT II 600V

489629.502921

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 10+ |
|---|---|---|---|---|
| AC50A | **146-6482** | 189.00 | 183.33 | 177.83 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## AC Leakage Clamp Meter

**DL6507**

Di-loG



W=64 H=183 D=36mm. Weight 190g

- Leakage currents from 10µA
- Autoranging
- Bargraph
- Auto power off
- 30mm Clamp
- Max/Min and Zero functions
- Supplied with holser and battery

CALIBRATION SERVICES

## Current Clamp Meters - continued

### AC Leakage Clamp Meter - continued

**DL6507 - continued**

**AC Current**

| Range | Resolution | Accuracy (50/60Hz) | Accuracy (40Hz - 1kHz) |
|---|---|---|---|
| 0 - 40mA | 10µA | ±(1.5%rdg+3d) | ±(2.0%rdg+5d) |
| 0 - 400mA | 100µA | ±(1.5%rdg+3d) | ±(2.0%rdg+5d) |
| 0 - 4A | 1mA | ±(1.5%rdg+3d) | ±(2.0%rdg+5d) |
| 0 - 40A | 10mA | ±(1.5%rdg+3d) | ±(2.0%rdg+5d) |
| 0 - 50A | 100mA | ±(1.5%rdg+5d) | ±(2.0%rdg+5d) |
| 0 - 60A | 100mA | ±(3%rdg+5d) | ±(3.5%rdg+5d) |
| **AC Voltage** | | | |
| 0 - 400V | 0.1V | ±(1.0%rdg+3d) | ±(2.0%rdg+4d) |

| | Range | Resolution | Best Accuracy |
|---|---|---|---|
| **Resistance** | 400Ω | 0.1Ω | ±(1%rdg+3d) |
| **Continuity** | Threshold: <40Ω | | |

450353

| Mftrs. List No. | Description | Order Code | 1+ | Price Each 3+ | 10+ |
|---|---|---|---|---|---|
| DL6507 | AC Leakage Clamp Meter | **129-6893** | 124.20 | 115.92 | 108.68 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | S C4 | | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | | 58.75 | |

### Low Current Leakage Clamp

**Fluke 360**




H=176, W=70, D=25mm Weight = 200g

A rugged and accurate solution for leakage current measurement. Ideally designed for non-invasive checks of insulation condition, allowing you to perform tests without powering down the installation or disconnecting equipment - saving you time, without compromising on quality or safety. The unique jaw design eliminates the influence of adjacent current conductors, and minimizes the effects of external magnetic fields, even at low currents. This allows you to perform accurate and reliable tests in today's crowded electrical environments. The tough and high-quality jaw design guarantees high stability for long-term repeatability and durability.

LATEST PRICING

- Measurement of leakage current with 3mA range and 1µA of resolution, for accurate monitoring of insulation erosion
- Broad range of measurement, from 1µA up to 60A, for all installation needs
- Advanced shielding to ensure accurate results when measuring near other conductors
- The high durability clamp construction can withstand over 50,000 operations, added ruggedness that extends the life of your leakage clamp.
- Easy-to-carry, pocket-sized leakage current tester with wide 40mm (1.5 in) jaw size
- Handy Display-Hold button for capturing leakage current readings in hard-to-reach places
- Auto power-off, with warning buzzer, saves battery life
- Conformance to IEC1010 and EMC standard for confident measurements
- Meets all of the applications and performance classes in safety standard VDE0404-4 and VDE0702 for leakage current and differential current measurement of electrical appliances

| | |
|---|---|
| AC current range | 3mA, 30mA, 30A, 60A |
| Resolution | 0.001mA - 0.1A |
| Accuracy | 1% + 5 |
| Display | Digital 3200 counts, Bar graph: 32 segment LCD |
| Method of detection | Mean value |
| Measurement cycle | Digital display: 2 times/second, Bar graph: 12 times/second |
| Circuit voltage | ≤300 Vrms |
| Safety standard | EN 61010-1 EN61010-2-032 CAT II |
| Power | 1x CR2032 3V lithium coin shaped battery |
| Battery life | Approx 90 hours continuous use |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

477862

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| 360 | **132-7560** | 398.00 | 386.06 | 374.48 |

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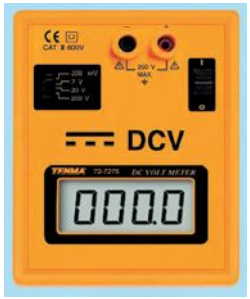
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## Meters - Single Function

### Bench Top LCD Voltmeter

TENMA




This single function voltmeter is perfect for a wide variety of applications including supply voltage monitoring, educational and experimental purposes.

- Measures from 0.1mV to 200V DC in four ranges
- Large 18mm four-digit LCD display
- Automatic zero adjust
- Colour coded binding post inputs
- Four position range select switch
- Auto switching polarity
- Meets CE and IEC1010 CAT II 600V
- Dimensions (WxHxD): 117x147x52mm
- Requires 1x 9V PP3 Battery (not supplied)

| Range | Resolution | Accuracy |
|---|---|---|
| 200mV | 0.1mV | ± 0.5% +1 digit |
| 2V | 0.001V | ± 0.8% +1 digit |
| 20V | 0.01V | ± 0.8% +1 digit |
| 200V | 0.1V | ± 0.8% +1 digit |
| Input Impedance | 10MΩ | — |

336968.343922

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 72-7275 | **490-8387** | 30.40 | 28.06 |

## Multimeters - Analogue

### Analogue Multimeter

**AM8C**

AMPROBE




New

- Quick responding multimeter for home, car, boat and workshop
- High sensitivity taut band movement
- 5 functions/15 ranges
- Small compact size for portability
- Battery Test Function
- Special ranges to test household batteries
- Fused input
- Zero Adjust for Ohms
- Protective holster and battery included
- Designed to EN61010-1 300V Cat II

| Specification | Ranges | Accuracy |
|---|---|---|
| DC Voltage | 2.5V, 10V, 50V, 150V, 300V | ±5% |
| AC Voltage | 50V, 150V, 300V (50-60Hz) | ±5% |
| DC Current | 0.5mA, 10mA, 250mA | ±5% |
| Resistance | 20kR, 2MR | ±5% |
| Battery Test | 1.5V, 9V | ±5% |

Note: This instrument has integral test leads and GS38 compliant leads cannot be connected. Use of an alternative instrument is recommended for applications where GS38 compliant leads (fused test leads) are required.

489614

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| AM8C | **146-6447** | 16.00 | 15.52 | 15.05 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C2 | 25.07 | |
| **UKAS Calibration Charge** | | N C2 | 36.33 | |

### Analogue Multimeter

**METRA*hit* 1A and 2A**

GOSSEN METRAWATT CAMILLE BAUER GMC-Instruments




- Voltage measurement
- Current measurement
- Resistance measurement

| | |
|---|---|
| AC / DC Voltage | 0 to 500V |
| Input Resistance | AC: 4kΩ / DC: 20kΩ |
| AC / DC Current | 0 to 5A **(MetraHit 2A is 15A** |
| Resistance | 1Ω to 1MΩ (4 ranges) |
| Level | -15 to +66dB (6 ranges) |
| Battery | 1.5 V IEC LR 6 (AA type) |

W=92, H=126, D=45mm
Weight = 0.25kg

412289

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| MetraHit 1A | 939-9437 | 82.71 |
| MetraHit 2A | 939-9445 | 121.27 |

## Analogue Multimeters

**MX1, MX2**




- Heavy duty multimeters
- Rubberised cases withstand shock and vibration
- Sealed to IP65
- Large easy to use scales
- SECURX test lead locking mechanism
- High speed continuity beeper and diode test
- Audible warning on ohms ranges if more than 5 volts is applied to the input terminals
- Mains proof ohms range, 10KA fuse potection on current ranges
- MX2 supplied with current clamp for non intrusive measurement

| | | |
|---|---|---|
| 9 dc | voltage ranges from | 150mV to 1000V |
| 6 ac | voltage ranges from | 5 to 1000V |
| 3 | resistance ranges | 200R,2kR,20kR |
| MX1 | 7 dc current ranges | 50μA to 10A |
| MX2 | 2 dc current ranges | 50μA to 10A |
| MX2 | 6 ac current ranges | 500mA to 10A |
| MX1 | 4 ac current ranges via clamp adaptor | |

222457

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| MX1 | 724-970 | 123.89 | 120.63 | 117.54 |
| MX2 | 724-981 | 156.34 | 152.31 | 151.55 |
| | | | Price Each | |
| Standard Calibration Charge | | S C5 | 39.11 | |
| UKAS Calibration Charge | | N C5 | 61.97 | |

## Model 8 Mk 7

**Accessories**



A range of replacement accessories for the obsolete Model 8 Analogue Multimeter

221813

| | Order Code | 1+ | Price Each 10+ | 100+ |
|---|---|---|---|---|
| Battery | 856-174 | 6.01 | 5.23 | 4.30 |
| Battery Adaptor | 423-1454 | 6.08 | 5.96 | 5.84 |
| Test Leads, Side Entry | 676-421 | 41.04 | 39.41 | 37.72 |

# Multimeters - Digital

## Pen-Type Multimeter with Voltage Detect



- 1999 count LCD display
- Auto or manual ranging
- Audible and visual non-contact voltage detection
- Continuity and diode test
- Data and MAX hold
- Auto power off
- Safety Category: IEC1010-1 CATIII 600V

| Function | Max. Range | Basic Accuracy |
|---|---|---|
| DC Voltage | 600V | ±(0.7%+2d) |
| AC Voltage | 600V | ±(0.8%+3d) |
| Resistance | 20MΩ | ±(1.0%+1d) |

**Physical Specifications**

| | |
|---|---|
| Power | 2x AAA batteries |
| Dimensions (WxHxD) | 38 x 208 x 29mm |
| Weight | 110g |

**Includes:** soft carry case/holster, probe test lead and alligator test lead.

468341.467962

| Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|
| 133-9600 | 11.71 | 10.63 | 10.16 |

## Pen-type Digital Multimeter



- Large 3¾ digit LCD display with bargraph
- Continuity buzzer and diode check
- Safety category: CATIII 600V

| Function | Max. Range | Basic Accuracy |
|---|---|---|
| DC Voltage | 600V | ±0.8% |
| AC Voltage | 600V | ±1.2% |
| DC Current | 200mA | ±1.5% |
| AC Current | 200mA | ±2.0% |
| Resistance | 20MΩ | ±3.0% |

**Physical Specifications**

| | |
|---|---|
| Power | 2x LR44 button cells |
| Dimensions (WxHxD) | 35 x 230 x 20mm |
| Weight | 200g |

**Includes:** Spare batteries, spare fuse, two test leads, extended probe tip.

486306.465502

| | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| | 143-0706 | 13.67 | 12.14 | 10.51 |
| | | | Price Each | |
| Standard Calibration Charge | | S C4 | 34.10 | |
| UKAS Calibration Charge | | N C4 | 58.75 | |

## Probe Style DMM

**DM 73C**



196 x 29 x 35mm

The DM73C has the following feature set:

- 3400 counts digital display
- Analog bargraph
- 0.5% basic accuracy
- AC/DC Voltage measurements up to 600V
- Resistance measurements up to 34MOhm
- Audible continuity test
- Diode test
- Data Hold
- Auto power off
- Ground lead with alligator clip
- **EN61010-1 CAT III 300V / CAT II 600V**

| Functions | Maximum | Max.resolution | Accuracy |
|---|---|---|---|
| Voltage DC | 600V | 1mV | 0.5% + 4 |
| | 300V | 1mV | |
| Voltage AC | 600V | 0.1V | 1.5% + 8 |
| | 300V | 0.1V | |
| Resistance | 34MΩ | 1Ω | 1.2% + 4 |
| | 4.2MΩ | 1Ω | |

489615

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 3+ |
|---|---|---|---|---|
| DM73C | 146-6453 | 44.00 | 42.68 | 41.40 |
| | | | Price Each | |
| Standard Calibration Charge | | S C2 | 25.07 | |
| UKAS Calibration Charge | | N C2 | 36.33 | |

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## Multimeters - Digital - continued

### Pen Type Multimeter



- 3¾ digits display
- Auto range
- AC/DC voltage measurement
- Resistance measurement
- Frequency measurement
- Diode test
- Continuity test
- Data hold
- Flash light output
- IEC1010: CAT III 600V

**AC Voltage**
Range 4V, 40V, 400V, 600V
Resolution 0.001V, 0.01V, 0.1V, 1V
Accuracy ±(1.2% + 3)
**DC Voltage**
Range 400mV, 4V, 40V, 400V, 600V
Resolution 0.1mV, 0.001V, 0.01V, 0.1V, 1V
Best Accuracy ±(0.8% + 2)
**Resistance**
Range 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ
Resolution 0.1Ω, 0.001Ω, 0.01Ω, 0.1kΩ, 0.001MΩ,
Best Accuracy ±(1.0% + 2)
**Frequency**
Range 9.999Hz, 99.99Hz, 999.9Hz, 9.999kHz, 99.99kHz, 999.9kHz
Resolution 0.001Hz, 0.01Hz, 0.1Hz, 0.001kHz, 0.01kHz, 0.1kHz
Accuracy ±(1.5% + 5)
**Duty Cycle**
Range 20 - 80%
Resolution 0.1%
Accuracy ±(3.5% + 5)

414905.404583

| Mftrs. List No. | Order Code | 1+ | Price Each 10+ | 25+ |
|---|---|---|---|---|
| BS3301 | 100-3029 | 19.52 | 17.94 | 16.89 |
| **Standard Calibration Charge** | S C3 | | Price Each 28.38 | |
| **UKAS Calibration Charge** | N C3 | | 58.75 | |

### Compact Digital Multimeter

New



- 3¾ digit LCD display
- Integrated test leads with neat stowaway design
- Diode test and audible continuity test
- Data hold
- Low battery indication and overload protection

| Function | Max. Range | Basic Accuracy |
|---|---|---|
| DC Voltage | 600V | ±(0.5%+3d) |
| AC Voltage | 600V | ±(0.8%+4d) |
| DC Current | 400mA | ±(2.0%+3d) |
| AC Current | 400mA | ±(3.0%+4d) |
| Resistance | 40MΩ | ±(1.0%+3d) |
| Frequency | 100kHz | ±(0.5%+3d) |
| Capacitance | 100µF | ±(3.0%+3d) |

**Physical Specifications**
Power 2x SR44
Dimensions (WxHxD) 70 x 120 x 18mm
Weight 170g

**Includes:** carry pouch, batteries and user manual.

468343.468340

| Order Code | 1+ | Price Each 10+ | 25+ |
|---|---|---|---|
| 133-9601 | 6.36 | 5.88 | 5.47 |

### Pocket DMM with Bargraph

TENMA

**72-4040**



- 3½ digit, 3200 count display with analogue bargraph
- Autoranging
- Data hold, range hold
- Diode test and continuity tester
- Auto power off
- Overload protection
- Includes battery, test leads and owners manual

H=108, W=57, D=19mm

The 72-4040 is a small pocket multimeter supplied with a folding vinyl case and integral test leads

| | | | |
|---|---|---|---|
| DC voltage | 3V to 450V | Resistance | 300R to 30MR |
| AC voltage | 3V to 450V | | |

228147

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| 72-4040 | 342-1491 | 20.40 | 19.38 | 18.87 |
| **Standard Calibration Charge** | S C2 | | Price Each 25.07 | |

### 3.5 Digit Multimeter



A pocket sized digital multimeter supplied with integral test leads.

- 3.5 digit display
- AC/DC voltage measurement
- DC current measurement
- Resistance measurement
- Capacitance measurement
- Continuity test and buzzer <100Ω
- Diode test
- Polarity indication
- Overload protection on DC current
- High voltage indication
- Rotary function switch
- Ergonomic, high visability case design
- Conforms to IEC1010

H = 124.5, W = 68.5 D = 27mm

**DC Voltage:** 200mV, 2000mV, 20V, 200V, 600V ± 0.8% ±1 digits
**AC Voltage:** 200V, 500V ±1.5% ± 10 digits
**DC Current:** 200µA, 2000µA, 20mA, 200mA, 10A
**Resistance:** 200, 2000, 20k, 200k, 2000k ± 1.5% ±4 digits ±1.5% ± 2 digits
**Capacitance** 20µF ±1.5% ± 2 digits

248806

| Mftrs. List No. | Order Code | 1+ | Price Each 10+ |
|---|---|---|---|
| CM1200C | 428-3533 | 8.19 | 7.16 |
| **Standard Calibration Charge** | S C4 | | Price Each 34.10 |
| **UKAS Calibration Charge** | N C4 | | 58.75 |

### Digital Multimeter with Phase Rotation

MARTINDALE ELECTRIC

**MM47**



The MM47 is an ideal electricians multimeter. Is has been designed to satisfy all the needs of a working electrician by including audible continuity, phase rotation, frequency and temperature measurement as well as the basic electrical functions. Current ranges can be provided by using a suitable clamp adaptor.

| | |
|---|---|
| Display | 3½ digit LCD display with automatic polarity and zero |
| AC Voltage | 1mV to 600V (3 ranges) |
| DC Voltage | 100µV to 600V (4 ranges) |
| Ohms | 100mΩ to 2000MΩ |
| Frequency | 10Hz - 40kHz autoranging 1Hz resolution |
| Phase Rotation Indicator | 80 - 480V, 45 to 450Hz |
| Temperature | -20 to 750°C, -4 to 1400°F (K-Type Probes) |
| Capacitance | 0.01µF to 2mF (4 ranges) |
| Over Voltage | |
| Dimensions | 147 x 70 x 39mm |
| Includes | Protective holster, battery, test leads, K-Type probe and user manual |

339545.344000

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| MARMM47 | 505-7851 | 81.21 | 74.96 | 69.61 |
| **Standard Calibration Charge** | S C4 | | Price Each 34.10 | |
| **UKAS Calibration Charge** | N C4 | | 58.75 | |

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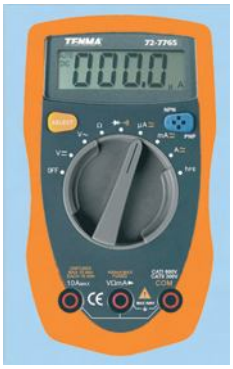
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## Palm Size Digital Multimeter

TENMA

**72-7765**



Autoranging meter features a wide range of measurement capabilities, and is ergonomically designed to easily fit in the palm of your hand. 3-3/4 digit, 3999 count display measures AC/DC voltage and current, ohms, diode check and transistor HFE.

- 1/2" high LCD digits
- Continuity buzzer
- Diode test
- Protective holster
- Includes test leads, standard 9V battery and owners manual
- Meets 600V CATI standards
- TTL/Transister test

H=137, W=76, D=35mm

| | 72-7765 |
|---|---|
| **DC Voltage** | |
| Range | 400mV, 4V, 40V, 400V, 500V |
| Accuracy | ±(0.8%+1) |
| **AC Voltage** | |
| Range | 4V, 40V, 400V, 500V |
| Accuracy | ±(1.2%+3) |
| **DC Current** | |
| Range | 400µA, 4000µA, 40mA, 400mA, 4A, 10A |
| Accuracy | ±(1%+2) |
| **AC Current** | |
| Range | 400µA, 4000µA, 40mA, 400mA, 4A, 10A |
| Accuracy | ±(1.5%+5) |
| **Resistance** | |
| Range | 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ |
| Accuracy | ±(1%+2) |
| **Input Impedance** | 10MΩ |

347428.403295

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| 72-7765 | **743-0558** | 10.81 | 9.91 | 9.15 | 8.97 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |

## Palm Size Digital Multimeters

TENMA

**72-7770**



Autoranging meter features a wide range of measurement capabilities. Ergonomically designed to easily fit in the palm of your hand. 1999 count display measures AC/DC voltage and DC current, ohms and diode check.

- 1/2" high LCD digits
- Continuity buzzer
- Diode test
- Data hold
- Backlit LCD display
- Square wave output
- Protective holster
- Includes test leads, standard 9V battery and owners manual
- Meets 600V CATI standards

H=137, W=76, D=35mm

| | Range | Accuracy |
|---|---|---|
| **DC Voltage** | 200mV, 2V, 20V, 200V, 500V | ±(0.5%+2) |
| **AC Voltage** | 200V, 500V | ±(1.2%+10) |
| **DC Current** | 2000µA, 20mA, 200mA, 10A | ±(1%+2) |
| **Resistance** | 200Ω, 2kΩ, 20kΩ, 200kΩ, 20MΩ, 200MΩ | ±(0.08%+2) |
| **Input Impedance** | 10MΩ | 10MΩ |

454606.454595

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| 72-7770 | **743-0566** | 6.36 | 5.29 | 5.05 | 4.95 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |


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## Pocket Size DMM

TENMA

**72-7935**



- 3999 digit
- AC/DC voltage measurement
- Resistance measurement
- Capacitance measurement
- Frequency measurement
- Auto ranging
- Duty cycle
- Diode check
- Continuity buzzer
- Relative mode
- Data hold
- Full icon display
- Sleep mode
- Low battery display
- Meets the **IEC1010 CAT II 300V** safety standard

W=58 H=108 D=12mm. Weight 62g

| | Range | Accuracy |
|---|---|---|
| **AC Voltage** | 4V/40V/400V/500V | ±(1.2% + 3) |
| **DC Voltage** | 400mV/4V/40V/400V/500V | ±(0.8% + 1) |
| **Resistance** | 400Ω/4kΩ/40kΩ/400kΩ/4MΩ/40MΩ | ±(1% + 2) |
| **Capacitance** | 4nF/40nF/400nF/4µF/40µF/200µF | ±(4% + 3) |
| **Frequency** | 10Hz - 100kHz | ±(0.5% + 3) |
| **Power** | 3V Battery (CR2032) | |

**Supplied with:** test lead, battery, manual, vinyl holder.

414619.381283

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|---|
| Pocket DMM | 72-7935 | **918-3647** | 10.58 | 9.67 | 8.92 | 8.44 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C3 | 28.38 |
| **UKAS Calibration Charge** | N C3 | 58.75 |



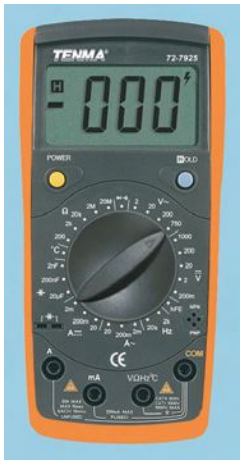
## Test Leads

See page 1494

## Digital Multimeter

TENMA

**72-7925**



W=83 H=172 D=38mm. Weight 310g

| | | |
|---|---|---|
| **AC Voltage** | | |
| Range | 2V/20V/200V/750V | |
| Accuracy | ±(0.8% + 3) | |
| **DC Voltage** | | |
| Range | 200mV/2V/20V/200V/1000V | |
| Accuracy | ±(0.5% + 1) | |
| **AC Current** | | |
| Range | 2mA/200mA/20A | |
| Accuracy | ±(1% + 3) | |
| **DC Current** | | |
| Range | 2mA/200mA/20A | |
| Accuracy | ±(0.8% + 1) | |
| **Resistance** | | |
| Range | 200Ω/2kΩ/20kΩ/2MΩ/20MΩ | |
| Accuracy | ±(0.8% + 10) | |
| **Capacitance** | | |
| Range | 2nF/200nF/20µF | |
| Accuracy | ±(4% + 3) | |
| **Temperature** | | |
| Range | -40 to +1800°F | |
| Accuracy | ±(2% + 8) | |
| **Frequency** | | |
| Range | 2kHz/20kHz | |
| Accuracy | ±(1.5% + 5) | |
| **General** | | |
| Power | 9V Battery (6F22) | |

- 1999 digit display
- AC/DC voltage measurement
- AC/DC current measurement
- Resistance measurement
- Capacitance measurement
- Temperature measurement (°F only)
- Frequency measurement
- Diode measurement
- Continuity buzzer
- Transistor
- Sleep mode
- Low battery display
- Meets the **IEC1010 CAT II 600V** safety standard

**Supplied with:** test lead, battery, manual, point contact temperature probe, holster.

414620.403321

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|---|
| Digital Multimeter | 72-7925 | **918-3663** | 20.14 | 19.94 | 19.74 | 19.54 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C3 | 28.38 |
| **UKAS Calibration Charge** | N C3 | 58.75 |

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## Multimeters - Digital - continued

### Digital Multimeter

**72-7930**

TENMA



W=88 H=179 D=39mm. Weight 62g

**AC Voltage**
Range 2V/20V/200V/1000V
Accuracy ±(0.8% + 3)

**DC Voltage**
Range 200mV/2V/20V/200V/1000V
Accuracy ±(0.5% + 1)

**AC Current**
Range 2mA/200mA/20A
Accuracy ±(1% + 3)

**DC Current**
Range 2mA/200mA/20A
Accuracy ±(0.8% + 1)

**Resistance**
Range 200Ω/2kΩ/20kΩ/2MΩ/20MΩ
Accuracy ±(0.8% + 1)

**Capacitance**
Range 2nF/200nF/100µF
Accuracy ±(4% + 3)

**Temperature**
Range -40 to 538°C
Accuracy ±(1% + 3)

**Frequency**
Range 2kHz/20kHz
Accuracy ±(1.5% + 5)

**General**
Power 9V Battery (6F22)

- 1999 digit display
- AC/DC voltage measurement
- AC/DC current measurement
- Resistance measurement
- Capacitance measurement
- Temperature measurement (°F only)
- Frequency measurement
- Diode test
- Continuity buzzer
- Transistor
- Data hold
- Full icon display
- Sleep mode
- Low battery display
- Meets **IEC1010** safety standards **CAT III 600V** and **CAT II 1000V**

**Supplied with:** test lead, battery, manual, test clip, multi-purpose socket, holster.

414621.381284

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|---|
| Digital Multimeter | 72-7930.1 | **918-3655** | 25.29 | 25.04 | 24.79 | 24.54 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C3 | 28.38 |
| **UKAS Calibration Charge** | N C3 | 58.75 |

### Digital Multimeters

**72-7720 and 72-7725**

TENMA



H=165, W=83, D=32mm



H=165, W=83, D=32mm

Full function multimeter offers a variety of ranges for every service application. Rugged overmolded housing stands up to the daily rigors of field service use, and large backlit LCD display is easily read from several feet away. Measures AC/DC voltage, AC/DC current, resistance and capacitance, the 72-7725 also measures frequency and temperature. 3-1/2 digit, 1999 count display features 7/8" digits for easy at-a-glance reading.

- Continuity buzzer
- Data hold
- Full icon display
- Sleep mode
- Low battery display
- Included standard test leads, plus separate short leads for accurate capacitance checking
- Includes standard 9V battery and owners manual
- Meets 1000V CATII standards

**72-7725 extra features**

- Temperature measurement (°C / °F)
- Frequency measurement

| | 72-7720 | 72-7725 |
|---|---|---|
| **DC Voltage** | | |
| Range | 200mV, 2V, 20V, 200V, 1000V | 200mV, 2V, 20V, 200V, 1000V |
| Accuracy | ±(0.5%+1) | ±(0.5%+1) |
| **AC Voltage** | | |
| Range | 200mV, 2V, 20V, 200V, 750V | 2V, 20V, 200V, 750V |
| Accuracy | ±(0.8%+3) | ±(0.8%+3) |
| **DC Current** | | |
| Range | 20µA, 2mA, 200mA, 20A | 20mA, 200mA, 20A |
| Accuracy | ±(0.8%+1) | ±(0.8%+1) |
| **AC Current** | | |
| Range | 200µA, 2mA, 20mA, 200mA, 20A | 20mA, 200mA, 20A |
| Accuracy | ±(1%+3) | ±(1%+3) |
| **Resistance** | | |
| Range | 200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 20MΩ, 200MΩ | 200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 20MΩ, 200MΩ |
| Accuracy | ±(0.8%+1) | ±(0.8%+1) |
| **Capacitance** | | |
| Range | 2nF, 20nF, 2µF, 100µF | 20nF, 200nF, 2µF, 100µF |
| Accuracy | ±(4%+3) | ±(4%+3) |
| **Temperature** | | |
| Range | | -40 - 1000°C, -40 - 1832°F |
| Accuracy | | ±(1%+3) |
| **Frequency** | | |
| Range | | 2kHz - 20kHz |
| Accuracy | | ±(1.5%+5) |
| **Input Impedance** | 10MΩ | 10MΩ |

347433.403296

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 25+ |
|---|---|---|---|---|
| 72-7720 | **743-0574** | 17.67 | 16.18 | 14.64 |
| 72-7725 | **743-0582** | 21.25 | 19.47 | 17.62 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |




**Don't forget Batteries!**

See page 1197

### Autoranging DMM with RS-232

**72-6870**

TENMA



A useful digital multimeter with RS-232 PC connection and software for display and capture.

- 3 ¾ digit, 4000 count LCD
- Auto/manual range selection
- AC/DC voltage 400mV to 1000V
- AC/DC current 40mA to 10A
- Current overload protection
- Capacitance 40nF to 100µF
- Temperature with built-in sensor and external probe
- Frequency and duty cycle measurement
- Diode test
- Continuity beeper
- RS-232 communication
- Relative value display
- Auto power off
- Meets **IEC1010** safety standards for **600V CAT II** applications
- Includes test leads, holster, 9V battery, temperature probe, owners manual, RS-232 software and cable

| | Range | Resolution | Accuracy |
|---|---|---|---|
| DC voltage | 400mV, 4V, 40V, 400V, 1000V | 0.1mV | ±(0.5%+ 3 digits) |
| AC voltage | 400mV, 4V, 40V, 400V, 700V | 0.1mV | ±(1.2%+ 3 digits) |
| DC current | 40mA, 400mA, 10A | 10µA | ±(1.5%+ 3 digits) |
| AC current | 40mA, 400mA, 10A | 10µA | ±(2%+ 5 digits) |
| Resistance | 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ | 0.1Ω | ±(1%+ 3 digits) |
| Capacitance | 40nF, 400nF, 4µF, 40µF, 100µF | 1pF | ±(3%+ 5 digits) |
| Frequency | 10Hz - 10MHz | 0.001Hz | ±(0.02%+ 1 digit) |
| Duty cycle | 0.1% - 99.9% | 0.1% | ±(0.02%+ 2 digits) |
| Temperature | -48°C - 749°C | | |

232195

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| 72-6870 | **360-6909** | 25.50 | 24.23 | 23.59 |

### Autoranging Multimeters

**72-7735, 72-7740 and 72-7745**

TENMA



H=171, W=86, D=38mm



H=171, W=86, D=38mm



H=171, W=86, D=38mm

Full function multimeters that offer a variety of ranges for every service application. Rugged overmolded housing stands up to the daily rigors of field service use, and large LCD display is easily read from several feet away. Measures AC/DC voltage, AC/DC current, resistance, capacitance, frequency, temperature (72-7740 and 72-7745 only) and duty cycle. 3-3/4 digit, 3999 count display features 3/4" digits and numerous on-screen icons, for easy at-a-glance reading.

- Switchable auto/manual range
- Diode check
- Continuity buzzer
- Data hold
- Full icon display
- Relative mode
- Low battery display
- Included standard test leads, plus separate short leads for accurate capacitance checking
- Comes complete with standard 9V battery and owners manual
- Meets 600V CATIII, and 1000V CATII standards

**72-7735 extra features**
- RS232C
- Display backlight

**72-7740 extra features**
- Sleep mode
- Temperature measurement (°C only)
- Thermocouple temperature probe

**72-7745 extra features**
- True RMS
- RS232C
- Display backlight
- Temperature measurement (°C only)
- Thermocouple temperature probe

| | Gamme | Précision |
|---|---|---|
| **DC Voltage** | 400mV, 4V, 40V, 400V, 1000V | ±(0.8%+1) |
| **AC Voltage** | 4V, 40V, 400V, 750V | ±(1%+5) |
| | 400µA, 4000µA, 40mA, 400mA, 4A, 10A | ±(1%+2) |
| **Courant CA** | 400µA, 4000µA, 40mA, 400mA, 4A, 10A | ±(1.5%+5) |
| **Résistance** | 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ | ±(1%+2) |
| **Capacité** | 40nF, 400nF, 4µF, 40µF, 100µF | ±(3%+5) |
| **Température** (72-7740 et 72-7745) | -40°C - 1000°C | ±(1%+3) |
| **Fréquence** | 10Hz - 10MHz | ±(0.1%+3) |

347434.403297

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| 72-7735 | **743-0590** | 28.69 | 28.40 | 28.12 | 27.84 |
| 72-7740 | **743-0604** | 33.13 | 32.80 | 32.47 | 32.15 |
| 72-7745 | **743-0612** | 44.46 | 44.02 | 43.58 | 43.14 |

## Multimeters with Analogue Bargraph

**72-7755 and 72-7760**



H=203, W=102, D=44mm



H=203, W=102, D=44mm

Rugged professional grade multimeter offers a complete set of ranges for every service application, including frequency and temperature (72-7755 only). Optical RS-232 interface allows datalogging with a PC, while safely keeping components isolated. Rugged moulded housing includes a specially designed holster to stand up to the daily rigours of field service use. Large backlit LCD display is easily read from several feet away. Measures AC/DC voltage, AC/DC current, resistance, capacitance, temperature (72-7755 only), RPM (72-7755 only) and frequency. 3-3/4 digit, 3999 (extended accuracy of a 7999 count display for 72-7760) count backlit display features 7/8" digits and numerous on-screen icons, for easy at-a-glance reading

- Switchable auto/manual range
- Diode check
- Continuity buzzer
- Min/max mode
- Relative mode
- Data hold
- Low battery display
- Sleep mode
- Included standard test leads, plus separate short leads for accurate capacitance checking
- Includes 4' opto-coupled RS-232 cable with female DB9 connector and datalogging software
- Comes complete with standard 9V battery and owners manual
- Meets 600V CATIII, and 1000V CATII standards

**72-7755 extra features**
- RPM measurement
- Temperature measurement (°C only)
- Includes thermocouple temperature probe

**72-7760 extra features**
- True RMS AC measurement
- Peak/min/max mode
- Max/min/average mode

| | 72-7755 | 72-7760 |
|---|---|---|
| **DC Voltage** | | |
| Range | 400mV, 4V, 40V, 400V, 1000V | 80mV, 800mV, 8V, 80V, 800V, 1000V |
| Accuracy | ±(0.8%+1) | ±(0.05%+10) |
| **AC Voltage** | | |
| Range | 4V, 40V, 400V, 750V | 800mV, 8V, 80V, 800V, 1000V |
| Accuracy | ±(1% +5) | ±(0.8% +20) |
| **DC Current** | | |
| Range | 400µA, 4000µA, 40mA, 400mA, 10A | 80mA, 800mA, 8A, 10A |
| Accuracy | ±(1%+2) | ±(0.2%+40) |
| **AC Current** | | |
| Range | 400µA, 4000µA, 40mA, 400mA, 10A | 80mA, 800mA, 8A, 10A |
| Accuracy | ±(1.5%+5) | ±(0.5%+40) |
| **Resistance** | | |
| Range | 400Ω,4KΩ,40KΩ,400KΩ,4MΩ,40MΩ | 800Ω,8KΩ,80KΩ,800KΩ,8MΩ,80MΩ |
| Accuracy | ±(1%+2) | ±(0.3%+40) |
| **Capacitance** | | |
| Range | 4nF,40nF,400nF,4µF,40µF,400µF,4mF,40mF | 1nF, 10nF, 100nF, 1µF, 10µF, 100µF |
| Accuracy | ±(4%+3) | ±(2%+3) |
| **Temperature** | | |
| Range | -40°C~1000°C | |
| Accuracy | ±(1%+3) | |
| **Frequency** | | |
| Range | 4kHz, 40kHz, 400kHz, 4MHz, 40MHz, 400MHz | 1kHz, 10kHz, 100kHz, 1MHz |
| Accuracy | ±(0.1%+3) | ±(0.02%+1) |
| **RPM** | | |
| Range | 40k RMP | |
| Accuracy | ±(0.1%+3) | |
| **Input Impedance** | 10MΩ | 10MΩ |

347436.403298

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | 10+ |
|---|---|---|---|---|---|
| 72-7755 | **743-0639** | 47.48 | 43.83 | 42.52 | 41.67 |
| 72-7760 | **743-0647** | 84.38 | 77.89 | 75.57 | 74.44 |

## Autoranging Multimeter with RS-232

**72-7750**



H=171, W=86, D=38mm

High accuracy, 5999 count multimeter offers a variety of ranges for every service application, plus an optically isolated RS-232 interface. Rugged overmolded housing stands up to the daily rigors of field service use, and large LCD display is easily read from several feet away. Measures AC/DC voltage, AC/DC current, resistance, capacitance, temperature and frequency. 3-3/4 digit, 5999 count backlit display features 3/4" digits and numerous on-screen icons, for easy at-a-glance reading.

- Switchable auto/manual range
- Diode check
- Continuity buzzer
- Data hold
- Low battery display
- Sleep mode
- Included standard test leads, plus separate short leads for accurate capacitance checking
- Includes 4' opto-coupled RS-232 cable with female DB9 connector and datalogging software
- Comes complete with standard 9V battery and owners manual
- Meets 600V CATIII, and 1000V CATII standards

| | | | |
|---|---|---|---|
| **DC Voltage** | | **Resistance** | |
| Range | 600mV, 6V, 60V, 600V, 1000V | Range | 600Ω, 6kΩ, 60kΩ, 600kΩ, 6MΩ, 60MΩ |
| Accuracy | ±(0.5%+3) | Accuracy | ±(1%+2) |
| **AC Voltage** | | **Capacitance** | |
| Range | 600mV, 6V, 60V, 600V, 1000V | Range | 6nF, 60nF, 600nF, 6µF, 60µF, 600µF, 6mF |
| Accuracy | ±(1% +2) | Accuracy | ±(3%+5) |
| **DC Current** | | **Temperature** | |
| Range | 60mA, 600mA, 10A | Range | -40°C - 1000°C |
| Accuracy | ±(1.2%+3) | Accuracy | ±(1%+3) |
| **AC Current** | | **Frequency** | |
| Range | 60mA, 600mA, 10A | Range | 6kHz, 60kHz, 600kHz, 6MHz, 60MHz |
| Accuracy | ±(2%+5) | Accuracy | ±(0.05%+3) |
| | | **Input Impedance** | 10MΩ |

347435

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | 10+ |
|---|---|---|---|---|---|
| 72-7750 | **743-0620** | 40.53 | 40.13 | 39.72 | 39.33 |

## TRMS Multimeter with USB Interface

**72-7730**



W=93 H=200 D=40mm. Weight 384g

Full function multimeter offers a variety of ranages for every service application, the accuracy of a 19,999 count display, and an optically isolated USB interface, It measures AC/DC voltage, AC/DC current, resistance, capacitance, temperature, frequency and duty cycle. Triple display features 12mm primary digits and dual 6mm secondary displays, plus an analogue bargraph and numerous on screen icons.

- True RMS measurement
- AC+DC measurement
- Selectable auto/manual range
- Data logging and data recall
- Peak hold and Data hold
- Max/min mode and Relative modes
- 4 - 20mA current loop measurement
- Dual level backlit display
- Supplied with 100mm opto-coupled USB cable, Data logging software, Standard test leads, Short clip leads for accurate capacitance measurements, Alligator clip adaptors, 9V battery, Soft case and detailed instruction manual

## Multimeters - Digital - continued

### TRMS Multimeter with USB Interface - continued

**72-7730 - continued**

| | Range | Accuracy |
|---|---|---|
| DC Voltage | 200mV, 2V, 20V, 200V, 1000V | ±(0.05% + 5d) |
| AC Voltage | 2V, 20V, 200V, 1000V | ±(0.6% + 40d) |
| DC Current | 200µA, 2mA, 20mA, 200mA, 10A | ±(0.1% + 15d) |
| AC Current | 200µA, 2mA, 20mA, 200mA, 10A | ±(1.8% + 15d) |
| Resistance | 200R, 2kR, 20kR, 200kR, 2MR, 20MR | ±(0.4% + 20d) |
| Capacitance | 20nF, 200nF, 2µF, 20µF, 200µF, 2mF, 20mF | ±(1.2% + 20d) |
| Temperature | -40°C to 1000°C | ±(1.0% + 30d) |
| Frequency | 20Hz, 200Hz, 2kHz, 20kHz, 200kHz, 2MHz, 20MHz, 200MHz | ±(0.1% + 15d) |
| Duty Cycle | 10% to 90% | ±(1.0% + 30d) |
| Current Loop | 4-20mA displays 0 - 100% | ±(1% + 50d) |
| Input Impedance | 10MR (2.5GΩ on 200mV range) | |

448303.460892

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | 10+ |
|---|---|---|---|---|---|
| 72-7730 | **128-3642** | 69.95 | 69.25 | 68.56 | 67.87 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |

### TRMS Multimeter with USB Data Logging

TENMA™

New

True RMS



- 40,000 count LCD display with bargraph
- Full icon display and dual backlight
- TRMS measurement
- Autoranging / manual range selection
- AC/DC voltage and current measurement
- Resistance and capacitance measurement
- Frequency and duty cycle measurement
- °C/°F temperature measurement (K type probes)
- 4-20mA measurement (0-100%)
- Min/Max/Relative modes
- Data and peak hold
- Continuity buzzer and diode test
- USB interface and datalogging (software supplied)
- Sleep mode and low battery warning
- Supplied with 9V battery, carry bag, USB lead, temperature probe, test leads, test clips and user manual

**Model:** Model: 72-7732
A high performance, intelligent multimeter with a USB interface and 9999 record datalogging. The multimeter also has extensive measurement functions, high accuracy and TRMS measurement.

| | Range | Accuracy |
|---|---|---|
| DC Voltage | | |
| AC Voltage | | |
| DC / AC Current | | |
| Resistance | 400Ω, 4KΩ, 40KΩ, 400KΩ, 4MΩ, 40MΩ | |
| Capacitance | 40nF, 400nF, 4 µF, 40(µF, 400µF, 4mF, 40mF | |
| Temperature | | |
| Frequency | 40Hz to 400MHz | |
| Data Logging | 9999 Records | |
| Input Impedance | 10MΩ | |
| Dimensions | 93x200x40mm (WxHxD) | |
| Weight | 384g | |

510034.509485

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| | **156-3719** | 101.95 | 100.93 |

### Pocket Digital Multimeters

AMPROBE®

**PM5X Series**



- Small meter with a large measurement capability
- Large oversize LCD display
- AutoTect™ directs the meter to know if its measuring AC Volts, DC Volts or Resistance
- Voltect™ built-in non-contact voltage detector
- Complete user protection with full CAT III safety ratings

Very compact digital multimeters that will easily fit in a shirt pocket. They are only 1cm thick and weigh 85g. Each powerful DMM is fully auto-ranging, has an oversized easy-to-read LCD display and is loaded with measurements, functions and features.

| | PM51A | PM53A | PM55A |
|---|---|---|---|
| Resolution (counts) | 4000 | 6000 | 6000 |
| Fully auto ranging | ● | ● | ● |
| Diode test | ● | ● | ● |
| Continuity with beeper | ● | ● | ● |
| AutoTect auto function switch | | ● | ● |
| VolTect non-contact voltage detector | | ● | ● |
| Holster/Carrying case | | ● / - | ● / ● |

**PM51A Ranges and Accuracy**

| | Range | Accuracy |
|---|---|---|
| DC voltage | 400mV | ±(1.0% + 2 digits) |
| | 4V, 40V, 400V | ±(2.0% + 2 digits) |
| | 600V | ±(2.5% + 4 digits) |
| AC voltage | 4V, 40V, 400V (50 - 60Hz) | ±(2.0% + 5 digits) |
| | 4V, 40V, 400V (60 - 500Hz) | ±(3.0% + 5 digits) |
| | 600V (50 - 500Hz) | ±(3.5% + 5 digits) |
| Capacitance* | 500nF, 5µF, 50µF, 500µF, 3000µF, | ±(3.5% + 6 digits) |
| Resistance | 400Ω | ±(1.5% + 6 digits) |
| | 4kΩ, 40kΩ, 400kΩ | ±(1.0% + 4 digits) |
| | 4MΩ | ±(1.5% + 4 digits) |
| | 40MΩ | ±(2.5% + 4 digits) |
| Frequency | 400Hz - 1MHz | ±(0.5% + 4 digits) |

**PM53A and PM55A Ranges and Accuracy**

| | Range | Accuracy |
|---|---|---|
| DC voltage | 6V | ±(0.5% + 3 digits) |
| | 60V | ±(1.0% + 5 digits) |
| | 450V (PM53 only) | ±(1.2% + 5 digits) |
| | 600V (PM55 only) | 1.5% + 5 digits (hi-Z only) |
| AC voltage | 6V, 60V, 450V (50 - 60Hz) | ±(1.5% + 5 digits) |
| Capacitance (PM53) * | 100nF, 1µF, 10µF, 50µF, 500µF, 3000µF | ±(3.5% + 6 digits) |
| Capacitance (PM55) * | 100nF, 1µF, 10µF, 100µF, 2000µF | ±(3.5% + 6 digits) |
| Resistance | 600Ω (PM55 only) | ±(2.0% + 6 digits) |
| | 6kΩ | ±(1.5% + 6 digits) |
| | 60kΩ, 600kΩ | ±(1.0% + 4 digits) |
| | 6MΩ | ±(2.0% + 4 digits) |
| Frequency (PM53) | 100 Hz, 1 kHz, 10 kHz 400 kHz, 1 MHz | ±(0.5% + 4 digits) |
| Frequency (PM55) | 10Hz - 999.9Hz | ±(0.5% + 4 digits) |
| DC current | 400µA | ±(1.5% + 3 digits) |
| | 2000µA | ±(1.2% + 3 digits) |
| AC current | 400µA | ±(2.0% + 3 digits) |
| | 2000µA | ±(1.5% + 4 digits) |

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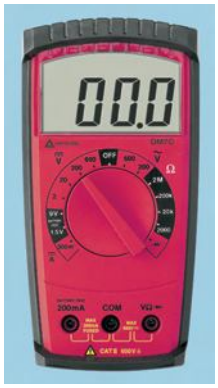
| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| PM51A | **146-6477** | 23.00 | 22.31 | 21.64 |
| PM53A | **146-6478** | 28.00 | 27.16 | 26.35 |
| PM55A | **146-6479** | 39.00 | 37.83 | 36.70 |

* Additional 50nF range - accuracy not specified. Accuracies with film capacitor or better. Updates > 1 minute on larger values. Accuracy may fall off as battery voltage falls below 2.8V.

### Pocket-Sized Digital Multimeter

AMPROBE®

**DM7C**



- Digital display multimeter for home, car, boat or workshop
- 6 functions/14 ranges
- Special ranges to test batteries
- Industry standard test leads, safety rated
- Protective holster and battery included
- CAT II 600 V rated

W=85 H=170 D=50mm.
Weight 410g

| | Range | Accuracy |
|---|---|---|
| DC voltage | 2V, 20V, 200V, 600V | ±1.2% rdg + 3 digits |
| AC voltage | 200V, 600V | ±1.5% rdg + 3 digits |
| DC Current | 200 mA | ±2.5% rdg + 3 digits |
| Resistance | 2kR, 20kR, 200kR, 2MR | ±1.5%rdg + 3 digits |
| Battery test | 1.5V, 9V | ±(2.5% rdg + 3 digits) |
| Diode test | 1mA/3.2V dc | 15% |

489631.502925

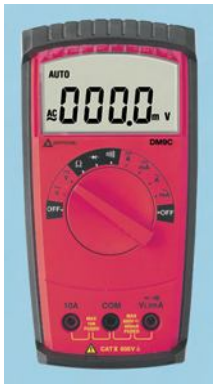
| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| DM7C | **146-6448** | 23.00 | 22.31 | 21.64 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C2 | 25.07 |
| **UKAS Calibration Charge** | N C2 | 36.33 |

## Pocket-Sized Digital Multimeter

AMPROBE

**DM9C**



- High-resolution, 4000-count autoranging
- 7 functions/23 ranges
- Battery Test Function with Go/NoGo LED indicator
- Industry standard test leads, safety rated
- Protective holster and battery included
- CAT II 600 V rated

W=78 H=140 D=50mm. Weight 215g

| | Range | Accuracy |
|---|---|---|
| DC Voltage | 400mV, 4V, 40V, 400V, 600V | ±(0.8% + 3d) |
| AC Voltage | 4V, 40V, 400V, 600V | ±(1.3% + 5d) |
| DC Current | 40, mA, 400mA, 10A | ±(1.5% + 3d) |
| AC Current | 40, mA, 400mA, 10A | ±(1.5% + 3d) |
| Resistance | 400R, 4kR, 40kR, 400KR, 4MR, 40MR | ±(1.5% + 3d) |
| Continuity Test | <60Ω | |
| Diode test | 0.5mA /3.2V dc | |

489630.502924

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| DM9C | **146-6449** | 40.00 | 38.80 | 37.64 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | **S** C2 | 25.07 | |
| **UKAS Calibration Charge** | | **N** C2 | 36.33 | |

## Digital Multimeters

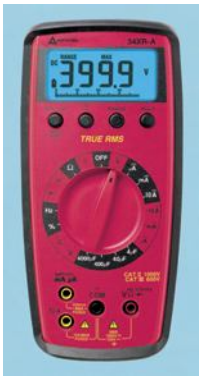
AMPROBE

True RMS

**XR Series**



30XR-A



34XR-A

W=92 H=196 D=60mm.
Weight 400 - 426g



37XR-A



38XR-A

W=92 H=196 D=60mm.
Weight 450g

The XR series of multimeters is designed for electronic, electrical, plant maintenance and HVAC use. Three models are true-rms: 34XR-A, 37XR-A and 38XR-A. Two are average responding, 30XR-A and 33XR-A. All five meters have a Magne-Grip Holster with magnetic hanging strap that secures the meter to a convenient steel surface, freeing both hands for work.

**30XR-A:** Has all the basic functions for automotive, residential and education applications.
**33XR-A:** Gives the contractor and field service technician all the essential measurement functions they need in a rugged package.
**34XR-A:** True RMS with temperature and backlight. Ideal for contractors and field service technicians.
**37XR-A:** True RMS meter for electronics troubleshooting at the bench or job site. The highest accuracy meter in the XR series.
**38XR-A:** True RMS digital multimeter with optical PC interface.

**All models come with the following included accessories:**

- Test leads with threaded alligator clips (TL36)
- Magne-Grip™ Holster with magnetic hanging strap
- 9 V battery, spare fuse, operators manual

**In addition the 33XR-A, 34XR-A and 38XR-A include:**

- Temperature adaptor (XR-TA)
- Type K thermocouple probe(TP255)

| Model | 30XR-A | 33XR-A | 34XR-A | 37XR-A | 38XR-A |
|---|---|---|---|---|---|
| True RMS | | | ● | ● | ● |
| Auto-ranging | | | ● | ● | ● |
| Bright Blue Backlight | | | | ● | ● |
| Min/Max | | ● | ● | ● | ● |
| Average | | | | ● | ● |
| Relative & Peak Hold | | ● | | ● | ● |
| Data Hold | | ● | ● | ● | ● |
| Range Hold | | | ● | | |
| Auto Power Off | | ● | ● | ● | ● |
| RS232 PC Interface | | | | | ● |
| LCD Digits | 1999 | 3999 | 3999 | 10000 | 10000 |
| LCD Bargraph | -- | 41-segment | 41-segment | 41-segment | 41-segment |
| Basic Accuracy | 1% | 0.7% | 0.5% | 0.1% | 0.25% |
| **Measurement Ranges** | | | | | |
| AC Voltage | 600V | 750V | 750V | 750V | 750V |
| DC Voltage | 600V | 1000V | 1000V | 1000V | 1000V |
| AC/DC Current | 10A | 10A | 10A | 10A | 10A |
| Resistance | 20MΩ | 4MΩ | 40MΩ | 40MΩ | 40MΩ |
| Capacitance | 200µF | 4mF | 4000µF | 400µF | 400µF |
| Temperature | -- | -20 to 1000°C | -20 to 1000°C | -20 to 1300°C | -- |
| Frequency | -- | 0 - 40 MHz | 0 - 40 MHz | 0 - 40 MHz | 0 - 40 MHz |
| Duty Cycle | -- | -- | 0 - 90% | 0 - 90% | 0 - 90% |
| dBm | -- | -- | -- | -13 to +50 dBm | -13 to +50 dBm |
| Loop Current (4 - 20mA dc) | -- | -- | -- | -- | 0 - 100% |
| Inductance | -- | -- | -- | 40 H | -- |
| Non-Contact Voltage Detect | 70 to 600V ac | -- | -- | -- | -- |
| Battery Test | 1.5V, 9V | -- | -- | -- | -- |
| Logic Test | -- | -- | -- | TTL & CMOS | -- |
| Audible Continuity Test | ● | ● | ● | ● | ● |
| Diode Test | ● | ● | ● | ● | ● |
| Safety Category | 300V CATIII 600V CATII | 600V CATIII 1000V CATII | 600V CATIII 1000V CATII | 600V CATIII 1000V CATII | 600V CAT IV 1000V CAT III |
| Warranty | 1 year | 1 year | 3 years | 3 years | 3 years |

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| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Digital Multimeter | 30XR-A | C4 **146-6462** | 50.00 | 48.50 | 47.05 |
| Digital Multimeter | 33XR-A | C4 **146-6459** | 71.00 | 68.87 | 66.80 |
| True rms DMM | 34XR-A | C4 **146-6461** | 91.00 | 88.27 | 85.62 |
| True rms DMM | 37XR-A | C4 **146-6455** | 104.00 | 100.88 | 97.85 |
| True rms DMM | 38XR-A | C4 **146-6456** | 119.00 | 115.43 | 111.97 |
| PC Software and Cable | 38-SWA | **146-6457** | 16.00 | 15.52 | 15.05 |
| Carry Case | VC221A | **146-6465** | 16.00 | 15.52 | 15.05 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | | **S** C4 | 34.10 | |
| **UKAS Calibration Charge** | | | **N** C4 | 58.75 | |

## Compact Digital Multimeters

New

AMPROBE

**XP Series**



5XP-A



15XP-A



35XP-A

Compact digital multimeters providing superior features and accuracy in a smaller form factor. The XP series features unique functions such as VolTect™ non-contact voltage (NCV) detection, temperature and Magne-Grip™ holster that frees both hands.

- VolTech™ non-contact voltage detection lets you instantly detect dangerous AC voltage
- Magne-Grip™ holster with magnetic strap frees both hands for work
- Battery Test (5XP-A only)
- Continuity Test
- Diode Test
- Min/Max and Data Hold
- CAT II 600V
- 2000 count resolution provides precise measurements
- Supplied with 5 language manual, holster, test leads and battery

CALIBRATION SERVICES

**15XP-A Additional features:**

- TTL logic test for digital circuits
- Autoranging
- Integrated tilt stand for easy bench top use

**35XP-A Additional features:**

# Multimeters - Digital - continued

## Compact Digital Multimeters - continued

### XP Series - continued

- Temperature measurement capability to 1000°C/1832°F is good for HVAC and industrial applications
- Capacitance for testing motor run/test capacitance
- Frequency lets you test and verify control systems
- Cat III 300V, Cat II 600V & Cat I 1000V

| | Range | Accuracy |
|---|---|---|
| **DC Voltage** | 200mV, 2V, 20V, 200V, 1000V | ±(1% rdg + 1 dgt) (5XP) |
| **AC Voltage** | 200mV, 2V, 20V, 200V, 750V | ±(1.5% rdg + 5 dgts) |
| | Resolution = 100µV | Input Impedance = 10MΩ |
| **DC Current** | 200µA, 2mA, 20mA, 200mA | ±(1.5% rdg + 1 dgt) |
| | 2A (15XP only) | ±(2% rdg + 3 dgt) |
| **AC Current** | 200µA, 2mA, 20mA, 200mA | ±(2% rdg + 5 dgts) |
| | 2A (15XP only) | ±(2.5% rdg + 5 dgts) |
| | Resolution = 0.1µA | |
| **Resistance** | 200Ω, 2kΩ, 20kΩ, 200kΩ | ±(1% rdg + 4 dgts) |
| | 2MΩ | ±(1.5% rdg + 4 dgts) |
| | 20MΩ | ±(2% rdg + 5 dgts) |
| | Resolution = 100mΩ | |

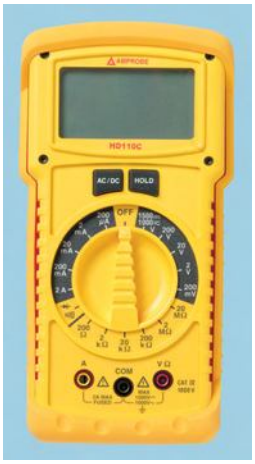
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| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| 5XP-A | **146-6466** | 30.00 | 29.10 | 28.23 |
| 15XP-A | **146-6467** | 46.00 | 44.62 | 43.28 |
| 35XP-A | **146-6468** | 62.00 | 60.14 | 58.34 |
| | | | | **Price Each** |
| **Standard Calibration Charge** | | | S C4 | 34.10 |
| **UKAS Calibration Charge** | | | N C4 | 58.75 |

## Heavy Duty Handheld Digital Multimeter

AMPROBE

### HD110C



The HD110C is designed for professional use in harsh environments. The meter is unusually rugged and reliable in everyday heavy use applications. The meter is made using waterproof construction to prevent dirt, grime and moisture from entering the case. Built of tough, fire retardant thermoplastic resistant to grease and chemical spills, with all sensitive components shock-mounted for a drop resistant to at least 8ft. HD110C has an extended voltage measurement capability of 1500V dc and 1000V ac. The extended voltage ranges can withstand transients up to 12kV.

- Measures up to 1500V dc and 1000V ac
- 3½ digit LCD display, 1999 counts, with annunciators and menu features
- CAT IV 1000 V rated
- Special sealing for environment and water resistance. IP67 rated
- Constructed with drop-resistant housing and PCB mounting
- Magne-Grip[TradeMark] holster, frees both hands for work
- Continuity buzzer
- Typically 500 hours operation with 9V alkaline battery
- Auto power-down

Supplied with heavy duty CAT IV 1000V test leads with threaded alligator clips (TL1500), battery (in instrument), hex wrench in holster, Magne-Grip flex strap and user manual

| | Maximum | Max. Resolution | Best Accuracy |
|---|---|---|---|
| DC Voltage | 1500V | 0.1mV | ±(0.1%+2) |
| AC Voltage | 1000V | 0.1mV | ±(0.8%+4) |
| DC Current | 2A | 0.1µA | ±(0.5%+2) |
| AC Current | 2A | 0.1µA | ±(0.8%+4) |
| Resistance | 20MΩ | 0.1Ω | ±(0.3%+2) |

488729.503498

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| HD110C | **146-1570** | 135.00 | 130.95 | 127.02 |
| | | | **Price Each** | |
| **Standard Calibration** | | S C4 | 34.10 | |
| **UKAS Calibration** | | N C4 | 58.75 | |

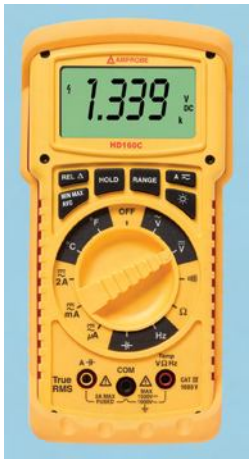
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## Heavy Duty Handheld Digital Multimeter

True RMS AMPROBE

### HD160C



The HD160C is designed for professional use in harsh environments. The meter is rugged and reliable in everyday heavy use applications. The meter is made using waterproof construction to prevent dirt, grime and moisture from entering the case. Built of tough, fire retardant thermoplastic resistant to grease and chemical spills, with all sensitive components shock-mounted for a drop resistant to at least 8ft. HD160C has an extended voltage measurement capability of 1500V dc and 1000V ac. The extended voltage ranges can withstand transients up to 12kV.

- Measures up to 1500 Vdc and 1000 Vac
- Rugged autoranging meter with **true rms**
- 4 digit LCD display, 9999 counts, with annunciators, menu features and 41 segment bargraph
- CAT IV 1000 V rated
- Special sealing for environment and water resistance - IP67 rated
- Constructed with drop-resistant housing and PCB mounting
- Measures **capacitance, temperature** and **frequency**
- 10,000 count resolution with bar graph
- Magne-Grip™ holster, frees both hands for work
- Digi-Glo™ bright backlight
- Continuity buzzer
- Typically 150 hours operation with 9V alkaline battery
- Auto power-down

Supplied with heavy duty CAT IV 1000V test leads with threaded alligator clips (TL1500), battery (in instrument), hex wrench in holster, holster with Magne-Grip flex strap, type K thermocouple probe (TP255), temperature adaptor (TA-1A) and user manual

| | Maximum | Max. Resolution | Best Accuracy |
|---|---|---|---|
| DC Voltage | 1500V | 0.1mV | ±(0.1%+5) |
| AC Voltage | 1000V | 0.1mV | ±(1.2%+10) |
| DC Current | 2A | 0.01µA | ±(0.5%+5) |
| AC Current | 2A | 0.01µA | ±(2.0%+10) |
| Resistance | 40MΩ | 0.1Ω | ±(0.5%+8) |
| Capacitance | 400µF | 0.01nF | ±(3.0%+10) |
| Temperature | -20°C to 1300°C | 1°C | ±(1.0%+3°C) |
| Frequency | 10MHz | 0.01Hz | ±(0.1%+5) |

488730.503499

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| HD160C | **146-1571** | 214.00 | 207.58 | 201.35 |
| | | | **Price Each** | |
| **Standard Calibration** | | S C4 | 34.10 | |
| **UKAS Calibration** | | N C4 | 58.75 | |

## Mini Digital Multimeters with Voltage Detection

EXTECH INSTRUMENTS

### EX300 Series



W=76 H=147 D=42mm. Weight 260g

- 0.5% basic accuracy
- Built-in non-contact AC Voltage Detector with red LED indicator and audible beeper
- Low battery indicator
- Built-in probe storage
- Supplied with stand, test leads, protective holster and batteries
- Model EX330 additionally supplied with bead wire temperature probe

| | EX310 | EX320 | EX330 |
|---|---|---|---|
| Max. Reading | 1999 | 1999 | 3999 |
| Auto Ranging | | ● | ● |
| Basic Accuracy | 0.5% | 0.5% | 0.5% |
| NC Voltage Detect | | 100 to 600Vac | |
| AC/DC Voltage | | 0.1mV to 600V | |
| AC/DC Current | 0.1mA to 10A | 0.1µA to 10A | 0.01µA to 10A |
| Resistance | 0.1Ω to 2MΩ | 0.1Ω to 20MΩ | 0.1Ω to 40MΩ |
| Capacitance | | | 1pF to 200µF |
| Frequency | | | 0.001Hz to 10kHz |
| Temperature | | | -50 to 1000°C |
| Duty Cycle | | | 0.1% - 99.9% |
| Battery Test | ● | | |
| Diode / Continuity | ● | ● | ● |
| Data Hold | | ● | ● |

| | EX310 | EX320 | EX330 |
|---|---|---|---|
| Max Hold | | ● | |
| Relative | | | ● |
| Auto Power Off | | ● | ● |
| Safety | | Cat III 600V | |
| Power | 9V Battery | 2 x AAA Battery | 2 x AAA Battery |

446744.437842

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| EX310 | **127-1505** | 22.49 | 20.07 | 15.03 |
| EX320 | **127-1506** | 33.77 | 27.62 | 21.42 |
| EX330 | **127-1508** | 45.04 | 34.95 | 28.19 |
| | | | Price Each | |
| **Standard Calibration Charge** | **S** C4 | | 34.10 | |
| **UKAS Calibration Charge** | **N** C4 | | 58.75 | |

## Digital Multimeters with IR Thermometer

**EX450 Series**

EXTECH INSTRUMENTS



W=76 H=147 D=42mm. Weight 260g

- Non-contact InfraRed thermometer measures surface temperature of objects unsafe to contact or difficult to reach
- InfraRed features 8:1 distance to target ratio with 0.95 fixed emissivity
- Input fuse protection and mis-connection warnings with audible and visible signals
- True RMS measurements (EX470 only)
- Auto power off, Data Hold
- Diode and continuity tests
- Supplied with test leads, multi-position tilt stand, hanging strap, holster with test lead storage and 9V battery
- Model EX470 additionally supplied with bead wire temperature probe

| | EX450 | EX470 |
|---|---|---|
| Max. Reading | 3999 | 3999 |
| True RMS | | ● |
| Basic Accuracy | 0.5% | 0.3% |
| AC Voltage | 1mV to 750V | 1mV to 750V |
| DC Voltage | 0.1mV to 1000V | 0.1mV to 1000V |
| AC/DC Current | 0.1µA to 20A | 0.1µA to 20A |
| Resistance | 0.1Ω to 20MΩ | 0.1Ω to 40MΩ |
| Capacitance | | 0.01nF to 100µF |
| Frequency | | 0.001Hz to 10MHz |
| Temperature (IR) | -50 to 270°C | -50 to 270°C |
| Temperature (Type K) | | -20 to 750°C |
| Duty Cycle | | 0.1% - 99.9% |
| Relative | | ● |
| Safety | Cat III 600V | |
| Power | 9V PP3 Battery | 9V PP3 Battery |

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| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| EX450 | **127-1509** | 67.61 | 58.35 | 43.97 |
| EX470 | **127-1510** | 101.42 | 89.07 | 69.91 |
| | | | Price Each | |
| **Standard Calibration Charge** | **S** C4 | | 34.10 | |
| **UKAS Calibration Charge** | **N** C4 | | 58.75 | |


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## Industrial Digital Multimeter

**EX510**

EXTECH INSTRUMENTS



W=83 H=184 D=57mm. Weight 400g

- Waterproof (IP67) double moulded design
- Rugged design - drop proof to 6 feet
- Large backlit LCD with bargraph
- Diode open circuit voltage of 2.8V DC
- Auto power off with disable feature
- Diode and continuity tests
- CE and EN61010 CAT IV-600V, and CAT III-1000V
- Supplied with double moulded test leads, carrying case, magnetic hanging strap and 9V battery.

| | EX510 |
|---|---|
| Max. Reading | 5999 |
| Basic Accuracy | 0.09% |
| AC Voltage | 1mV to 1000V |
| DC Voltage | 0.1mV to 1000V |
| AC/DC Current | 0.1µA to 20A |
| Resistance | 0.1Ω to 40MΩ |
| Frequency | 0.01Hz to 40MHz |
| Data Hold | ● |
| Min/Max and Relative | ● |
| Safety | Cat IV 600V |
| Power | 9V PP3 Battery |

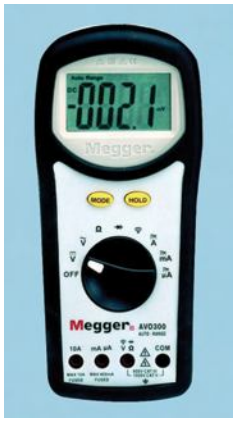
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| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| EX510 | **127-1511** | 101.42 | 89.07 | 69.91 |
| | | | Price Each | |
| **Standard Calibration Charge** | **S** C4 | | 34.10 | |
| **UKAS Calibration Charge** | **N** C4 | | 58.75 | |

## Digital Multimeters

**AVO300 Series**

Megger



W=82 H=182 D=55mm. Weight 375g

Tough compact instruments designed for the contracting electrician, but are also suitable for a wide range of applications and users.Both instruments offer a range of measurement modes for AC and DC applications, resistance and current measurement. The AVO300 series multimeters have tough rubber armoured cases offering the maximum amount of protection from the extreme use found in modern industrial environments. They draw on extensive experience of Megger engineers in designing safe reliableinstruments for the electrical industry. Neither of the instruments are burdened with functions that never get used. This keeps the instruments simple to operate without the continued need to refer to the user manual.

- Designed for Electricians
- Fully auto ranging
- Large display characters
- Separate battery and fuse cover
- Data hold and Min/Max store
- **IEC 61010-1 CATIII 600 V**

CALIBRATION SERVICES

| | AVO300 | AVO310 | | AVO300 | AVO310 |
|---|---|---|---|---|---|
| Fast continuity buzzer | ● | ● | Tough rubber armoured case | ● | ● |
| Auto-ranging | ● | ● | Integral stand / hanger | ● | ● |
| Data Hold | ● | ● | Probe holder | ● | ● |
| Max / Min | | ● | Auto power down | ● | ● |
| Backlight | | ● | Battery low warning | ● | ● |

| | | | Resolution | Accuracy |
|---|---|---|---|---|
| **Measurement Ranges** | | | | |
| **DC Voltage** | 400mV, 4V, 40V, 400V, 1000V | | 0.1mV, 1mV, 10mV, 100mV, 1V | 0.8% ±2 digits |
| **AC Voltage** | 400mV*, 4V, 40V, 400V, 1000V | | 0.1mV, 1mV, 10mV, 100mV, 1V | 1.0% ±5 digits |
| **DC Current** | 400µA, 4mA, 40mA, 400mA, 10A | | 400µA, 4mA, 40mA, 400mA, 10A | 1.0% ±3 digits |
| **AC Current** | 400µA, 4mA, 40mA, 400mA, 10A | | 400µA, 4mA, 40mA, 400mA, 10A | 1.5% ±5 digits |
| **Resistance** | 400R, 4kR, 40kR, 400kR, 4MR, 40MR | | 0.1R, 1R, 10R, 100R, 1kR, 10kR | 0.8% ±2 digits |
| **Diode Test** | 0.3mA / 1.5V **(AVO300)** | | 1mV | +10% ±5 digits |
| | 1mA / 3V **(AVO310)** | | 1mV | +10% ±5 digits |
| **Continuity** | **AVO300:** <10Ω to 30Ω. 0.3mA. **AVO310:** <35Ω. 1.5mA. | | | |

* AVO310 only

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| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| DMM | AVO300-EN | **108-6231** | 69.00 | 67.62 | 66.27 |
| DMM | AVO310-EN | **108-6232** | 79.00 | 77.42 | 75.87 |
| Test Leads | 6220-779 | **108-6237** | 23.00 | 22.54 | 22.09 |
| Fused Test Leads | 6220-789 | **108-6238** | 40.00 | 39.20 | 38.42 |


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## Multimeters - Digital - continued

### Digital Multimeters

*digimess*®

**HM Series**





The **digimess**® HM series is a comprehensive range of low cost general purpose hand held digital multimeters including 2000, 4000, & 6000 count models. As well as standard DC/AC volts, DC/AC current & resistance ranges, all models in the HM series include temperature, capacitance, diode test, continuity test & data hold. Additional features depending on the specific model include true rms, back lit LCD displays, frequency, duty cycle, max/min/rel value & transistor HFE (using the supplied multi-function adaptor). All units are supplied with integral rubber holsters, test leads, batteries, K type thermocouples & operating manuals. HM300 also includes a moulded carrying case, RS232 cable & software.

| **HM200** | **501-9850** |
|---|---|
| No. of counts | 2000 |
| **DC volts** | 200mV, 2V, 20V, 200V, 600V, |
| Accuracy | 0.7% |
| **AC volts** | 200mV, 2V, 20V, 200V / 600V |
| Accuracy | 0.8% / 1.0% |
| **DC Current** | 200µA, 2000µA, 20mA, 200mA / 2A,10A |
| Accuracy | 1.2% / 2.0% |
| **AC Current** | 200µA, 2000µA, 20mA, 200mA / 2A / 10A |
| Accuracy | 1.5% / 3.0% |
| **Resistance** | 200, 2k, 20k, 2M, 20M |
| Accuracy | 1.0% |
| **Capacitance** | 20nF, 200nF, 2µF, 20µF, 200µF, 1000µF |
| Accuracy | 4.0% |
| **Frequency** | N/A |
| **Temperature** | -20°C to 0°C 5.0%, 0°C to 400°C 1.0%, 400°C to 1000°C 2.0% |
| **Miscellaneous** | Data hold, max value, auto range, continuity, diode test, HFE, back lit LCD display, auto power off, multi-function adaptor for HFE, temperature & capacitance |
| **Safety** | IEC1010 CAT III 600V |
| **Dimensions & Weight** | 158x74x31mm, 220g |

| **HM200** | **501-9850** |
|---|---|
| No. of counts | 4000 |
| **DC volts** | 400mV / 4V, 40V, 400V, 1000V, |
| Accuracy | 1.0% / 0.5% |
| **AC volts** | 400mV / 4V, 40V, 400V, 1000V |
| Accuracy | 3.0% / 1.0% |
| **DC Current** | 400µA, 4000µA, 40mA, 400mA, 4A, 10A |
| Accuracy | 1.5% |
| **AC Current** | 400µA, 4000µA, 40mA, 400mA, 4A, 10A |
| Accuracy | 1.5% |
| **Resistance** | 400, 4k, 40k, 400k, 4M / 40M |
| Accuracy | 0.5% / 1.5% |
| **Capacitance** | 50nF, 500nF, 5µF, 50µF, 100µF |
| Accuracy | 3.0% |
| **Frequency** | 50Hz, 500hZ, 5kHz, 50kHz, 100kHz 0.1% duty cycle |
| **Temperature** | -55°C to 0°C 9.0%, 1°C to 4000°C 2.0%, 401°C to 1000°C 2.0% |
| **Miscellaneous** | Data hold, rel value, auto/manual range, continuity, diode test, auto power off, wrong connection protection, multi-function adaptor for temperature & capacitance |
| **Safety** | IEC1010 CAT III 600V<br>IEC1010 CAT II 1000V |
| **Dimensions & Weight** | 185x85x38mm, 380g |

| **HM300** | **501-9862** |
|---|---|
| No. of counts | 6000 |
| **DC volts** | 600mV, 6V, 60V, 600V / 1000V |
| Accuracy | 0.5% / 0.8% |
| **AC volts** | 600mV / 6V, 60V, 600V / 700V |
| Accuracy | 1.0% / 0.8% / 1.0% |
| **DC Current** | 600µA, 6000µA / 60mA, 600mA / 10A |
| Accuracy | 0.8% / 1.2% / 1.5% |
| **AC Current** | 600µA, 6000µA / 60mA, 600mA / 10A |
| Accuracy | 1.0% / 1.5% / 2.0& TRMS |
| **Resistance** | 600, 6k, 60k, 600k, 6M / 60M |
| Accuracy | 1.0% / 1.5% |
| **Capacitance** | 6nF / 60nF, 600nF, 6µF / 60µF, 600µF, 6mF |
| Accuracy | 2.0% / 1.0% / 1.5% |
| **Frequency** | 6kHz, 60kHz, 600kHz, 6MHz, to 10MHz 0.1%, 60MHz |
| **Temperature** | -40°C to -20°C ±2°C, -19°C to 350°C 0.5%, 351 to 1000°C 2% |
| **Miscellaneous** | Data hold, max/min value, auto/manual range, trms, continuity, diode test, back lit LCD display, auto power off, RS232 cable and software*, moulded carry case |
| **Safety** | IEC1010 CAT III 1000V |
| **Dimensions & Weight** | 195x92x43mm, 380g |

* Logic Driver not compatible with Windows XP

339426.343946

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| HM100 | **501-9849** | 29.58 | 27.54 | 26.52 |
| HM200 | **501-9850** | 49.98 | 46.92 | 45.39 |
| HM300 | **501-9862** | 80.58 | 76.50 | 73.44 |

### TRMS Digital Graphic Multimeters

True RMS metrix

**MTX3280 Series**




- Large, swivelling, graphic LCD display
- 4x 100,000 count digital displays, bargraph, graphic measurement log
- Basic accuracy: 0.02%, Pass band: 200kHz
- 3 measurement terminals with automatic selection and autoranging
- Eight key virtual measurement selector with simple one-handed operation
- "SPEC" function calculates measurement tolerances such as min/max values
- "AUTOPEAK" mode, auto range management prevents peak factor limitation (not MTX3281)
- Frequency measurements up to 2MHz, period, duty cycle and event counting
- Temperature measurement using Pt 100, Pt 1000 probes, and J or K thermocouples
- Preferred measurement setup can be saved for any physical quantity
- Storage of 6500 measurements with date and time (up to 4 simultaneous parameters)
- HOLD and AUTOHOLD functions
- Relative, surveillance and maths functions
- Optical RS232, USB communication, depending on the model
- Power supply from batteries, rechargeable NiMH batteries or mains adaptor

| | **MTX3281** | **MTX3282** | **MTX3283** |
|---|---|---|---|
| **DC, AC & AC+DC Voltages (Ranges: 100mV - 1V - 10V - 100V - 1000V / Resoutions: 1µV to 10 mV)** | | | |
| Basic Accuracy, DC | 0.1% | 0.03% | 0.02% |
| Basic Accuracy, AC and AC+DC | 0.7% | 0.3% | 0.3% |
| Specified Pass Band | DC to 50kHz | DC to 100kHz | DC to 200kHz |
| **DC, AC and AC+DC Current (6 ranges from 1mA to 20A)** | | | |
| Basic Accuracy, DC | 0.08% | 0.08% | 0.08% |
| Basic Accuracy, AC and AC+DC | 1.0% | 0.3% | 0.3% |
| Specified Pass Band | DC to 20kHz | DC to 50kHz | DC to 50kHz |
| **Time Measurements** | | | |
| Frequency & Period | 7 ranges from 10Hz to 2MHz. Basic Accuracy: 0.02% | | |
| Duty Cycle | 5% to 95%. Resolution 0.01% | | |
| Pulse Counting | N/A | Up to 99,999 counts. Min. duration 5µs. | |
| Graphical Logging | Relative Mode | Date/Time Mode | |
| **Resistance (Ranges: 1kΩ - 10kΩ - 100kΩ - 1MΩ - 10MΩ - 50MΩ / Resolutions: 10mΩ to 1kΩ)** | | | |
| Basic Accuracy | 0.1% | 0.07% | 0.07% |
| Audible Continuity Detection | Range 1kΩ - 5ms response time | | |
| **Diode Test** | 0 to 2.6V. Accuracy 2%. Measuring current 1mA. | | |
| **Capacitance** | 7 ranges frm 10nF to 10mF. Basic accuracy 1% | | |
| **Temperature Measurement** | | | |
| Pt 100 or Pt 1000 Probes | N/A | -125°C to 800°C. Basic accuracy ±0.5°C | |
| J or K thermocouples | -40°C to 750°C (J) or 1200°C (K). Basic accuracy 0.1% | | |
| **Other Measurements** | | | |
| V Peak >250µs & Peak Factor | Measurement of glitches and periodic phenomena | | |
| dBm Measurement | N/A | N/A | Resolution 0.01dBm |
| Resistive Power ($V^2/R$ or $I^2R$ | N/A | N/A | Resolution 100µW |
| dB Function | N/A | N/A | dB variaton vs reference |

403598

| Mfrs. List No. | Order Code | Price Each |
|---|---|---|
| **Standard Versions** | | |
| MTX3281 | **111-1458** | 282.86 |
| MTX3282 | **111-1459** | 407.24 |
| MTX3283 | **111-1460** | 448.00 |
| **RS232 / USB Versions** | | |
| MTX3281-COM | **111-1461** | 358.27 |
| MTX3282-COM | **111-1463** | 452.65 |
| MTX3283-COM | **111-1464** | 508.45 |

### METRA*hit*

GOSSEN METRAWATT

**Multimeters**

**'Simple and Safe' Automatic Blocking System**

All **METRA*hit*** multimeters utilise the patented Automatic Blocking System designed to reduce the risks highlighted within the health and safety guidance note GS38. This safe connection system prevents incorrect connection of the measuring leads to the multimeter once the function has been selected or incorrect function selection when the leads are already connected to the instrument.
This system prevents unnecessary blown fuse, significantly reduces the potential danger to

the user, instrument and system under test. When working on equipment or systems with a potential high-energy source (this could include both AC power or DC battery systems), fused leads will also help meet the requirements of the HSE guidance note **GS 38** adding to operator safety.

338636

## TRMS Digital Multimeters

GOSSEN METRAWATT

**METRA*hit* Series**

True RMS

CALIBRATION SERVICES





A range of TRMS digital multimeters complete with "Automatic Blocking System", a safety system which prevents incorrect connection of the test leads to the multimeter once the function has been selected or incorrect function selection when the leads are connected to the meter.

- 1st Multimeter with cursor style menu selection
- 0.05% Basic accuracy for DC volts
- 12,000 count resolution
- Bargraph indicates position within range
- Resistance measurement 0 - 40MΩ
- Continuity & diode test with acoustic signal
- MIN, MAX and DATA HOLD functions
- Temperature measurement via Type K TCs
- Frequency measurement
- Min/Max and display value storage
- High contrast illuminated display
- Auto power off plus battery level indicator
- EN61010 safety standard CAT IV 600V /CAT III 1000V

**METRA*hit* pro**

Current measurements from a resolution of 10µA to a max reading of 16A are possible, without having to change a range selector switch or move the test leads.

- 0.2% Basic accuracy for AC volts
- 0 to 1000V a.c./d.c. 5 ranges, 10µV resolution
- 0 to 16A a.c./d.c. 2 ranges, 100µA resolution
- Optional 1kHz low-pass filter on AC V measurements

**METRA*hit* x-tra**

Complete with integral datalogger, plus 23 measurement functions.

- 0.2% Basic accuracy for AC volts
- 0 to 1000V a.c./d.c. 5 ranges, 10µV resolution
- 0 to 10A a.c./d.c. 6 ranges, 0.01µA resolution
- Capacitance 10nf to 10pf
- Duty cycle displayed as % positive signal
- Integral memory and IR data interface
- Temperature measurement via pt100/1000
- Optional 1kHz low-pass filter on AC V measurements
- Frequency and keying ratio measurements on 2-5V pulses up to 1MHz

| Feature | METRA*hit* pro | METRA*hit* x-tra |
|---|---|---|
| TRMS AC+DC Voltage | ● | ● |
| AC V Bandwidth | 15Hz - 10kHz | 15Hz - 20kHz |
| TRMS AC+DC Current | ● | ● |
| Resistance | ● | ● |
| Temperature | TC (K) | TC (K) & RTD |
| Capacitance | | ● |
| Protection | IP52 | IP52 |
| Fuse | 10A / 1000V | 10A / 1000V |

| | Ranges | Resolutions | Best Accuracy |
|---|---|---|---|
| DC Voltage | 100mV, 1V, 10V, 100V, 1000V | 10µV, 100µV, 1mV, 10mV, 100mV | ±(0.05%+3d) |
| AC Voltage | 100mV, 1V, 10V, 100V, 1000V | 10µV, 100µV, 1mV, 10mV, 100mV | ±(0.5%+9d) |
| DC Current | 100µA,1mA,10mA,100mA,1A,10A* | 10nA,100nA,1µA,10µA,100µA,1mA* | ±(0.5%+3d) |
| AC Current | 100µA,1mA,10mA,100mA,1A,10A* | 10nA,100nA,1µA,10µA,100µA,1mA* | ±(1.5%+10d) |
| Resistance | 100Ω - 40MΩ (7 ranges) | 10mΩ - 10kΩ | ±(0.2%+5d) |
| Capacitance | 10nF, 100nF, 1µF, 10µF, 100µF, 1mF | 10pF, 100pF, 1nF, 10nF, 100nF, 1µF | ±(1.0%+6d) |

* x-tra only. Pro: (Ranges: 1A, 10A, Resolutions 100µA, 1mA)

**Test kit includes:** multimeter, test leads, 2x AA batteries, instructions, CDROM with full instructions and demo software, DKD calibration certificate and protective rubber cover.

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| Description | Mfrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| TRMS DMM | METRAHIT PRO | **127-6490** | 229.00 | 212.79 | 198.60 |
| TRMS DMM | METRAHIT X-TRA | **127-6491** | 319.00 | 296.21 | 276.47 |
| **Standard Calibration Charge** | | | S C4 | Price Each 34.10 | |
| **UKAS Calibration Charge** | | | N C4 | 58.75 | |

## 6½ Digit Precision True RMS DMM + Logger

GOSSEN METRAWATT

**METRA*hit* 30M**



- Highest basic accuracy @ 0.0035% dc V
- highest resolution 1200000
- TRMS measurement via PT100/PT1000 and J/K thermo-couple probes
- 4 wire temperature measurement
- 4 wire resistance measurement
- Frequency
- Continuity with acoustic signal
- Data logging with large 128Kb memory
- Min/Max and display value storage
- Infrared data transmission
- Supported by Windows software
- Calibration certificate included
- 128Kb of memory storage with sample speeds of be-tween 0.1 secs to 10 mins
- Supplied with standard lead set

True RMS

The METRA*hit*30M TRMS multimeter with it high level of accuracy and functionality along with the data logging facility make this product ideal for precision measurements both within industry and the laboratory applications.

338640

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| METRA*hit*30M | **505-4187** | 581.36 | 552.29 | 537.76 |
| **Standard Calibration Charge** | | S C4 | Price Each 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## Low Ohm and Insulation DMM

GOSSEN METRAWATT

**METRA*hit* 27i**



The METRA HIT 27I is used additionally for service and repair work performed on airplane and helicopter electrical systems (voltage, insulation, milliohm and temperature measurement). In addition to its own multimeter functions for electrical quantities, the instrument also includes a mega-ohm measuring function with insulation test voltages of 50, 100, 250 and 500 V, as well as temperature measurement with Pt100 and Pt1000 sensors.

**METRA*hit* 27I**

- Insulation resistance tester
- LCD panel with background illumination
- Compact and multifunctional
- Mains power or battery operation
- DKD calibration certificate as standard feature

380951.381283

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Insulation Multimeter | METRAHIT 27I | **842-1285** | 899.00 | 854.05 | 831.58 |
| Kelvin Probes | KC27 | **842-1293** | 189.00 | 183.33 | 177.83 |

## Handheld Digital Multimeters

Agilent Technologies

**U1241A and U1242A**

True RMS

LATEST PRICING





The U1240A series of multimeters enable you to check more with wide measurement ranges, they feature true-RMS readings on a 10,000 count display. The adjustable backlighting enables viewing even in subdued lighting conditions, and prolongs the battery life. Supplied with a certificate of calibration and test report. The **U2142A** has additional functionality such as manual **datalogging,** harmonic ratio, dual temperature and differential temperature capa-bilities.

# Multimeters - Digital - continued

## Handheld Digital Multimeters - continued

### U1241A and U1242A - continued

- 10,000 count display
- 0.09% basic DC voltage accuracy and true RMS measurement
- Basic functions: DCV, DCI, ACV, ACI, resistance, frequency, continuity, diode test
- Advanced functions (U2141A): capacitance, temperature, switch counter
- Advanced functions (U2142A): capacitance, temperature, switch counter, harmonic ratio, dual temperature (T1, T2, T1-T2)
- Manual and autoranging
- Continuity beeper and diode test
- Adjustable backlighting
- Min/Max recording
- Built-in probe holder
- Overmould body casing
- CAT III 1000V OV protection
- Certified to CE, CSA, and UL standards
- Powered by 4 x AAA batteries
- Dimensions (HxWxD): 194 x 92 x 58mm

Supplied with batteries, certificate of calibration, test leads, quick start guide and product reference CD

| | Maximum | Max. Resolution | Best Accuracy |
|---|---|---|---|
| DC Voltage | 1000V | 0.1mV | ±(0.09%+2) |
| AC Voltage | 1000V | 0.1mV | ±(1.0%+5) |
| DC Current | 10A | 0.1µA | ±(0.1%+3) |
| AC Current | 10A | 0.1µA | ±(1.5%+3) |
| Resistance | 100MΩ | 0.1Ω | ±(0.8%+3) |
| Capacitance | 10mF | 0.1nF | ±(1.2%+4) |
| Frequency | 100kHz | 0.01Hz | ±(0.03%+3) |
| Temperature * | -40 to 1000°C | 0.1°C | 1% + 1 °C/ |

* Thermocouple type K (for U1241A and U1242A), type J (for U1242A only)

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

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| Description | Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|---|
| Handheld Multimeter U1241A | U1241A | **144-0381** | 126.00 | 124.74 | 123.49 | 122.26 |
| Handheld Multimeter U1242A | U1242A | **144-0382** | 138.00 | 136.62 | 135.25 | 133.90 |
| **Accessories** | | | | | | |
| Alligator Test Clips (Pair) | U1162A | **144-0383** | 5.37 | 5.32 | 5.26 | 5.21 |
| Test Grabbers, SMT (Pair) | U1163A | **144-0384** | 5.37 | 5.32 | 5.26 | 5.21 |
| Test Probes, Fine Tip (Pair) | U1164A | **144-0385** | 5.37 | 5.32 | 5.26 | 5.21 |
| Test Probe, Immersion | U1181A | **144-0386** | 31.66 | 31.34 | 31.03 | 30.72 |
| Probe Adaptor, Temperature | U1184A | **144-0389** | 5.37 | 5.32 | 5.26 | 5.21 |
| Thermocouple, J Type | U1185A | **144-0390** | 10.68 | 10.57 | 10.47 | 10.36 |
| Thermocouple, K Type | U1186A | **144-0392** | 10.68 | 10.57 | 10.47 | 10.36 |

## Handheld Digital Multimeters

Agilent Technologies

True RMS

### U1251A and U1252A







W=94, H=204, D=59mm. Weight 0.5kg

Full featured handheld multimeters that offer maximum versatility for current and future needs. 4½ digit dual display handheld multimeters featuring accuracy up to 0.025%, true RMS, temperature, capacitance and frequency measurements on top of data-logging and PC connectivity capability.

- 50000 counts resolution on both displays
- 100 manual data storage points
- True RMS measurements
- dBm measurements
- Diode test
- Duty cycle measurements
- Pulse width measurement
- Peak Hold
- IR to USB connectivity (optional U1173A connectivity cable sold separately)
- -20°C to + 55°C operating temperature
- IEC61010-1 Cat III 1000V safety compliance
- Robust overmoulded design with multi-function tilt stand

**U1252A Additional Features:**

- 20 MHz frequency counter
- Programmable square wave generator
- Built-in battery charger capability
- Support for J type thermocouple

| | Ranges | Best Accuracy U1251A | U1252A |
|---|---|---|---|
| AC Voltage | 50mV, 500mV, 1V, 5V, 50V, 500V, 1000V | ±0.6% + 20 counts | ±0.4% + 25 counts |
| DC Voltage | 50mV, 500mV, 1V, 5V, 50V, 500V, 1000V | ±0.03% + 5 counts | ±0.025% + 5 counts |
| AC Current | 500µA, 5mA, 50mA, 440mA, 5A, 10A | ±0.8% + 20 counts | ±0.7% + 20 counts |
| DC Current | 500µA, 5mA, 50mA, 440mA, 5A, 10A | ±0.8% + 20 counts | ±0.7% + 20 counts |
| Resistance | 500R, 5kR, 50kR, 500kR, 5MR, 50MR, 500MR | ±0.08% + 5 counts | ±0.05% + 5 counts |
| Capacitance | 10nF - 100mF (9 ranges) | ±1% + 5 counts | ±1% + 5 counts |
| Temperature | -200 to 1372°C | 0.3% + 3°C | 0.3% + 3°C |
| Frequency | 100Hz, 1kHz, 10kHz, 100kHz, 1MHz | ±0.02% + 3 counts | ±0.02% + 3 counts |
| Battery Requirements | | 9V Alkaline | 7.2V Rechargeable |

**Accessories Included:**
Soft carrying case, Battery, U1160A Standard Test Lead Kit, Quick Start Guide, User Guide, PC Software, Instrument Drivers, AC adaptor (U1252A only).

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

446606

| Description | Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|---|
| DMM | U1251A | **126-3217** | 251.00 | 248.49 | 246.01 | 243.55 |
| DMM | U1252A | **126-3218** | 276.00 | 273.24 | 270.51 | 267.80 |
| Interface Cable | U1173A | **126-3219** | 16.11 | 15.95 | 15.79 | 15.63 |
| Standard Test Lead Kit | U1160A | **126-3220** | 32.23 | 31.91 | 31.59 | 31.27 |
| Extended Test Lead Kit | U1161A | **126-3221** | 22.56 | 22.33 | 22.11 | 21.89 |
| Temperature Accessory Kit | U1180A | **126-3222** | 18.79 | 18.60 | 18.42 | 18.23 |

## Agilent OLED Handheld Digital Multimeter

Agilent Technologies

True RMS

New

### U1253A




With the world's first OLED handheld DMM, the U1253A, you get crystal-clear measurements indoors, in the dark, off-angle situations, on the bench or on the go.

When you're carrying the world's first OLED handheld DMM, you won't have to squint to be sure that you're reading it right. On the go or on the bench, you'll get crystal-clear viewing indoors, even in dark, off-angle situations. Even though the U1253A is loaded with high-performance features and easy-to-use functions, it's priced to be easy on your pocket, too. You might even say it's revolutionary.

Organic Light Emitting Diodes (OLED) display You've heard about OLED displays for televisions, A/V players, mobile phones, and digital cameras - now, this technology is available in Agilent's new U1253A handheld DMM . OLED-based display has gained worldwide attention as the new benchmark for future display trends. It provides significant advantages over conventional LCDs (liquid crystal displays), including:

- Brighter colour
- Wider viewing angle
- Lack of need for a backlight

**Key features:**

- 50,000-count OLED display
- 0.025% basic DCV accuracy
- 2000:1 contrast ratio
- 160° viewing angle
- True RMS AC+DC
- USB connectivity
- Field upgradable through PC
- Basic functions:
- DCV, DCI, ACV, ACI, resistance, frequency, continuity, diode test
- Advanced functions:
- Temperature, capacitance, 20 MHz frequency counter, square wave generator
- Includes: Silicone test leads, alligator clips, battery charger, certificate of calibration and test report.
- Standard 3-year warranty

| | |
|---|---|
| Display resolution | 50,000 counts OLED display |
| AC bandwidth | 100 kHz |
| True RMS | AC + DC |
| Voltage AC/DC | 1000 V, 0.025% |
| Current AC/DC | 10 A, 0.05% |
| Resistance | 500MΩ, 0.05% |
| Frequency | 20MHz, 0.02% |
| Capacitance | 100mF, 1.00% |
| Temperature | -200°C to +1372°C, 0.30% |
| Battery | 7.2V (Rechargeable) |
| Operating temperature | -20°C to 55°C |
| Over-voltage safety protection | CAT III 1000V |
| CE, CSA, UL compliance | CE, CSA |

5222858

| Mfrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| U1253A | **164-5129** | 281.20 |


## Troubleshooting tips

WWW

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

## Fluke 113 Digital Multimeter

FLUKE



New

The new 113 Digital Multimeter has the features needed to repair most electrical problems. This meter is simple to use. With features such as VCHEK™, from Fluke, which includes added measurement functions, backlight, conformance to the latest safety standards, and a much larger display that's easier to view, this new meter is a must-have for the utility user's toolbox.

**Fluke 113 Digital Meter Includes:**
Fluke 113 digital multimeter
TL75 test leads
One 9V battery
Printed user manual

L=167.1, W=85.1, D=46, Weight=404g

- VCHEK™ LoZ low impedance measurement function to simultaneously test for voltage or continuity
- True-rms for accurate ac measurements on non-linear loads
- A large backlit display allows for easy visibility in low-lit areas
- Record signal fluctuations using the min / max function
- Diode test for testing general-purpose germanium, silicon, and power diodes
- Integral holster with probe holders for easy storage
- Auto and Manual ranging for added user functionality
- Meets Measurement Category CAT III 600V and Category IV 300V standards for a higher level of safety
- The optional TPAK magnetic hanger allows the user hands-free flexibility

| Measuring Range | | Resolution | | Temperature | |
|---|---|---|---|---|---|
| Capacitance | 1μF to 999μF | Capacitance | 1μF to 1nF | Operating Range | -10°C to +50°C |
| Resistance | 600R to 60kR | Resistance | 0.01R to 0.1R | Storage Range | -40°C to +60°C |
| Voltage | 6V to 600V | Voltage | 0.001V to 0.1V | | |
| Test Diode Range | 2V | | | | |

**Maximum Voltage** 600V
**Display** 3 3/4-digits, 6000 counts, updates 4/sec
**Relative Humidity** 95 % to 30 °C, 75 % to 40 °C, 45 % to 50 °C
**Battery Type** 9 Volt Alkaline, ANSI 1604A / IEC 6F22
**Battery Life** Alkaline: 300 hours typical, without backlight
**Shock** 1 Meter drop per IEC 61010-1-2001
**Vibration** Per MIL-PRF-28800 for Class 2 instrument
**Safety** UL 61010-1 (2004) and IEC/EN 61010-1 2nd Edition for measurement Category III, 600 V, EMC EN61326-1.
* Between any terminal and earth ground

509931

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|
| FLUKE 113 | **157-8321** | 94.00 | 91.18 | 88.45 |
| **Accessories** | | | | |
| TL223.. Test Lead Set | **431-4219** | 41.00 | – – | – – |
| C50 Case | **424-006** | 22.00 | 21.34 | 20.70 |
| TPAK Magnetic Hanger | **302-9578** | 22.00 | 21.34 | 20.70 |

## TRMS Digital Multimeters

### 114 and 115

FLUKE

True RMS

CALIBRATION SERVICES

LATEST PRICING



W=84 H=167 D=46mm. Weight 550g

The **114 Electrical Multimeter** is ideal for electrical troubleshooting and straightforward "go/no-go" testing in residential/commercial electrical testing. It has all the basic functions plus a special feature to prevent false readings caused by ghost voltage.

The **115 Field Service Multimeter** is optimised for electrical and electronic testing in field service, industrial, and applications where more than basic functionality (such as measurement of ac/dc current) simplifies working.

- True RMS AC measurements
- Large 6000 count display with white LED backlight
- Analogue bargraph
- Auto/Manual ranging
- MIN/MAX/AVG functions
- Data Hold
- Low battery indication
- Compact case with removable holster
- CAT III 600 V
- 400 hours operation from supplied 9V alkaline battery
- Supplied with user manual and TL75 test leads

| Feature | 114 | 115 |
|---|---|---|
| **AutoVolt:** automatic ac/dc selection | ● | |
| **LoZ:** low input impedance to prevent ghost voltages | ● | |
| **AC/DC Voltage Measurements** | ● | ● |
| **AC/DC Current Measurements** | | ● |
| **Resistance / Continuity** | ● | ● |
| **Frequency and Capacitance** | | ● |
| **Diode Test** | | ● |

| | Maximum | Max. Resolution | Best Accuracy 114 | 115 |
|---|---|---|---|---|
| DC Voltage | 600V | 1mV | ±(0.5%+2) | ±(0.5%+2) |
| AC Voltage | 600V | 1mV | ±(1.0%+3) | ±(1.0%+3) |
| DC Current | 10A | 1mA | | ±(1.0%+3) |
| AC Current | 10A | 10mA | | ±(1.5%+3) |
| Resistance | 40MΩ | 0.1Ω | ±(0.9%+1) | ±(0.9%+1) |
| Capacitance | 10mF | 1nF | | ±(1.9%+2) |
| Frequency | 50kHz | 0.01Hz | | ±(0.1%+2) |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

447402.460900

| Description | Mfrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|---|
| TRMS DMM | 114 | **127-4598** | 107.00 | 103.79 | 100.68 |
| TRMS DMM | 115 | **127-4599** | 130.00 | 126.10 | 122.32 |
| **Accessories** | | | | | |
| Carry Case | C50 | **424-006** | 22.00 | 21.34 | 20.70 |
| Magnetic Hanger | TPAK | **302-9578** | 22.00 | 21.34 | 20.70 |
| Test Lead Set | TL223.. | **431-4219** | 41.00 | – – | – – |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | | N C4 | 58.75 | |

## HVAC Multimeter

### 116

True RMS

FLUKE



W=84 H=167 D=46mm. Weight 550g

- True RMS AC measurements
- Large 6000 count display with white LED backlight
- Analogue bargraph
- Built in thermometer and temperature probe included for HVAC applications
- Microamps to test flame sensors
- Resistance, continuity, frequency and capacitance measurements
- LoZ: low input impedance to eliminate ghost (stray) voltage to make more accurate measurements
- AutoVolt: automatic ac/dc selection
- Auto/Manual ranging
- MIN/MAX/AVG functions
- Data Hold
- Low battery indication
- Diode Test
- Compact case with removable holster
- CAT III 600 V
- 400 hours operation from supplied 9V alkaline battery
- Supplied with user manual and TL75 test leads

LATEST PRICING

The Fluke 116 was specifically designed for the HVAC professional. It has everything needed in an HVAC meter including temperature and microamp measurements to quickly troubleshoot problems with HVAC equipment and flame sensors. Use the Fluke 116 to test motor start and run capacitors up to 10,000 microfarads. Rely on the Fluke 116 to make your everyday measurements - up to 600 volts ac or dc, 40 MΩ, diode test and exceptionally fast continuity.

| | Maximum | Max. Resolution | Best Accuracy |
|---|---|---|---|
| DC Voltage | 600V | 1mV | ±(0.5%+2) |
| AC Voltage | 600V | 1mV | ±(1.0%+3) |
| Resistance | 40MΩ | 0.1Ω | ±(0.9%+1) |
| Capacitance | 10mF | 1nF | ±(1.9%+2) |
| Frequency | 50kHz | 0.01Hz | ±(0.1%+2) |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

447432.460901

| Description | Mfrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|---|
| HVAC Multimeter | 116 | **127-4601** | 146.00 | 141.62 | 137.37 |
| **Accessories** | | | | | |
| Carry Case | C50 | **424-006** | 22.00 | 21.34 | 20.70 |
| Magnetic Hanger | TPAK | **302-9578** | 22.00 | 21.34 | 20.70 |
| Test Lead Set | TL223.. | **431-4219** | 41.00 | – – | – – |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | | N C4 | 58.75 | |

## Multimeters - Digital - continued

### Digital Multimeter with non-contact voltage

**117**

FLUKE





The ideal meter for demanding settings like commercial buildings, hospitals and schools. The compact design makes it easy to hold and use one-handed. Integrated VoltAlert™ Technology allows testing for non-contact voltage directly from the meter to help get the job done faster.

LATEST PRICING

W=84 H=167 D=46mm. Weight 550g

True RMS

- True RMS AC measurements
- Large 6000 count display with white LED backlight
- Analogue bargraph
- VoltAlert™ Technology for integrated non-contact voltage detection
- Current measurement 20A (30 seconds momentary; 10A continuous)
- Resistance, continuity, frequency and capacitance measurements
- LoZ: low input impedance to eliminate ghost (stray) voltage to make more accurate measurements
- AutoVolt: automatic ac/dc selection
- Auto/Manual ranging
- MIN/MAX/AVG functions
- Data Hold
- Low battery indication
- Diode Test
- Compact case with removable holster
- CAT III 600 V
- 400 hours operation from supplied 9V alkaline battery
- Supplied with user manual and TL75 test leads

The **Electrician's Combo kit** (117/322) pairs the new Fluke 117 DMM with a Fluke 322 clamp meter and is the perfect solution to meet the demands of Electrical Professionals. The combo kit includes:

- 117 True-rms digital multimeter with non-contact voltage detection
- 322 Compact clamp meter (600V ac/dc, 400A ac, 400Ω
- 4 mm lantern tip probe and test lead set
- ToolPak Magnetic Meter Hanging Strap
- C115 Deluxe carrying case with shoulder strap

| | Maximum | Max. Resolution | Best Accuracy |
|---|---|---|---|
| DC Voltage | 600V | 1mV | ±(0.5%+2) |
| AC Voltage | 600V | 1mV | ±(1.0%+3) |
| DC Current | 10A | 1mA | ±(1.0%+3) |
| AC Current | 10A | 10mA | ±(1.5%+3) |
| Resistance | 40MΩ | 0.1Ω | ±(0.9%+1) |
| Capacitance | 10mF | 1nF | ±(1.9%+2) |
| Frequency | 50kHz | 0.01Hz | ±(0.1%+2) |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

447497.460902

| Description | Mfrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|---|
| Multimeter | 117 | **127-4602** | 154.00 | 149.38 | 144.90 |
| Combo Kit | 117/322 KIT | **127-4603** | 202.00 | 195.94 | 190.06 |
| **Accessories** | | | | | |
| Carry Case | C50 | **424-006** | 22.00 | 21.34 | 20.70 |
| Magnetic Hanger | TPAK | **302-9578** | 22.00 | 21.34 | 20.70 |
| Test Lead Set | TL223.. | **431-4219** | 41.00 | – – | – – |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |


**Premium service without a premium price**

With thousands of prices already reduced, go online to see our most up-to-date pricing: **www.farnell.co.uk**


### Digital Multimeter

**Fluke 77 Series IV**

FLUKE



Versatile meters for field service or bench repair. Simple to use and has significant improvements over Fluke's original 70 Series with more measurement functions, conformance to the latest safety standards, and a much larger display that's easier to view.

LATEST PRICING

- Large 6000 count display with 33 segment bar graph
- Rated at 10 Amps continuous (20A for 30 seconds)
- Backlight for work in dim areas
- Min / Max to record signal fluctuations
- Ergonomic overmolded housing with integrated probe holders
- Auto and Manual ranging
- IEC61010-1 1000V CATIII and 600V CATIV rated

W=90 H=185 D=43mm. Weight 420g

| | Range | Resolution | Accuracy |
|---|---|---|---|
| **AC Voltage** | 6V - 1000V | 0.1mV | ±(0.3% + 1 digits) |
| **DC Voltage** | 600mV - 1000V | 1.0mV | ±(2.0% + 2 digits) |
| **AC Voltage** | 60mA - 10A | 0.01mA | ±(1.5% + 2 digits) |
| **DC Voltage** | 60mA - 10A | 0.01mA | ±(2.5% + 2 digits) |
| **Resistance** | 600R - 50MR | 0.1R | ±(0.5% + 1 digits) |
| **Capacitance** | 1nF - 9999μF | 1nF | ±(1.2% + 2 digits) |
| **Frequency** | 99.9Hz - 99.9kHz | 0.01 Hz | ±(0.1% + 1 digits) |
| Battery life | 400 hours typical | | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

460557.460540

| Description | Mfrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Digital Multimeter | 77IV | **132-7552** | 230.00 | 223.10 | 216.41 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |

### Digital Multimeters

**170 Series**

FLUKE

True RMS

LATEST PRICING



H=183, W=90, D=43

The three models of the new 170 Series are the new benchmarks for the general-pupose multimeters. The three models: the 175, 177 and the 179 set the standard with a combination of precision, features, ease-of-use, safety and reliability.

All models offer true RMS AC voltage and current readings, 6000-count resolution, min-max-average recording, as well as frequency and capacitance ranges. Despite all of these and many other useful features, the 170 Series remains easy to use. The ergonomic case with integrated holster protects the units in rough and tough environments. To change the batteries, the case does not have to be opened as access to the batteries is through an easy to open battery door. All inputs are protected to **EN61010-1 CAT IV 600V/CAT 111 1000V.**The Fluke 170 Series is supplied with TL75 test leads, installed 9V battery and user manual and comes with Fluke's unique lifetime warranty.

| Features | 175 | 177 | 179 |
|---|---|---|---|
| True-rms measurements | AC | AC | AC |
| Digital display counts, updates 4 times per second | 6000 | 6000 | 6000 |
| Display backlight | | ● | ● |
| Analog bargraph/segments, updates 40 times per second | 33-segments | 33-segments | 33-segments |
| Auto and manual ranging | ● | ● | ● |
| Display hold and auto hold | ● | ● | ● |
| Min-max-average recording mode with min/max alert | ● | ● | ● |
| Temperature readings (bead thermocouple probe included) | | | ● |
| Smoothing mode allows filtering of rapidly changing inputs | ● | ● | ● |
| Audible continuity and diode test | ● | ● | ● |
| Test lead alert warns for improper connection of test leads | ● | ● | ● |
| Unsafe voltage alert warns for voltages above 30V | ● | ● | ● |
| Low battery indication | ● | ● | ● |
| Ergonomic case with integrated holster | ● | ● | ● |

| Features | 175 | 177 | 179 |
|---|---|---|---|
| Easy battery exchange without opening the complete case | ● | ● | ● |
| Selectable sleep mode preserves battery life | ● | ● | ● |
| Warranty | Lifetime | Lifetime | Lifetime |
| **EN 61010-1** safety rating on all inputs | CAT III 1000V CAT IV 600V | CAT III 1000V CAT IV 600V | CAT III 1000V CAT IV 600V |

Accuracies are best accuracies for each function

| | |
|---|---|
| Battery life | Alkaline, 200 hrs typical |
| Weight | 420g |
| Warranty | Lifetime |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

228196

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | + |
|---|---|---|---|---|---|
| | | MIXED QUANTITY PRICING | | | |
| FLUKE 175 | **355-8678** | 173.00 | 167.81 | 162.78 | – – |
| FLUKE 177 | **355-8680** | 199.00 | 193.03 | 187.24 | – – |
| FLUKE 179 | **355-8691** | 220.00 | 213.40 | 207.00 | – – |
| C101 Carry Case | **947-9783** | 34.00 | 32.98 | 31.99 | – – |
| | | | | Price Each | |
| **Standard Calibration Charge** | | S C3 | | 28.38 | |
| **UKAS Calibration Charge** | | N C3 | | 58.75 | |

## Electronics Combo - Fluke 179/EDA2 Kit



Rugged 1000 V CAT III multimeter with backlight and industrial strength test lead probe kit in a lightweight,soft case to hold your meter and your accessories. Includes TL224 SureGrip™ silicone test leads, TL910electronic test probes, AC280 SureGrip™ heavy duty hooks clips, an 80BK integrated temperature probeand ToolPak™, meter hanging accessory.

179/EDA2 Kit includes:
- Fluke 179 True-rms Digital Multimeter
- Fluke C35 Soft Case
- TL910 Electronic Test Probes
- TL224 SureGrip™ Silicone Test Leads resist heat
- AC280 SureGrip™ Heavy Duty Hook Clips
- Fluke 80BK Integrated Temperature Probe
- ToolPak™ Meter hanging accessory to position and hold meter to steel surfaces
- Limited lifetime warranty on the multimeter, 1-year on all accessories

242751

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 179/EDA2 | **128-9674** | 253.00 | 245.41 | 238.05 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C3 | 28.38 | |
| **UKAS Calibration Charge** | | N C3 | 58.75 | |

## Industrial Combi Kit
**179/MAG2**



Rugged 1000 V CAT III Fluke 179 multimeter with industrial strength test lead probe kit plus a maglight in a compact lightweight soft case.

179/MAG2 Kit includes:
- Fluke 179 True-rms Digital Multimeter
- Fluke C35 soft Case
- TL224 SureGrip™ 1.5m heat resistant silicone test leads with reinforced strain relief
- TP220 SureGrip™ test probes - Sharp 12mm stainless steel tip
- AC220 Retractable long reach alligator clips - Insulated nickel plated jaws, blunt tip grabs round screw heads
- TPAK™ Magnetic meter hanger accessory to attach meter to steel surfaces for positioning and holding the meter for hands-free operation
- Fluke 80BK Integrated temperature probe (Type K)
- A mini maglite flashlight
- All test leads 1000V CAT III, 600V CAT IV, 10A
- Limited lifetime warranty on the multimeter, 1-year on all accessories

**Fluke 179 True-rms Digital Multimeter:**
- 0.09% basic dc accuracy
- True rms AC voltage and current measurement
- Resistance, capacitance, frequency, MIN/MAX
- Temperature in °C and °F (probe included)

489453

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 179/MAG2 | **132-7566** | 250.00 | 242.50 | 235.23 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C3 | 28.38 | |
| **UKAS Calibration Charge** | | N C3 | 58.75 | |

## Digital Multimeter
**80 Series V**









The new Fluke 80 Series V has improved measurement functions, troubleshooting features, resolution and accuracy to solve more problems on motor drives, in plant automation, power distribution, and electro-mechanical equipment. The 80 Series V operates very similar to the classic 80 Series, but with more problem solving power, safety, convenience and impact protection.

LATEST PRICING

- True-RMS voltage and current for accurate measurements on non linear signals
- Large display with analog bargraph and 2 level bright white backlight
- Auto and manual ranging for maximum flexibility
- Relative mode to remove test lead resistance from low ohms measurements
- Min-Max-Average recording with Min/Max Alert to capture variations automatically
- Touch Hold to capture stable readings avoiding noisy signals
- Audible continuity, diode test and duty cycle
- Input Alert
- Classic design with new removable holster with built in test lead and probe storage
- Improved selectable sleep mode for long battery life
- Easy battery and fuse exchange without opening the complete case

**87V extra features:**
- Selectable filter for accurate voltage and frequency measurements on motor drives
- Built-in thermometer
- Peak capture to record transients as fast as 250µs

**Fluke 87V/E Industrial Electrician Combo Kit includes:**
- 0.5 m heat resistant silicone test leads
- Removeable test probes with 4mm of exposed metal for use on industrial circuits
- Retractable long reach alligator clips
- Magnetic hanger to position and hold meter to steel surfaces
- Temperature probe
- Durable carrying case

**H80M Holster**
- Yellow holster for all 80 series DMMs (new as well as old)
- Hanging magnet
- Hook and loop straps
- General purpose hanger

| | | 83V | | 87V | |
|---|---|---|---|---|---|
| **Functions** | **Maximum range** | **Max resolution** | **Accuracy** | **Max resolution** | **Accuracy** |
| Voltage DC | 1000V | 0.1mV | ±(0.1%+1) | 10µV | ±(0.05%+1) |
| Voltage AC | 1000V | 0.1mV | ±(0.5%+2) | 10µV | ±(0.7%+2) |
| Current DC | 10A | 0.1µV | ±(0.4%+2) | 0.01µ | ±(0.2%+2) |
| Current AC | 10A | 0.1µV | ±(1.2%+2) | 0.01µ | ±(1.0%+2) |
| Resistance | 50MΩ | 0.1Ω | ±(0.4%+1) | 0.01Ω | ±(0.2%+1) |
| Conductance | 60nS | 0.01nS | ±(1.0%+10) | 0.001nS | ±(1%+10) |
| Capacitance | 9999µF | 0.01nF | ±(1.0%+2) | 0.01nF | ±(1%+2) |
| Frequency | >200kHz | 0.01Hz | ±(0.005%+1) | 0.01Hz | ±(0.005%+1) |
| Temperature | -200 to 1090°C | | | 0.1°C | 1.0% |
| 80BK temperature probe | -40 to 260°C | | | | 2.2°C or 2% |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

347687

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 83V | **736-3486** | 264.00 | 256.08 | 248.40 |
| 87V | **736-3494** | 323.00 | 313.31 | 303.91 |
| 87V/E2 Kit | **127-2833** | 366.00 | 355.02 | 344.37 |
| H80M Holster | **800-2223** | 23.00 | 22.31 | 21.64 |
| C101 Carry Case | **947-9783** | 34.00 | 32.98 | 31.99 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

Over 480,000 products online GO

## Multimeters - Digital - continued

### Digital Logging Multimeters

**Fluke 287 & Fluke 289**

FLUKE

True RMS

LATEST PRICING




H=254 W=194 D=76mm. Weight 1kg




High performance industrial logging multimeters. Log data and display it graphically on the large display.

- Large 50,000 count 320x240 dot matrix display
- Logging function with TrendCapture for easy review of logged data
- Multiple readings per display
- True RMS measurements (AC and AC+DC)
- Info button for convenient on-board help
- Optical USB Communications interface for easy data transfer
- Internal memory allows up to 180 hours of logging
- Current measurement to 20A (30 seconds), 10A continuous
- Peak capture (records transients as fast as 250µs
- Min/Max and Average functions with Time Stamp
- Protected to IP54
- All inputs are protected to **EN61010-1 CAT III 1000V / CAT IV 600V**
- **UL**, **CSA** and **TUV** listed

**Fluke 289 Additional Features:**

- Low pass filter for motor drive measurements
- Low impedance function prevents false "ghost voltage" readings
- 50Ω range for motor winding and low ohm measurements

| Function | Measuring Ranges | Resolution | Accuracy |
|---|---|---|---|
| VDC | 1000V | 1µV | ±(0.025%+5d) |
| VAC | 1000V | 1µV | ±(0.4%+40d) |
| ADC | 10A | 0.01µA | ±(0.15%+2d) |
| AAC | 10A | 0.01µA | ±(0.7%+5d) |
| Resistance | 500MR | 0.01Ω | ±(0.05%+2d) |
| Conductance | 50nS | 0.01nS | ±(1.0%+10d) |
| Capacitance | 100mF | 0.001nF | ±(1.0%+5d) |
| Frequency | 1MHz | 0.01Hz | ±(0.005%+1d) |
| Temperature | -200°C to 1350°C°C | 0.1°C | (1% + 1°C) |

Accuracies are best accuracies for each function.
Supplied with TL71 silicone test leads, probe holder, 6x AA batteries (installed) and manual

**289FVF - FlukeView Combo Kit:** contains Fluke 289 and accessories as above plus; alligator clips, 80BK thermocouple, FlukeView forms software, data cable and a soft carry case.

**TLK287 Test Lead Kit** is designed for electronics designers, test and service technicians. The kit includes: spring tipped probes, micro-grabbers, mini alligator clips, leads and couplers.

**TLK289 Test Lead Kit** is designed for high-end industrial users. The kit includes: SureGrip alligator clips, SureGrip grabbers, SureGrip hook clips, Suregrip industrial test probes, magnetic hanger, temperature adaptor with K-type thermocouple, soft carry case. Rated to 1000V CAT III.

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

477767.501419

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Multimeter | 287 | **142-2691** | 369.00 | 357.93 | 347.19 |
| Multimeter | 289 | **142-2692** | 399.00 | 387.03 | 375.42 |
| FlukeView Combo Kit | 289/FVF | **142-2693** | 459.00 | 445.23 | 431.87 |
| Test Lead Kit | TLK287 | **150-3745** | 97.00 | 94.09 | 91.27 |
| Test Lead Kit | TLK289 | **150-3746** | 97.00 | 94.09 | 91.27 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | | N C4 | 58.75 | |

### Insulation Multimeters

**Model 1577 / 1587**

FLUKE

True RMS

LATEST PRICING







W=275 H=200 D=100mm. Weight 3 kg

Combining a digital insulation tester with a full-featured, true RMS digital multimeter in a single, compact, handheld unit, which provides maximum versatility for both troubleshooting and preventative maintenance. Whether you work on motors, generators, cables, or switch gear, the Fluke 1587/1577 Insulation Multimeters are ideally suited to help you with your tasks and at a cost that is far less than buying the two products.

- Large backlit display for easy reading
- EN61010-1 1000V CAT III / 600V CAT IV
- Three year warranty
- Auto power off
- Input alert warns of incorrect connections
- Rugged utility hard case

**Includes:** hard case, test leads, crocodile clips, temperature probe (1587 only) and remote test probe.

**Accessories:**

- TPAK Magnetic Hanger (302-9578)

| **Multimeter Features** | **1577** | **1587** |
|---|---|---|
| True RMS voltage and current measurement | ● | ● |
| Auto and manual ranging | ● | ● |
| Selectable filter for accurate measurements on motor drives | | ● |
| MIN / MAX recording | | ● |
| Diode Test | | ● |
| Temperature, capacitance and frequency measurement | | ● |
| **Insulation Features** | | |
| User selectable test voltages for many applications | ● | ● |
| Special remote control probe for easy and safe measurements | ● | ● |
| Auto discharge of capacitive voltage for added user protection | ● | ● |
| Live circuit detection prevents insulation tests if >30V is detected | ● | ● |

| **Insulation Specifications** | **1577** | **1587** |
|---|---|---|
| Measurement Range | 0.1MΩ to 600MΩ | 0.01MΩ to 2GΩ |
| Test Voltages | 500V, 1000V | 50V, 100V, 250V, 500V, 1000V |
| Test Voltage Accuracy | +20%, -0% | +20%, -0% |
| Short-circuit Test Current | 1mA nominal | 1mA nominal |
| Auto Discharge | Discharge time <0.5s for C = 1µF or less | |
| Maximum Capacitive Load | Up to 1µF load | Up to 1µF load |

| **Other Functions** | **Maximum** | **Resolution** | **Accuracy 1577** | **Accuracy 1587** |
|---|---|---|---|---|
| **DC Voltage** | 1000V | 1 mV | ±(0.2%+2d) | ±(0.09%+2d) |
| **AC Voltage** | 1000V | 0.1 mV | ±(2%+3d) | ±(1%+3d) |
| **DC Current** | 400 mA | 0.01 mA | ±(1%+2d) | ±(0.2%+2d) |
| **AC Current** | 400 mA | 0.01 mA | ±(2%+2d) | ±(1.5%+2d) |
| **Resistance** | 50 MΩ | 0.1Ω | ±(1.2%+2d) | ±(0.9%+2d) |
| **Capacitance** | 9999 µF | 1 nF | | ±(1.2%+2d) |
| **Frequency** | 99.99 kHz | 0.01 Hz | | ±(0.1%+1d) |
| **Temperature** | -40 - 537 °C | 0.1 °C | | ±(1% + 10 digits) |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

415767.429121

| Description | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| 1577 Insulation Multimeter | **948-7484** | 359.00 | 348.23 | 337.78 |
| 1587 Insulation Multimeter | **948-7492** | 427.00 | 414.19 | 401.76 |
| TPAK Magnetic Hanger | **302-9578** | 22.00 | 21.34 | 20.70 |
| | | | | Price Each |
| **Standard Calibration Charge** | | S C6 | | 39.92 |
| **UKAS Calibration Charge** | | N C6 | | 79.41 |

### Motor & Drive Troubleshooting Kit

**1587MDT**

FLUKE

LATEST PRICING



**Contents:**
- Fluke 1587 Insulation Multimeter
- Fluke 9040 Phase Rotation Indicator
- i400 Current Clamp (includes C101 hard case)

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

442023

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|
| 1587MDT | **124-2942** | 567.00 | 549.99 | 533.49 |

**Need a Head Torch?**

Turn to page 1010



## Electrical Troubleshooting Kit

**1587ET**

FLUKE



LATEST PRICING

**Contents:**
- Fluke 1587 Insulation Multimeter
- Fluke 62 Mini IR Thermometer
- i400 Current Clamp (includes C101 hard case)

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

442022

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|
| 1587ET | **124-2941** | 529.00 | 513.13 | 497.74 |

## Voltage Tester with LED Flashlight

**LVD1**

FLUKE



LATEST PRICING

A portable flashlight with exclusive dual-sensitivity voltage detector, delivered in a 5 piece eye catching counter display.
- Bright white flash light illuminates working area
- Blue indicator means you're close
- Red indicator means you're at the source
- Detects voltage from 40V ac upwards
- Comes with a versatile clip to secure light to a pocket, hat or even a panel door

| | |
|---|---|
| Voltage range | 40V to 300V a.c |
| Operating temperature | 0 to 50°C |
| Bulb life | 100 000 hours |
| Power | 1x AAA battery (supplied) |

L=245, W=195, D=233mm Weight=750g

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

339575.409236

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ | 50+ |
|---|---|---|---|---|
| LVD1 | **800-2207** | 15.00 | 14.55 | 14.11 |

**FREE global legislation support**

RoHS, REACH, WEEE, EuP, Batteries Directive - we've got it covered at:
**www.global-legislation.com**

## Instrument Holsters, Cases and Bags

FLUKE









LATEST PRICING

A range of holsters, cases and bags for FLUKE instruments.
**C10 Holster:**Snap-on yellow holster with integarl stand.
**H110 Holster:**Snap-on yellow holster with integral stand and probe/lead storage. Accepts the FLUKE ToolPak™ accessory for hanging.
**H5 Holster:**A rugged fabric holster with belt loop and lead storage.
**H3 Holster:**A rugged fabric holster with belt loop and lead storage.
**C12A Soft Case:**Zipped carry case with inside pocket and belt loop.
**C50 Soft Case:**Zipped carry case with inside pocket, belt loop and inside meter strap.
**C90 Soft Case:**Zipped carry case with padding and inside pocket.
**C125/C781 Soft Case:**Zipped carry case with detachable external accessory pouch.
**C100 Hard Case:**A tough polypropylene meter and accessory case.
**C550 Tool Bag**A rugged test tool bag with manufactured from ballistic cloth and a steel reinforced frame. Includes a large pocket with 25 compartments.

| Description | Mftrs. List No. | FLUKE Compatibility |
|---|---|---|
| Holster | C10 | 10/12, 16, 705/706 |
| Holster | H110 | 110/111/112, 712/714/715/717 |
| Holster | H5 | T3/T5 |
| Holster | H3 | 333/334/335/336/337 |
| Soft Carry Case | C12A | 10/12, 7-300/7-600, 705/707 |
| Soft Carry Case | C50 | 110/111/112, 73/75 III, 27, 50S/50D, 51/52/53/54 II |
| Soft Carry Case | C90 | 175/177/179, 83/85/87 III, 73/77 III, 712/714/715/717, 50S/50D |
| Soft Carry Case | C125 | 183/185/187/189, 867B, 39/41B/123, 718/724/725 |
| Soft Carry Case | C781 | 183/185/187/189, 867B, 39/41B/123, 718, 741B/743B/744 |
| Tool Bag | C550 | For multiple meters and accessories |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

248378

| | Mftrs. List No. | Order Code | Price Each |
|---|---|---|---|
| Holster | C10 | **227-018** | 14.00 |
| Holster | H5. | **874-164** | 17.00 |
| Holster | H6 | **828-3931** | 16.00 |
| Holster | H3 | **369-3107** | 24.00 |
| Soft Carry Case | C12A | **432-7720** | 17.00 |
| Soft Carry Case | C50 | **424-006** | 22.00 |
| Soft Carry Case | C90 | **424-018** | 22.00 |
| Soft Carry Case | C125 | **428-3650** | 32.00 |
| Soft Carry Case | C781 | **431-3914** | 52.00 |
| Tool Bag | C550 | **428-3685** | 72.00 |

## Meter and Accessory Case

**C1600**

FLUKE



LATEST PRICING

The C1600 is a general purpose carrying case that houses Fluke Test tools and accessories. It is large enough to fit additional tools that the engineer may wish to carry to the job.
- Deep interior large enough to hold and protect your gear and leaves room for accessories and other essentials
- Rubber gasket in lid seals out dust and keeps contents dry
- Lift out tray keeps everything organised
- Snap open compartment on top of lid for easy access to small parts
- Includes five hook and loop straps for test leads
- Lockable for added security
- Large carry handle for added comfort

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

339466

| Mftrs. List No. | Order Code | Price Each 1+ | + | + |
|---|---|---|---|---|
| C1600. | **491-7224** | 22.00 | – – | – – |

## Multimeters - Digital - continued

### ToolPak™ DMM Accessoires

FLUKE





**ToolPak™**
A multimeter hanging solution supplied as a kit which includes: 2x universal hanger clips, 2x lengths of hook and loop type straps and a strong magnetic insert. The components can be combined to meet most hanging requirements.
Compatibility: Attaches to the back of the FLUKE 110/170/180 Series and 20/70 III series.

248370

| Description | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| ToolPak™ | **302-9578** | 22.00 | 21.34 |

### Fluke Electronic Accessories

FLUKE



LATEST PRICING

A range of electronic accessories designed for low energy test and measurement applications. These small, compact probes and leads are ideally suited for use with meters by an electronic technician or engineer to install, test, troubleshoot, and maintain low voltage and low current electronic equipment. These new products, whether used in the lab, on the bench, or in the field are specifically designed to provide reliable, convenient connections for most electronic accessory needs.

The **TL40** retractable tip test lead set is the ideal product to measure on hard to reach test points. The extra hard probe tips with sharp needlepoint tips can be adjusted to desired length from 0 to 76mm. **EN 61010-2-031 CAT II, 150V, 3A**

The **TL910** electronic test probes have a slender design that is comfortable to hold and allows accessibility to hard to reach test points. It comes with 5 sets of replaceable tips that includes 3 sets of spring loaded gold plated and 2 sets of stainless steel tips. **EN 61010-2-031 CAT IV, 600V:CAT III,1000V, 3A**

**TL75** is a pair of hard point test leads

The **TP920** test probe adapter kit offers 3 sets of push-on adapters and includes:
- 1 set of IC test clips adapters for probing integrated circuit leads without shorting adjacent leads
- 1 set of sharp, probe tip extenders for probing hard to reach test points
- 1 set of medium-sized alligator clips
- **EN 61010-2-031 CAT II, 300V/3A(5A For Croc. Clips)**

A multi-stacking, 4 mm banana plug patch cord is available.
- **TL932** is a pair of 90cm red and black patch cords
- ≤30 Vrms/15A

The **TL970** hook and pincer test lead kit is a handy all-in-one kit that includes 3 pairs of 36-inch long, red and black, multi-stacking, 4 mm banana plug test leads terminated with 3 different style connectors:
- Mini-hooks that attach to component leads up to 1.5 mm diameter (also offered separately as TL940 mini-hook test leads).
- Mini-pincers for connecting to SMD devices and discrete component leads and opens to 23 mm (also offered separately as TL950 mini-pincer test leads).
- Micro-hooks that attach to component leads up to 1 mm diameter (also offered separately as TL960 Micro-Hook Test Leads).
- 30 V rms/5A (micro hooks 3A)

The **BP980** dual banana plug kit is a set of 5 pairs of red and black double 4 mm banana plugs with 3.17 mm diameter holes with set screws for mounting wires and components.
30 V rms/15A

The **H900** test lead holder offers a test lead hanging solution. This heavy duty holder has a durable and distinctive yellow powder coat finish with 10 slots that can hold a variety of test leads up to 0.320" in diameter.

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

232273

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ |
|---|---|---|---|
| TL40 | **389-0545** | 30.00 | 29.10 |
| TL75 | **201-285** | 12.00 | 11.64 |
| TL910 | **389-0557** | 41.00 | 39.77 |
| TP920 | **389-0570** | 29.00 | 28.13 |
| TL932 | **389-0594** | 10.00 | 9.70 |
| TL940 | **389-0612** | 10.00 | 9.70 |
| TL950 | **389-0624** | 18.00 | 17.46 |
| TL960 | **389-0636** | 10.00 | 9.70 |
| TL970 | **389-1290** | 40.00 | 38.80 |
| H900 | **389-1318** | 16.00 | 15.52 |

### Stray Voltage Adapter Test Lead Kit

**TL225 SureGrip™**

FLUKE



LATEST PRICING

Eliminates false readings due to stray or ghost voltages caused by the capacity between wires. This is achieved by ensuring that there is a lower impedance across the input terminals of the meter. The low impedance is achieved without compromising the safety of the electrician.
- Ensures the meter has a low input impedance that eliminates stray voltages
- On energized wires, the meter will indicate the real voltage
- On non-energized circuits the meter will read close to zero (even if there are stray voltages)
- Can be used with all modern meters with standard input spacing
- Operating range 200 V to 1000 V AC
- **EN61010-1 CATIII 1000V, CATIV 600 V**
- One year warranty

**Kit includes:** SV225 Stray Voltage Eliminator, TL224 SureGrip™ Silicone Test Lead Set (right to straight), TP220 SureGrip™ Test Probe Set and C75 Accessory Case.

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

416655

| Type | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| TL225 Test Lead Set | **101-8362** | 57.00 | 55.29 | 53.63 |

### Multimeter Soft Carry Cases



A range of soft cases with zips for hand-held meters.
Available in three sizes:
Internal Dimensions (WxHxD):
Small: 150x100x35mm
Medium: 170x100x35mm
Large: 190x110x50mm

248859

| Size | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Small | **428-3879** | 4.03 | 4.00 |
| Medium | **428-3880** | 4.55 | 4.52 |
| Large | **428-3892** | 3.86 | 3.84 |

### High Voltage Probe

**72-3040**

TENMA™



The Tenma multiplier probe adapts most 10Mohm multimeters into a high voltage meter.

| | |
|---|---|
| Maximum Working Voltage | 40KV DC or AC Peak<br>28KV DC RMS (Hz) |
| Division Ratio | 1000:1 |
| Input Resistance | 1000M Ohm |
| Accuracy | DC: ± 1% (1KV to 20KV), 2% (20KV to 40KV)<br>AC: ±5 % (1KV to 28KV RMS, 50/60Hz) |

337085

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 72-3040 | **490-8351** | 36.50 | 35.77 |


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## High Voltage Probe
**To BS EN61010 40kV**




- Suitable for measuring EHT rails
- Maximum input voltage 40kVdc or pk ac at 1000:1 division ratio
- Suitable for most multimeters (input resistance 10M)
- Moulded hard guard
- Hook style tip for hand free operation
- Supplied with 2m connection lead, terminated in 4mm plugs

**BS EN61010** to 40kV dc or peak to ac to earth

Secondary voltage is derived from an over voltage category II primary supply

| | | | |
|---|---|---|---|
| Input resistance | MΩ | Working voltage | 40kVdc or pk ac, up to 300Hz 28kV RMS |
| Division ratio | 1000:1±1% into 10MΩ<br>1000:1±6% into 1MΩ | Operating temperature | 0°C to +50°C |
| Accuracy DC volt | ±2% (1kV to 20kV)<br>±3% (20kV to 40kV) | | |

222348

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| TT-HVP 40 | **329-1285** | 61.98 | 59.64 | 58.12 | 55.97 |

## Thermocouple Adaptor
**80AK**

FLUKE



- Adapts Type-K thermocouple mini-connector to dual banana plug inputs
- Suitable for low voltage applications (below 30V AC, 60V DC)

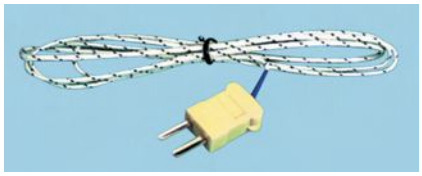
LATEST PRICING

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

382569

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| 80AK-A | **335-7053** | 16.00 | 15.20 |

## K Type Thermocouple Probes





General purpose thermocouple probes for multimeters and thermometers. 1m length. The probes are available in two different variations.

248855

| Description | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| -50C to +200C Bead Type Probe | **428-3820** | 7.31 | 7.26 |
| -50C to +1000C Insertion Type Probe | **428-3831** | 2.87 | 2.76 |

## Infrared Temperature Probe



New

- Switchable analogue output of 1mV/°C or 1mV/°F
- Compatible with multimeters, clamp meters and other electrical test equipment
- Built-in laser pointer
- Provides instant and highly repeatable readings

| | | | |
|---|---|---|---|
| IR Temperature range | -35°C to 550°C | Emissivity | Fixed at 0.95 |
| Basic Accuracy | ±2.0% or ±2°C | Dimensions (WxHxD) | 53 x 166 x 53mm |
| Response Time | Less than 0.5 second | Weight | 180g |
| Optical resolution | 8:1 | | |

**Includes:** 9V battery and integrated test leads.

486330.465661

| Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|
| **143-0714** | 26.34 | 24.29 | 21.12 |

## Multimeter Thermometer Module — 80TK

FLUKE



LATEST PRICING

A thermocouple converter for use with any K-type thermocouple fitted with a miniature connector that fits most standard digital multimeters. The module accepts the output of the K-type thermocouple and converts it to millivolts per degree (°C or °F). A three position switch selects on/off, °F or °C.
Suitable for use with digital multimeters with 4mm socket entry on a 19mm, ¼" pitch and with an input impedance ≥10MΩ. Supplied with bead type thermocouple with 1.2 metre lead and miniature connector.

H=100 (excluding pins),
W=65, D=25

| | | |
|---|---|---|
| Measurement Range | -50 to +1000°C or -58 to +1832°F<br>(range of supplied thermocouple -40°C to +260°C) | |
| Accuracy (18°C to 28°C), not including error of probe or multimeter | | |
| | -50°C to -21°C | ±2.5% of reading ±2°C |
| | -58°F to -5.8°F | ±2.5% of reading ±3.6°F |
| | -20°C to 350°C | ±0.5% of reading ±2°C |
| | -4°F to 662°F | ±0.5% of reading ±3.6°F |
| | 351°C to 500°C | ±1.75% of reading ±2°C |
| | 663°F to 932°F | ±1.75% of reading ±3.6°F |
| | 501°C to 1000°C | ±2% of reading ±2°C |
| | 933°F to 1832°F | ±2 of reading ±3.6°F |
| Resolution | 2000 count display | 0.1°C/°F in 200mV range<br>1.0°C/°F in 2V range* |
| | 3200 count display | 0.1°C/°F in 300mV range<br>1.0°C/°F in 3V range*<br>*ignore decimal point on 2V or 3V range |
| Ambient operating temperature | | 0°C to 50°C |
| Input protection | | 60V dc or 24V rms ac max |
| Battery | | One 9V PP3(1600+ hrs life) supplied with module |
| Weight | | 126g |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

222597

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 80TK | **424-080** | 79.00 | 76.63 | 74.33 |

## Tachometer Probe
**A2108**

compact





The Multimeter Probe will convert any digital multimeter into an accurate optical tachometer quickly and easily. This probe measures rpm optically or by using the optionally available Contact Adaptor, contact rpm & linear rate in metres/minute only can be measured. The A2108 is an ideal instrument for economic general purpose rpm checking with a more than adequate specification via any digital or analogue multimeter.

| | |
|---|---|
| RPM overall range | 60 to 60,000 rpm |
| 2 ranges | 6000 to 60,000 rpm |
| Resolution | ±1 rpm |
| Accuracy | ±1% fsd analogue output |
| Response time | Time between pulses - max. 1 m/s |
| Light source - LED Models | Red Visible LED |
| Optical Range | 1 metre |
| Light source - Laser Models | 1 mw 635nm Class II |
| Optical Range | 2 metres |
| Voltage output | 0-6 vdc both ranges |
| Connections | Coiled cable with 2 x 4mm plugs fitted |

347189.410673

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Tachometer | A2108 | **506-1775** | 111.73 | 105.57 | 101.43 |

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# Multimeters - Application Specific

## Intrinsically Safe Digital Multimeter

**87V-Ex**



W=98 H=201 D=52mm.
Weight 624g

The Fluke 87V Ex is an intrinsically safe version of the most popular meter in the world: the Fluke 87V. It has measurement functions, troubleshooting features, plus the resolution and accuracy to solve problems on motor drives, in plant automation, power distribution and electromechanical equipment. Additionally, it has an intrinsically safe rating and ATEX certification for use in hazardous areas. This makes it the ideal general-purpose measurement tool for use in environments such as (petro-) chemical plants, the pharmaceuticals industry and other locations subject to risk of explosion.

**The 87V Ex has been developed for use both inside and outside hazardous zones without compromising performance or safety:**

- Inside the zone it is a fully ATEX-certified DMM
- Outside the zone it can be used just like a standard Fluke 87V with full performance
- Unique function for accurate voltage and frequency measurements on adjustable speed motor drives and other electrically noisy equipment.
- ATEX safety rating for use in Zone 1 and Zone 2
- Large display with analog bargraph and 2 level bright white backlight
- Built-in thermometer
- True-RMS voltage and current for accurate measurements on non linear signals
- Selectable filter for accurate voltage and frequency measurements on motor drives
- 4½-digit mode for precise measurements (20,000 counts)
- Min-Max-Average recording with Min/Max Alert to capture variations automatically
- Touch Hold to capture stable readings avoiding noisy signals
- Peak capture to record transients as fast as 250µs
- Relative mode to remove test lead resistance from low ohms measurements
- Auto and manual ranging for maximum flexibility
- Input Alert provides audible warning against wrong use of input jacks
- Audible continuity, diode test and duty cycle
- Improved selectable sleep mode for long battery life
- Easy battery and fuse exchange without opening the complete case
- Conducting holster with built in test lead and probe storage

| Functions | Maximum range | Max resolution | Accuracy |
|---|---|---|---|
| Voltage DC | 1000V | 10µV | ±(0.05%+1) |
| Voltage AC | 1000V | 10µV | ±(0.7%+2) |
| Current DC | 10A | 0.01µ | ±(0.2%+2) |
| Current AC | 10A | 0.01µ | ±(1.0%+2) |
| Resistance | 50MΩ | 0.01Ω | ±(0.2%+1) |
| Conductance | 60nS | 0.001nS | ±(1%+10) |
| Capacitance | 9999µF | 0.01nF | ±(1%+2) |
| Frequency | >200kHz | 0.01Hz | ±(0.005%+1) |
| Temperature | -200 to 1090°C | 0.1°C | 1.0% |
| 80BK temperature probe | -40 to 260°C | | 2.2°C or 2% |

| Safety Specifications | |
|---|---|
| ATEX Safety Rating | Ex II 2 G EEx ia IIC T4 |
| Agency Approvals | ZELM 05 ATEX 0274; CSA, TUV |
| Measurements in Ex Area | Voltage ≤ 65V, Current ≤ 5A |
| Electrical Safety Rating | EN61010-1 CATIV 600V, CATIII 1000V |

**Includes:** DMM with red holster, TL75 test leads, AC72 alligator clips, 80BK temperature probe, 9V battery (installed), printed user manual, CD-ROM.

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

417251

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| 87V-EX | **105-7381** | 720.00 | 698.40 | 677.45 |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## Digital TRMS Wattmeter

**PX110 and 120**



The PX 120 and PX 110 feature a wide measuring range high sensitivity, so are ideally suited for both general teaching and vocational training. Their ability to measure RMS values in AC + DC (or TRMS) enables them to carry out measurements in the 4 quadrants on signals which are disturbed and polluted by harmonics. The only difference between the two models is that the PX 120 measures powers using the three-phase three balanced wire system, whereas the PX 110 is reserved for single-phase networks.

- DC or AC TRMS networks: balanced single-phase (PX 110) or three-phase (PX 120)
- Voltage, current, active/reactive/apparent powers and power factor measurements
- High degree of sensitivity
- Simple and quick implementation with direct access keys



- Numerous automatic functions: current range switching, HOLD, filtering, starting current, etc.
- Excellent readability: 3 quantities displayed simultaneously with a digit height of 14 mm
- Digital transmissions protected by infrared communication interface
- Mains power supply (optional)

**General Characteristics**

| | |
|---|---|
| Interfaces and software | Yes |
| Operating temperature | 0°C to +50°C |
| Storage temperature | -40°C to +70°C |
| Power supply | 6x 1.5V LR6 batteries |
| Autonomy | 40 hours |
| Dimensions (HxWxD) | 211 x 108 x 60mm |
| Weight | 835g |
| Safety IEC61010 | 600V, Cat III, pollution level 2 |

**Technical Characteristics**

| | Range | Resolution | Accuracy AC / DC |
|---|---|---|---|
| Active power | 10W to 6kW | 0.1W - 1W | 1%R±2 digits/2%R±3 digits |
| Apparent/reactive power | 10W to 6kW | 0.1W - 1W | 2%R±2 digits |
| Power factor | 1 | 0.01 | 3%R±2 digits |
| Voltage | 0.5 to 600V RMS | 100mV | 0.5%R±2 digits/1%R±3 digits |
| Current | 10mA - 10A RMS | 1mA - 10mA | 0.5%R±2 digits/1%R±3 digits |
| Starting current | 5A - 65A (peak) | 100mA | 10%R±2 digits |

339418.410674

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|---|
| 1 Phase Wattmeter | PX0110 | **411-0134** | 392.23 | 379.37 | 362.64 | 347.21 |
| 3 Phase Wattmeter | PX0120 | **411-0146** | 463.33 | 445.51 | 430.22 | 418.75 |
| Software package | HX0013 | **411-0158** | 156.55 | 154.25 | 152.18 | 150.09 |

# Multimeters - Bench

## Bench Multimeter – True RMS

**72-1016**





W=105, H=240, D=310mm. Weight 2.4 kg

A bench top DMM with true RMS measurement of AC signals and LED display. Supplied with test leads, UK and Euro power leads, user manual, temperature probe, Alligator clips, multi-purpose test socket, RS232C interface cable and communications software.

- 5,999 count LCD display
- Backlit, full icon display
- Fused 10A measuring range
- Autoranging
- True RMS measurement with 100kHz bandwidth
- Diode, Continuity and Transistor tests
- Max/Min mode and data hold
- Low battery display and sleep mode
- Connect to PC via RS232 (software and cable included)
- Powered by mains lead or 6x C batteries (not included)
- Neat, built-in accessory storage compartment

| | Ranges | Best Accuracy |
|---|---|---|
| AC Voltage | 600mV/6V/60V/600V/1000V | ±(0.6%+5) |
| DC Voltage | 600mV/6V/60V/600V/1000V | ±(0.3%+2) |
| AC Current | 600µA/6mA/60mA/600mA/10A | ±(1.0%+5) |
| DC Current | 600µA/6mA/60mA/600mA/10A | ±(0.5%+3) |
| Resistance | 600Ω/6kΩ/60kΩ/600kΩ/6MΩ/60MΩ | ±(0.5%+2) |
| Capacitance | 6nF/60nF/600nF/6µF/60µF/600µF/6mF | ±(2.0%+5) |
| Temperature | -40°C - 1000°C | ±(1.0%+3) |
| Frequency | 6kHz/60kHz/600kHz/6MHz/60MHz | ±(0.1%+3) |

440677.434556

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|---|
| Bench Multimeter | 72-1016 | **119-6432** | 99.00 | 92.00 |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## Digital Multimeter



W=238 H=83 D=230mm. Weight 1.5kg

- A 4000 count bench multimeter with a basic accuracy of 0.3%
- 18mm high back lit LCD display with annunciators and a 42 segment bar graph
- True RMS measurement
- Capacitance and frequency measurement
- Auto and manual ranging
- RS232 connectivity
- Diode test
- Data hold, delay, min, max, memory store/recall

- Powered by either mains supply or AA batteries
- Includes an integral storage compartment for leads

**Supplied with:** mains lead, test leads, RS232 lead, software, carrying strap and operating manual.

| | Ranges | Accuracy |
|---|---|---|
| DC Voltage | 400mV, 4V, 40V, 400V, 1000V | 0.3% |
| AC Voltage (True RMS) | 4V, 40V, 400V, 750V | 1.2% |
| DC Current | 4mA, 40mA, 400mA, 10A (20A for 30 secs) | 1.5% |
| AC Current (True RMS) | 4mA, 40mA, 400mA, 10A (20A for 30 secs) | 2% |
| Resistance | 400R, 4kR, 40kR, 400kR, 4MR, 40MR | 0.5% (<400kR) |
| Capacitance | 4nF to 40µF | 2% (>20µF 5%) |
| Frequency | 100Hz, 1kHz, 10kHz, 100kHz, 600kHz | 0.1% |
| Continuity Test | <40Ω, 2kHz tone | |
| Safety Category | EN61010-1 CAT II 1000V | |
| Power Requirements | 110/220VAC 50/60Hz or 1 x PP3 and 6 x AA batteries | |

417502.428715

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| DM200 | Multimeter | **107-6811** | 131.58 | 117.30 | 110.16 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C11 | 55.16 |
| **UKAS Calibration Charge** | N C11 | 76.82 |

## Bench DMM with LED Display

GW INSTEK

**GDM-8135**



H = 95, W = 230 D = 280mm

A bench top digital multimeter with a bright, clearly visible LED display. Ideal for education, workshops and laboratories. Supplied with test leads.

- 3½ digit LED display
- AC/DC Voltage measurement (0.1% accuracy on DC V range)
- AC/DC Current measurement
- Resistance measurement
- Diode test
- Audible continuity check
- 1000V Voltage rating
- 20A Current rating
- Auto zero circuit

| | |
|---|---|
| **AC/DC Voltage** | |
| Range | 200mV, 2V, 20V, 200V, 1000V (1200V DC) |
| Best Accuracy | DC: ±(0.1%rdg +1 digit)<br>AC: ±(0.5%rdg +1 digit) |
| Input Impedance | 10MΩ |
| **AC/DC Current** | |
| Range | 200µA, 2mA, 20mA, 200mA, 2A, 20A |
| Best Accuracy | DC: ±(0.2%rdg +1 digit)<br>AC: ±(1%rdg +1 digit) |
| **Resistance** | |
| Range | 2Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 20MΩ |
| Best Accuracy | ±(0.2%rdg +1 digit) |
| **Continuity** | Buzzer < 10Ω |

248853

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| GDM-8135 | **428-3818** | 155.96 | 144.74 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |

## Dual Display Digital Multimeter

GW INSTEK

**GDM-8245**



A compact bench top digital multimeter with a clear LED display and RS-232 interface. The high resolution 50,000 count display provides accurate measurements across the meters test ranges.

- 50,000 count display
- AC/DC Voltage, AC/DC Current, Resistance, Capacitance, Frequency and Diode Test functions
- Dual display to indicate AC Voiltage and Frequency, DC Voltage (ACV) and dBm or DC Voltage and AC Voltage ripple
- Manual or Auto-ranging
- 0.03% DC voltage accuracy
- AC voltage measuring frequency up to 100kHz
- 20A current range with up high energy fuse protection
- 1200V High voltage range
- AC true RMS or AC + DC true RMS

| | | |
|---|---|---|
| **DC Voltage** | Range | 500mV, 5V, 50V, 500V, 1200V |
| | Accuracy | ± (0.03% rdg + 4 digits), 1200V range<br>± (0.03% + 9 digits) |
| | Input Impedance | 10MΩ |
| **AC Voltage True RMS (AC or AC+DC True RMS)** | Range | 500mV, 5V, 50V, 500V, 1000V 5 ranges |
| | Accuracy | ± (0.5% rdg + 15 digits) |
| **DC Current** | Range | 500µA, 5mA, 50mA, 500mA, 2A, 20A |
| | Accuracy | 500µA to 500mA: ± (0.2% rdg + 2 digits)<br>2A to 20A: ± (0.3% rdg + 2 digits) |
| **AC Curent True RMS (AC or AC+DC True RMS)** | Range | 500µA, 5mA, 50mA, 500mA, 2A, 20A |
| | Accuracy | 500µA to 500mA: 45Hz to 2kHz± (0.5% rdg + 15 digits)<br>2kHz to 10kHz± (1% rdg + 15 digits); 10kHz to 20kHz ± (2% rdg + 15 digits)<br>20A to 20A: 45Hz to 2kHz± (0.5% rdg + 15 digits) |
| **Resistance** | Range | 500Ω, 5kΩ, 50kΩ, 500kΩ, 5MΩ, 20MΩ |
| | Accuracy | 500Ω: ± (0.1% drg + 4 digits)<br>5kΩ to 500kΩ: ± (0.1% drg + 2 digits)<br>5MΩ: ± (0.2% drg + 2 digits)<br>20MΩ: ± (0.3% drg + 2 digits) |
| **Diode Test** | | The one range can check the forward voltage of diode. Maximum forward voltage 1.5V, Open voltage 2.8V |
| **Capacitance** | Range | 5nF, 50nF, 500nF, 5µF, 50µF |
| | Accuracy | ± (2% rdg + 4 digits) |
| **Frequency** | Input Level(Sine Wave) | mV range: >120mV (10Hz to 50kHz)<br><200mV (50kHz to 150kHz)<br>5V range: >1V (10Hz to 200kHz)<br>50V range: >1.2V (20Hz to 200kHz)<br>500V range: >12V (20Hz to 1kHz) |
| Continuity Beeper | | <5Ω |
| NMRR | | >60dB |
| CMRR | | >90dB |
| Operating Mode | | AUTO RANGE |
| Others | | MAX, MIN, dBm (63.8dBm to -97.7dBm), REL, HOLD |
| Display | | Dual Display 0.4", 0.5", 7 segment LED display |
| Power Source | | AC 230V ± 15%, 50/60Hz |
| Accessories | | Power cord, Instruction manual, Test Lead |
| Dimensions / Weight | | 251x91x291mm, 2.6kg |

339503.343953

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| GDM-8245 | **491-1738** | 224.34 | 196.35 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |

## 40,000 Count True RMS DMM with PC interface

TTi

**1604**



- 40,000 count, auto/manual ranging
- Basic d.c. V accuracy 0.08%
- Resoloution 10µV, 10mΩ, 0.1µA
- Large bright LED display (14mm/0.56")
- Current measurement up to 10 amps
- True RMS as functions, wide ac bandwidth
- Frequency measurement function
- Relative, T-Hold and Min-Max functions
- Isolated RS232 interface as standard
- Safety **EN6101-1, EMC 50081-1, EN50082-1**

True RMS

| Function | Ranges | Max. Resolution |
|---|---|---|
| dc voltage | 400mV to 1000V | 10µV |
| ac voltage | 400mV to 750V | 10µV |
| dc/ac current | 4mA to 10A | 0.1µV |
| dc/ac current | 1mA to 10A | 10µV |
| Resistance | 400R to 40MR | 10mR |
| Fequency | 4kHz to 40kHz | 0.1Hz |
| **General** | | |
| Power | 230V or 115V ac nominal 50/60Hz (adjustable internally) | |
| Weight | 2kg | |

RS232 interface opto-isolated bi-directional, 9600 baud

222506

| Order Code | Price Each 1+ | + | + |
|---|---|---|---|
| **605-499** | 205.00 | – – | – – |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C11 | 55.16 |
| **UKAS Calibration Charge** | N C11 | 76.82 |

## Dual Display True RMS DMM

TTi

True RMS

CALIBRATION SERVICES

**1705**



- Dual Display and Dual measurement
- Auto ranging and manual ranging
- Frequency and capacitance measurements
- dB, watts and VA
- 100 reading datalogging
- 12000 count, 0.04% basic dcV acc.
- True rms ac functions
- Relative measurement
- Wide range of computing functions, eg Ax + b
- Mains battery operated
- Isolated RS-232 interface as standard

| Ranges | | Ranges | |
|---|---|---|---|
| dc voltage | 100mV to 1000V | Resistance | 100R to 20MR |
| ac voltage | (True rms) 100mV to 750V | Fequency | 100Hz to 100kHz |
| dc/ac current | 1mA to 10A | Capacitance | 10nF to 100µF |

## Multimeters - Bench - continued

### Dual Display True RMS DMM - continued

**1705 - continued**

222445.409505

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| 1705 | 724-014 | 305.00 | 295.85 | 286.97 |

| | | Price Each |
|---|---|---|
| Standard Calibration Charge | S C5 | 39.11 |
| UKAS Calibration Charge | N C5 | 61.97 |

### High Resolution DMM - 1906

**True RMS 5½ digit Computing Multimeter**



- 5½ digit (210,000 Count) LED display
- 0.012% basic accuracy, 1µV, 1mΩ and 1nA resolution
- Automatic or manual ranging
- Four terminal ohms measurement
- True rms ac functions, wide ac bandwidth
- Current up to 10 Amps
- 100 reading data logger
- Wide range of computing functions, Ax +B, % deviation, min/max
- Isolated RS-232 interface as standard

| Ranges | | | |
|---|---|---|---|
| dc voltage | 200mV to 1000V | dc/ac current | 200µA to 10A |
| ac voltage | (True rms) 200mV to 750V | Resistance | 200R to 20MR |

222450

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| 1906 | 724-026 | 403.00 | 390.91 | 379.18 |

| | | Price Each |
|---|---|---|
| Standard Calibration Charge | S C11 | 55.16 |
| UKAS Calibration Charge | N C11 | 76.82 |

### Digital Multimeter



- Microprocessor controlled, with self test facility
- 4.5 digit display
- Basic accuracy 0.05%
- dcV & acV, 200mV to 1KV
- dc & ac current, 200uA to 20A
- 200Ω to 20MΩ
- Auto/manual ranging
- True rms
- All measurements via two input sockets (except 1kV)
- Fast or Slow measuring mode
- Quattro key operating concept
- Can be controlled by a PC using standard RS232 or IEEE488 interface and Labview software

241083

| Mftrs. List No. | Description | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|---|
| HUC50-00 DM100 | Multimeter | 413-1010 | 345.78 | 328.44 | 311.10 |

| | | Price Each |
|---|---|---|
| Standard Calibration Charge | S C11 | 55.16 |
| UKAS Calibration Charge | N C11 | 76.82 |

### Digital Bench Multimeter

**BK 2831D**



W=298 H=114, D=264mm. Weight 2.5 kg

Provides versatility and reliability for a broad spectrum of laboratory and service applications.

- True RMS AC measurements for accurate interpretation of any waveform signal
- 4½ Digit, 20000 count LED display
- Great overload protection on all ranges
- Diode and continuity test
- %, MIN, MAX, HOLD and PEAK HOLD functions
- Safety IEC61010-1 Cat II 600V

| | Ranges | Typical Accuracy (1 yr) |
|---|---|---|
| DC Voltage | 2V - 1200V (4 ranges) | ±(0.05%+5d) |
| AC Voltage | 2V - 1000V (4 ranges) | ±(0.75%+10d) |
| DC Current | 2mA - 20A (5 ranges) | ±(0.75%+5d) |
| AC Current (TRMS) | 2mA - 20A (5 ranges) | ±(0.75%+5d) |
| Resistance | 500Ω - 50MΩ | ±(0.1%+3d) |
| Frequency | 20Hz to 200kHz (2 ranges) | ±(1.0%+5d) |

447779

| Mfrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| BK2831D | 122-5521● | 287.67 | 275.26 | 257.70 |

| | | Price Each |
|---|---|---|
| Standard Calibration Charge | S C11 | 55.16 |
| UKAS Calibration Charge | N C11 | 76.82 |

### TRMS Digital Bench Multimeters

**BK 5491A and BK 5492**



W=255 H=105, D=305mm. Weight 3 kg



- True RMS AC and AC+DC measurements
- Dual Display
- 30Hz to 100kHz bandwidth
- MIN, MAX, HOLD, COMP and REL functions
- DBm measurement
- Diode and continuity test
- RS 232 Interface
- Safety IEC61010-1 Cat II 600V

**Model 5491A:**
- 50000 count LED display

**Model 5492:**
- 5½ Digit, selectable 120,000 / 40,000 / 4,000 Count display
- Selectable sampling rate
- 2 or 4 wire selectable for Resistance Measurements

| | 5491A Ranges | 5491A Best Accuracy | 5492 Ranges | 5492 Best Accuracy |
|---|---|---|---|---|
| DC Voltage | 500mV - 1000V (5 ranges) | ±(0.02%+4d) | 120mV - 1000V (5 ranges) | ±(0.012%+5d) |
| AC Voltage | 500mV - 750V (5 ranges) | ±(0.5%+15d) | 120mV - 750V (5 ranges) | ±(1.0%+40d) |
| DC Current | 500µA - 10A (6 ranges) | ±(0.05%+4d) | 12mA - 12A (4 ranges) | ±(0.1%+3d) |
| AC Current (TRMS) | 500µA - 10A (6 ranges) | ±(0.5%+25d) | 12mA - 12A (4 ranges) | ±(0.5%+12d) |
| Resistance | 500Ω - 50MΩ | ±(0.1%+3d) | 1.2kΩ - 120MΩ | ±(0.06%+3d) |
| Frequency | 5Hz to 500kHz (4 ranges) | ±(0.01%+3d) | 5Hz to 1MHz (4 ranges) | ±(0.005%+2d) |

447788

| Mfrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| BK5491A | 122-5519● | 332.560 | 318.770 | 300.890 |
| BK5492 | 122-5520● | 392.505 | 383.584 | 375.060 |

| | | Price Each |
|---|---|---|
| Standard Calibration Charge | S C11 | 55.160 |
| UKAS Calibration Charge | N C11 | 76.820 |

## Precision digital multimeter HM8112-3

HAMEG Instruments

True RMS

**6.5-digit display**




- 6.5-digit display (1.2 MPoints)
- resolution 100 nV, 100 pA, 100 µΩ, 0.01 °C/F
- DC basic accuracy 0.003%
- 2-wire/4-wire measurement
- adjustable measurement intervals of from 0.1s to 60s
- up to 100 measurements per second to the PC
- true rms value measurement AC+DC and AC; offset correction
- RS-232 interface, optional: USB (HO870), IEEE-488 (HO880)
- supplied with: mains cable, operating instructions, HZ15 measuring lead, RS-232 IF cable

| | Measurement ranges | Accuracy (in %) | Resolution |
|---|---|---|---|
| **DC voltage** | 0.1V to600V | 0.003 + 2 | 1 µV |
| **AC voltage** | 0.1V to 600V | 0.08% + 0.08 | 1 µV |
| **DC current** | 100µA to 1A | 0.02% + 0.002 | 1 nA |
| **AC current** | 100µA to 1A | 0.1% + 0.08 | 100 pA |
| **Resistance** | 100Ω - 10MΩ | 0.005% + 0.001 | 1mΩ - 100µΩ |
| **Frequency/period** | 1Hz - 100kHz | 0.05% | 0.00001Hz - 1Hz |
| **Temperature** | -200°C to +800°C | ±0.05°C | 0.01°C |

474905

| Mftrs' List No. | Order Code | Price Each 1+ |
|---|---|---|
| HM8112-3 | **137-1028** | 719.50 |

## Digital Bench Multimeters

FLUKE

**8808**



LATEST PRICING

W=217 H=88, D=297mm. Weight 2.1 kg

5.5 digit precision multimeter which delivers a wide variety of measurement functions, including volts, ohms, and amps, plus frequency - all at superior accuracy and resolution with a basic V dc accuracy of 0.015%.

- **Measure sensitive leakage current:** includes two low impedance low current ranges for measuring sensitive leakage currents (i-Leakage).
- **Perform routine manufacturing functional tests with consistency:** Use setup keys (S1 - S6) for fast access to repetitive measurements. Operators no longer need to press multiple buttons to make routine measurements.
- **Eliminate production mistakes:** has a limit compare mode with built in display enunciators that clearly show whether a test is within or out of limits.
- **Perform 4-wire measurements with only two leads:** Patented split terminal jacks for 2x4 Ohms function allow you to performprecise 4-wire low ohms measurements with only two leads instead of four.
- Continuity / Diode Test
- Limit Compare functions
- dBm, dB, Min, Max functions
- RS-232 interface (USB interface version available 150-3748)
- Supports programming in simplified ASCII

| | Ranges | Resolution | Accuracy |
|---|---|---|---|
| **DC Voltage** | 200mV to 1000V | 1µV | 0.015% |
| **AC Voltage** | 200mV to 750V | 1µV | 0.2% |
| **DC Current** | 200µA to 10A | 1nA | 0.02% |
| **AC Current** | 20mA to 10A | 100µA | 0.3% |
| **Resistance** | 200Ω - 100MΩ | 1mΩ | 0.02% |
| **Frequency** | 20Hz to 1MkHz | 0.1mHz | 0.01% |

**Included Accessories**:
LCI Line Power Cord, TL71 Test Lead Set, Spare Line Power fuse, Programmers Manual / User Manual on CD-ROM, FVF-BASIC FlukeView Forms Software Basic Version.

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

492365.501790

| Description | Mfrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Bench DMM | 8808 | **150-3747** | 463.00 | 449.11 | 435.64 |
| DMM with SW and USB Cable | 8808/SU | **150-3748** | 592.00 | 574.24 | 557.01 |
| **Standard Calibration Charge** | | S C11 | | Price Each 55.16 | |
| **UKAS Calibration Charge** | | N C11 | | 76.82 | |

## Digital Bench Multimeters

FLUKE

**8845A and 8846A**



LATEST PRICING

W=217 H=88, D=297mm. Weight 3.6 kg

6.5 digit precision multimeters with the versatility to handle your most demanding measurements, on the bench or in a system.These meters are both high performance and feature rich, yet also remarkably easy to use.

**Common Features**:
- 6.5 digit resolution
- Basic DC Voltage accuracy of up to 0.0024%
- Dual display
- 2 x 4 ohms 4-wire measurement technique
- Graphical display
- Trendplot™ paperless recorder mode, statistics, histogram
- 5000 measurement internal memory
- RS-232, IEEE-488 and Ethernet interfaces
- Transfer data to a PC with FlukeView Forms Basic software, the full version (FVF-UG) allows customisable forms
- CAT II 600 V

**8846A Additional Features:**
- Measures capacitance and temperature
- USB memory drive port
- Includes TL2X4W-PT 2x4 wire ohms test leads

| | Ranges | | Typical Accuracy (1 yr) | |
|---|---|---|---|---|
| | **8845A** | **8846A** | **8845A** | **8846A** |
| **DC Voltage** | 100mV/1V/10V/100V/1000V | | ±(0.0035%+5ppm) | ±(0.0025%+2ppm) |
| **AC Voltage** | 100mV - 750V | 100mV - 1000V | ±(0.06% rdg + 0.03% rng) | |
| **DC Current** | 100µA/1mA/10mA/100mA/1A/10A | | ±(0.05% rdg + 0.005% rng) | |
| **AC Current** | 100µA/1mA/10mA/100mA/1A/10A | | ±(0.1% rdg + 0.04% rng) | |
| **Resistance** | 100Ω - 100MΩ | 10Ω - 1GΩ | ±(0.01% rdg + 0.001% rng) | |
| **Frequency** | 3Hz to 300kHz | 3Hz to 1MHz | ±(0.01% rdg) | |
| **Capacitance** | | 1nF - 100mF | | ±(1.0%rdg+0.5%rng) |
| **Temperature** | | -200°C - 600°C | | ±0.08°C |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

447365.460907

| Description | Mfrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Bench DMM | 8845A UK | **127-4086** | 710.000 | 688.700 | 668.040 |
| Bench DMM | 8845A EURO | **127-4087** | 710.000 | 688.700 | 668.040 |
| Bench DMM | 8846A UK | **127-4088** | 938.000 | 909.860 | 882.560 |
| Bench DMM | 8846A EURO | **127-4091** | 938.000 | 909.860 | 882.560 |
| **Accessories** | | | | | |
| 4-Wire Short | 884X-SHORT | **127-4092** | 21.000 | 20.370 | 19.760 |
| 2x 4-Wire Ohms Test Lead | TL2X4W-PT | **127-4093** | 53.000 | 51.410 | 49.870 |
| 512MB USB Memory | 884X-512M | **127-4094** | 42.400 | 41.130 | 39.900 |
| 1GB USB Memory | 884X-1G | **127-4095** | 69.600 | 67.510 | 65.490 |
| USB to RS232 Adaptor | 884X-USB | **127-4096** | 95.000 | 90.250 | 87.880 |
| Ethernet Interface Cable | 884X-ETH | **127-4097** | 13.000 | 12.610 | 12.230 |
| 2m RS232 Cable | RS43 | **127-4098** | 50.000 | 48.500 | 47.050 |
| 2m IEEE488 Cable | Y8022 | **127-4099** | 267.977 | 261.886 | 256.067 |
| FlukeView Forms SW Upgrade | FVF-UG | **127-4100** | 73.000 | 70.810 | 68.690 |
| FlukeView Forms SW with cable | FVF-SC4 | **127-4101** | 157.000 | 152.290 | 147.720 |
| **Standard Calibration Charge** | | S C18 | | Price Each 89.270 | |
| **UKAS Calibration Charge** | | N C18 | | 123.000 | |

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## Multimeters - Bench - continued

### Dual Display Bench Multimeter

Agilent Technologies

**34405A**



LATEST PRICING

W=261, H=104, D=303mm. Weight 3.75kg

A 5.5 digit benchtop digital multimeter that comes with a broad range of measurement functions, including temperature and capacitance measurements. The 34405A features simultaneous reading of DC and AC measurements with its dual display and can take up to 19 readings/sec at 4.5 digits resolution through the standard USB interface. The SCPI language compatibility makes it easy to migrate from your existing test setup.

- 120000 counts resolution
- 16 measurement functions including temperature and capacitance
- 0.025% DC voltage accuracy
- USB 2.0 interface (TMC-488.2 Compliance)
- SCPI language compatible
- Comes with DMM Intuilink data logging software

| | Ranges | Best Accuracy |
|---|---|---|
| AC Voltage | 100mV, 1V, 10V, 100V, 1000V | ±(0.2% of rdg + 0.1% of range) |
| DC Voltage | 100mV, 1V, 10V, 100V, 750V | ±(0.025% of rdg + 0.005% of range) |
| AC Current | 10mA, 100mA, 10A | ±(0.5% of rdg + 0.1% of range) |
| DC Current | 10mA, 100mA, 1A, 10A | ±(0.5% of rdg + 0.1% of range) |
| Resistance | 100R, 1kR, 10kR, 100kR, 1MR, 10MR, 100MR | ±(0.005% of rdg + 0.005% of range) |
| Capacitance | 1nF, 10nF, 100nF, 1µF, 10µF, 100µF, 1mF, 10mF | ±(1% of rdg + 0.5% of range) |
| Temperature | -80 to 150°C | Probe Accuracy + 0.2°C |
| Frequency | 0 - 300kHz | ±(0.02% of rdg + 0.003% of range) |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

441223.501608

| Description | Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|---|
| Bench Multimeter | 34405A | **120-9896** | 400.00 | 396.00 | 392.04 | 388.12 |
| **Standard Calibration Charge** | | S C18 | | Price Each 89.27 | | |
| **UKAS Calibration Charge** | | N C18 | | 123.00 | | |

### Benchtop Digital Multimeter

Agilent Technologies

**34401A**



LATEST PRICING

W=254, H=104, D=374mm. Weight 3.6kg

Gives you the performance you need for fast, accurate bench and system testing. The 34401A provides a combination of resolution, accuracy and speed that rivals DMMs costing many times more.

- Measure up to 1000V with 6½ digits resolution
- 0.0015% basic dcV accuracy (24hr)
- 0.06% basic acV accuracy (1yr)
- 3Hz to 300kHz ac bandwidth
- 1000 readings/sec. direct to GPIB
- Continuity and Diode Test functions
- Null feature allows you to remove lead resistance and other fixed offsets in your measurements
- Min / Max / Avg readouts
- Direct dB and dBm measurements
- Data Hold capability
- Store up to 512 readings in internal memory
- GPIB and RS-232 interfaces as standard features
- Voltmeter Complete and External Trigger signals are provided so you can synchronize to other instruments
- TTL output indicates Pass/Fail
- Includes three command languages (SCPI, Agilent 3478A and Fluke 8840A /42A)
- Included Agilent IntuiLink PC software allows you to put your captured data to work easily
- Programmers can use ActiveX components to control the DMM using SCPI commands

**Accessories Included:**
Test lead kit with probe, alligator and grabber attachements. Operating Manual, Service Manual, Test Report and power lead.

| | Ranges | Best Accuracy |
|---|---|---|
| AC Voltage | 100mV, 1V, 10V, 100V, 750V | ±(0.04% rdg + 0.02% range) |
| DC Voltage | 100mV, 1V, 10V, 100V, 1000V | ±(0.001% rdg + 0.0004% range) |
| AC Current | 1A, 3A | ±(0.1% rdg + 0.04% range) |
| DC Current | 10mA, 100mA, 1A, 3A | ±(0.1% rdg + 0.04% range) |
| Resistance | 100R, 1kR, 10kR, 100kR, 1MR, 10MR, 100MR | ±(0.002% rdg + 0.0005% range) |
| Frequency | 3Hz to 300kHz | ±0.006% |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

464373

| Description | Mfrs. List No. | Order Code | 1+ | Price Each + | + | + |
|---|---|---|---|---|---|---|
| DMM | 34401A | **133-5866** | 571.00 | – – | – – | – – |
| **Standard Calibration Charge** | | S C4 | | Price Each 34.10 | | |
| **UKAS Calibration Charge** | | N C4 | | 58.75 | | |

### Performance Bench and Systems Multimeters

Agilent Technologies

**34410A and 34411A**



LATEST PRICING

W=261, H=104, D=303mm. Weight 3.72kg

**34410A:**

- 6½ Digit high-performance multimeters
- 10,000 readings/sec @ 5½ digits direct to PC
- 1,000 readings/sec @ 6½digits direct to PC
- 30 PPM 1 year Basic DC accuracy
- LAN, USB & GPIB standard
- DCV, ACV, DCI, ACI, 2-wire and 4-wire resistance, frequency, period, continuity, and diode test
- Capacitance & temperature measurements
- Expanded measurement ranges
- Data logger with 50 K reading non-volatile memory

**34411A Additional Features:**

- 50,000 readings/sec @ 4½ digits direct to PC
- 1 Million reading memory
- Analog level triggering
- Programmable Pre/Post triggering

Both models supplied with: Test lead kit with probes and SMT attachments, test report, power cord, USB interface cable, product reference CD-ROM with soft documentation and software

| | Ranges | Best Accuracy |
|---|---|---|
| AC Voltage | 100mV to 750V | ±(0.06% of rdg + 0.03% of range) |
| DC Voltage | 100mV, 1V, 10V, 100V, 1000V | ±(0.003% of rdg + 0.0005% of range) |
| AC Current | 100µA to 3A | ±(0.1% of rdg + 0.04% of range) |
| DC Current | 100µA to 3A | ±(0.1% of rdg + 0.04% of range) |
| Resistance | 100R, 1kR, 10kR, 100kR, 1MR, 10MR, 100MR, 1GR | ±(0.01% of rdg + 0.001% of range) |
| Capacitance | 1nF, 10nF, 100nF, 1µF, 10µF | ±(0.4% of rdg + 0.1% of range) |
| Temperature | -80 to 150°C | ±0.08°C |
| Frequency | 3Hz - 300kHz | ±(0.007% of rdg + 0% of range) |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

488532

| Description | Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|---|
| Bench Multimeter | 34410A | **144-0376** | 692.00 | 685.08 | 678.23 | 671.45 |
| Bench Multimeter | 34411A | **144-0377** | 1,069.00 | 1,058.31 | 1,047.73 | 1,037.25 |
| Test Lead Set | 34138A | **144-0379** | 14.57 | 14.42 | 14.28 | 14.14 |
| **Standard Calibration Charge** | | S C18 | | Price Each 89.27 | | |
| **UKAS Calibration Charge** | | N C18 | | 123.00 | | |

### Digital Bench Multimeter

KEITHLEY

**2100**



W=256 H=112 D=375mm Weight=4.1kg

- High precision 6½-digit DMM for critical measurements at a 5½-digit price
- 11 measurement functions cover most commonly measured parameters

New

- Fully specified accuracies on all functions for ISO-compliant results
- TMC compliant USB 2.0 interface for use with SCPI test programs
- Included PC software utilities for graphing and data sharing in both Microsoft Word and Excel
- Rugged construction for durability in bench/portable applications
- Selectable front/rear inputs facilitate bench or rack use

A high accuracy (38ppm), 6½-digit resolution is ideal for critical measurements. The Model 2100 features 11 measurement functions and 8 math functions to easily accommodate the most commonly measured parameters.

**Related Applications:**

- Test Engineers: Manual and semi-automatic electrical functional test
- Development Engineers: Electrical/electronic circuit and product validation
- Service/Calibration Technicians: Electronic product repair and calibration
- Research Scientists: Electrical and physics experiments testing
- Engineering Students: Electronic device and circuits experiment testing

**Supplied with:**

Instruction manual on CD, LabVIEWTM Driver, Keithley I/O Layer, USB Cable, Power Cable, Safety Test Leads, KI-Tool and KI-Link Add-in (Both Microsoft Word and Excel versions)

| Range | Resolution | Best Accuracy |
|---|---|---|
| **DC Voltage** 100mV, 1V, 10V, 100V,1000V | 0.1µV, 1µV, 10µV, 0.1mV, 1mV | 0.0038%rdg + 0.0006%range |
| **AC Voltage** 100mV, 1V to 750V | 0.1µV, 1µV to 1mV | 0.08%rdg + 0.04%range |
| **DC Current** 10mA, 100mA, 1A, 3A | 10nA, 100nA, 1µA, 10µA | 0.055%rdg + 0.006%range |
| **AC Current** 1A, 3A | 1µA, 10µA | 0.15%rdg + 0.05%range |
| **Resistance** 100Ω to 100MΩ | 100µΩ to 100Ω | 0.013%rdg + 0.002%range |
| **Frequency** 100mV to 750V | | 0.001%rdg |
| **Continuity** 1kΩ | 10mΩ | 0.024%rdg + 0.03%range |
| **Diode Test** 1V | 10µV | 0.04%rdg + 0.02%range |

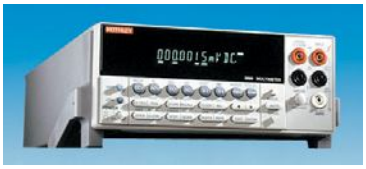
494078

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|---|
| Digital Multimeter | 2100 | **151-7379** | 554.54 | 541.45 | 529.55 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | S C 20 | | 108.78 | |
| **UKAS Calibration Charge** | | N C 20 | | 128.40 | |

## Digital Bench Multimeter

KEITHLEY

**Model 2000**



CALIBRATION SERVICES

H=89, W=213, D=370mm Weight=2.9kg

The 6½-digit Model 2000 has unique capabilities that simplify building andupgrading automated production test systems. For example, the built-inlimit testing function can be used to sort or grade components orassemblies. It also offers a full resolution reading rate (50 rdg/s) that'snearly ten times faster than any other meter in its class and a maximumspeed of 2000 rdgs/s. Built-in math functions let you make a variety ofcalculations on the acquired data without a computer controller.

**2000-SCAN 10-Channel Scanner Card**

Designed for use with Model 2000, 2010, 2001 DMMs this plug in card multiplexes ten 2-pole, five 4-pole or any combination of 2-pole/4-pole signals. The quick and easy way to create a ten channel data logger and reduce test time.

- A complete set of measurement tools in one compact enclosure
- Superior measurement integrity
- Cost-effective solutions for specific applications
- Easy migration from model to model as applications evolve
- Exceptional long-term reliability
- Selectable reading rates up to 2000 readings/second
- Common SCPI programming and software architecture
- Easy to read vacuum florescent display with clear annunciators
- Built-in frequency counter and temperature measurement capabilities
- Fast, flexible triggering
- Data storage memory
- 2 or 4 wire resistance measurements
- Easy calibration without opening the case
- IEEE-488 bus for controlling a range of GPIB instruments
- TriggerLink for external triggering of multiple instruments
- Accepts optional scanner card (390-4076) for additional multiplexed inputs
- 3 year warranty

| | | | |
|---|---|---|---|
| Digits | 6.5 | Range Span | 1A - 3AV |
| Expansion Channels | 10 | Resolution | 1µA |
| **DC Voltage** | | Basic Accuracy | 0.1% |
| Maximum Reading | 1000V | Bandwidth | 3Hz - 5kHz |
| Resolution | 100nV | **Resistance** | |
| Basic Accuracy | 0.002% | Maximum Reading | 120MΩ |
| **AC Voltage** | | Resolution | 100µΩ |
| Maximum Reading | 750V | Basic Accuracy | 0.008% |
| Resolution | 100nV | Continuity Test | ● |
| Basic Accuracy | 0.05% | Diode Test | ● |
| Bandwidth | 3Hz - 300kHz | Constant Current | ● |
| dB, dBm | ● | **General Features** | |
| Frequency, Period | ● | Interface | GPIB, RS-232 |
| **DC Current** | | Reading Hold | ● |
| Range Span | 10mA - 3AV | Reading Memory | 1024 rdgs. |
| Resolution | 10nA | Sampling Speed | 2000 rdgs/s |
| Basic Accuracy | 0.03% | Temp. Measurement | T / C |
| **AC Current** | | | |

417378

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|---|
| Digital Multimeter | 2000 | **390-3679** | 756.80 | 734.40 | 719.10 |
| 10-ch Scanner Card | 2000-SCAN | **390-4076** | 597.07 | 582.15 | 567.21 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | S C 20 | | 108.78 | |
| **UKAS Calibration Charge** | | N C 20 | | 128.40 | |

## Picoammeter

KEITHLEY

**6485**



H=90 W=214 D=369mm. Weight 2.8kg

The 5½-digit Model 6485 Picoammeter combines Keithley's expertise in sensitive current measurement instrumentation with enhanced speed and a robust design. With eight current measurement ranges and high speed autoranging, this cost-effective instrument can measure currents from 20fA to 20mA, taking measurements at speeds up to 1000 readings per second. The Model 6485's 10fA resolution and superior sensitivitymake it well suited for characterizing low current phenomena, while its 20mA range lets it measure currents high enough for applications such asmeasuring 4-20mA sensor loops. Although it employs the latest current measurement technology, it is significantly less expensive than other instruments that perform similar functions, such as optical power meters, competitive picoammeters, or user-designed solutions. With a price that's comparable to a general purpose DMM, the Model 6485 makes picoamp-level measurements affordable for virtually any laboratory or production floor.

- Cost-effective low current measurement solution
- 10fA resolution
- 5½-digit resolution
- <200µV burden voltage
- Up to 1000 readings/second
- Built-in Model 485 emulation mode
- IEEE-488 and RS-232 interfaces
- Analogue output
- Drivers for LabVIEW, LabWindows/CVI, Visual Basic, C/C++, and TestPoint included
- ExceLINX Excel Add-In included

**Features that Expand Test and Measurement Flexibility:**

- Scaled voltage analogue output allows measurement results to be transmitted to devices like DMMs, data acquisition boards, oscilloscopes, or strip chart recorders
- 220V overload protection
- One-touch front panel design. Functions can be configured easily with the push of a button, without complicated function menus
- Built-in Trigger Link interface simplifies synchronizing with other instruments and voltage sources. This interface combines six independent selectable trigger lines on a single connector for simple, direct control over all instruments in a system
- RS-232 and IEEE-488 interfaces make it easy to integrate the 6485 into automated test and measurement systems
- For research on light-sensitive components, such as measuring the dark currents of photodiodes, the front panel display can be switched off to avoid introducing light that could significantly reduce the accuracy of the results
- REL and LOG functions: make relative readings with respect to a baseline value or display the logarithm of the absolute value of the measured current

**Supplied Accessories:** Protective Shield / Cap (2-lug), 1.2m Low Noise BNC Input Cable, ExceLINX Excel Add-In (downloadable fromwww.keithley.com)

| Range | Resolution | Accuracy |
|---|---|---|
| 2nA | 10fA | ±(0.4% + 400fA) |
| 20nA | 100fA | ±(0.4% + 1pA) |
| 200nA | 1pA | ±(0.2% + 10pA) |
| 2µA | 10pA | ±(0.15% + 100pA) |
| 20µA | 100pA | ±(0.1% + 1nA) |
| 200µA | 1nA | ±(0.1% + 10nA) |
| 2mA | 10nA | ±(0.1% + 100nA) |
| 20mA | 100nA | ±(0.1% + 1µA) |

| General Specifications | | |
|---|---|---|
| **Input Connector** | BNC on rear panel | |
| **Reading Rate / Buffer Size** | 1000 rdgs/sec | 2500 rdgs |
| **Standards: EMC / Safety** | EN 61326-1 | EN61010-1 |
| **Operating Temperature / RH** | 0 to 50°C | 70% RH |
| **Warm Up** | One hour to rated accuracies | |

419360

| Model | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| 6485 Picoammeter | **108-7944** | 1,519.11 | 1,481.04 | 1,443.30 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C 18 | 89.27 | |
| **UKAS Calibration Charge** | | N C 18 | 123.00 | |

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# Multimeters with Data Acquisition

## Data Acquisition and Switching System

Agilent Technologies

**34970A**



LATEST PRICING

W=254, H=104, D=374mm. Weight 3.6kg

A three-slot mainframe with a built-in 6½ digit digital multimeter. Each channel can be configured independently to measure one of 11 different functions without the added cost or hassles of signal-conditioning accessories. Choose from eight optional plug-in modules to create a compact data logger, full-featured data acquisition system or low-cost switching unit. On-module screw-terminal connections eliminate the need for terminal blocks and a unique relay maintenance feature counts every closure on every switch for easy, predictable relay maintenance.

**Agilent BenchLink Data Logger** software is included with the 34970A. BenchLink Data Logger gives you a familiar Microsoft Windows interface for test configuration and real-time data display and analysis. Setup and make measurements quickly, export data or use the built-in graphs to log your results.

- 3-slot mainframe with built-in GPIB and RS232 interfaces
- 6½-digit (22-bit) internal DMM, scanning up to 250 channels per second
- 8 switch and control plug-in modules to choose from
- Built-in signal conditioning measures thermocouples, RTDs and thermistors, ac/dc volts and current; resistance; frequency and period
- 50k readings of non-volatile memory holds data when power is removed
- Hi/LO alarm limits on each channel, plus 4 TTL alarm outputs

| | Ranges | Best Accuracy |
|---|---|---|
| AC Voltage | 100mV, 1V, 10V, 100V, 300V | ±(0.04% rdg + 0.03 range) |
| DC Voltage | 100mV, 1V, 10V, 100V, 300V | ±(0.0015% rdg + 0.0004 range) |
| AC Current | 10mA, 100mA, 1A | ±(0.1% rdg + 0.04 range) |
| DC Current | 10mA, 100mA, 1A | ±(0.01% rdg + 0.004 range) |
| Resistance | 100Ω, 1kΩ, 10kΩ, 100kΩ, 1MΩ, 10MΩ, 100MΩ | ±(0.002% rdg + 0.0005 range) |
| Frequency | 3Hz to 300kHz | ±0.006% |
| Temperature | -150°C to 1200°C | 1.0°C |

**Accessories Included:**
Operating and Service Manuals, Test Report and power lead. Agilent Benchmark Data Logger software, RS-232 cable, thermocouple, screwdriver.
*Modules are purchased separately and are required to operate.*

**Modules**

| Model | Description | Type | Speed (ch/s) | Max Volts | Max Amps | Bandwidth | Thermal Offset |
|---|---|---|---|---|---|---|---|
| 34901A | 20ch Multiplexer | 2-wire armature | 60 | 300V | 1A | 10MHz | <3μV |
| 34902A | 16ch Multiplexer | 2-wire reed | 250 | 300V | 50mA | 10MHz | <6μV |
| 34903A | 20ch Actuator | SPDT / form C | 120 | 300V | 1A | 10MHz | <3μV |
| 34904A | 4x8 Matrix Switch | 2-wire armature | 120 | 300V | 1A | 10MHz | <3μV |
| 34905A | Dual 4ch RF Mux, 50Ω | Common Low | 60 | 42V | 0.7A | 2GHz | <6μV |
| 34907A | Multifunction Module | 2x 8-bit Digital IO | | 42V | 400mA | | |
| | | 26-bit Event Counter | | 42V | | 100kHz | |
| | | 2x 16-bit Analog o/p | | ±12V | 10mA | dc | |
| 34908A | 40ch Single-Ended Mux | 1-wire armature | 60 | 300V | 1A | 10MHz | <3μV |

**34901A: 20-channel General Purpose Multiplexer**
A versatile multiplexer for general purpose scanning. It combines dense, multi-function switching with 60 channel/second scan rates to address a broad spectrum of data acquisition applications. Two- and four-wire channels can be mixed on the same module. Two additional fused inputs (22 channels total) route up to 1A of current to the internal DMM, allowing ac and dc current measurements without the need for external shunt resistors.

- Two- and four-wire scanning
- Built-in thermocouple reference junction

**34902A: 16-channel High-Speed Multiplexer**
Employs reed relays to achieve scan rates up to 250 channels-per-second. Use this module for high-throughput automated test applications as well as high-speed data logging and monitoring tasks. Sixteen two-wire inputs switch up to 300 V. Two-and four-wire channels may be mixed on the same module. User provided shunt resistors are required for current measurements.

- Two- and four-wire scanning
- Built-in thermocouple reference junction

**34903A: 20-channel Actuator / General Purpose Switch**
A general-purpose switch module with 20 independent single-pole, double-throw (SPDT) relays and is used to cycle power to products under test, control indicator and status lights, and to actuate external power relays and solenoids. Combine it with matrix and multiplexer modules to build custom switch systems. Its 300 V, 1 A contacts can handle up to 50 W, enough for many power line switching applications.

**34904A: 4x8 two-wire Matrix Switch**
Gives a flexible connection path between the device under test and your test equipment, allowing different instruments to be connected to multiple points on your DUT at the same time. Rows or columns may be connected between multiple modules to build 8 x 8, 4 x 16 or larger matrices, with up to 96 crosspoints in a single frame.

- 32 two-wire crosspoints
- 300 V, 1 A switching

**34905A (50Ω): Dual 4-channel RF Multiplexers**
Offers broadband switching capabilities for high-frequency and pulsed signals. Use it to route test signals between your device under test and your signal generator, oscilloscope, spectrum analyzer, or other instrumentation. The RF multiplexers are arranged as two independent 1 x 4 multiplexers, each with a common shield and a switched center conductor. Connections can be made directly to SMB inputs with 2 GHz usable bandwidth, or to the BNC-to-SMB adapters provided with 1 bandwidth. Multiple banks may be cascaded together for applications requiring even larger topologies--create a stubless 16:1 multiplexer in a single frame.

- 10x BNC to SMB adapter cables included

**34907A: Multifunction Module**
Allows great flexibility for a variety of sense and control applications. It combines two 8-bit ports of digital input and output, a 100 kHz gated totalizer, and two ±12V analogue outputs - all on a single earth-referenced module. The digital inputs and totalizer input may be included in a scan. Alarm limits for the digital and event counter inputs are evaluated continuously, capturing and logging alarm conditions even between scans.

- 16 bits of digital output - use with an external power supply to control microwave switches and attenuators, solenoids, power relays, indicators, etc.
- 16 bits of digital input - use to sense limit switch and digital bus status. There are no complex handshake modes; reads and writes are initiated either from the front panel or the bus
- 100 kHz totalizer input - count events from devices like photo interrupters, limit switches, and Hall-effect sensors. It keeps an updated total which can be read via the front panel or programmatically at any time. With 26 bits of resolution, it can count events at full speed for nearly 45 minutes without an overflow.
- Two ±12V analogue outputs - use the two electronically calibrated outputs to source bias voltages to your device under test, to control your analogue programmable power supplies, or use the outputs as setpoints for your control systems. The outputs are programmed directly in volts, either from the front panel or from the bus

**34908A: 40-channel Single-Ended Multiplexer**
For high-density common-low applications, such as battery test, component characterization, and benchtop testing. Each module switches 40 one-wire inputs. All two-wire internal measurements except current are supported. The module low connection is isolated from earth and can float up to 300 V.

- Single-wire switching for common-low applications
- Built-in thermocouple reference junction

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

464381

| Description | Mfrs. List No. | Order Code | Price Each 1+ | + | + | + |
|---|---|---|---|---|---|---|
| Data Acquisition Unit | 34970A | **133-5867** | 832.00 | – – | – – | – – |
| Multiplexer - 20ch | 34901A | **133-5869** | 256.00 | – – | – – | – – |
| Multiplexer - 16ch | 34902A | **133-5871** | 302.00 | – – | – – | – – |
| Actuator/Switch - 20ch | 34903A | **133-5872** | 221.00 | – – | – – | – – |
| Matrix Switch - 4x8 | 34904A | **133-5873** | 256.00 | – – | – – | – – |
| 4ch RF Multiplexer - 50Ω | 34905A | **133-5874** | 404.00 | – – | – – | – – |
| Multifunction Module | 34907A | **133-5876** | 192.00 | – – | – – | – – |
| Multiplexer - 40ch | 34908A | **133-5877** | 256.00 | – – | – – | – – |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |

## Ethernet Multimeter / Data Acquisition System

KEITHLEY

**2701**



H=89 W=213 D=370mm. Weight 8kg

Combine precision measurement, switching, and control in a single, tightly integrated enclosure for either rack-mounted or benchtop applications. These cost-effective, high performance test platforms offer affordable alternatives to separate DMMs and switch systems, dataloggers/recorders, plug-in card data acquisition equipment, and VXI/PXI systems. The Integra Series plug-in switching and control modules offer unmatched flexibility and testing efficiency for a wide range of industries and applications. System builders can create test solutions with a combination of channel count, cost per channel, and system performance unmatched by any other single-box measurement system. The input modules provide the flexibility to vary the channel count from 20 to 200 (2-pole), apply a stimulus to the device under test, route signals, control system components, and make precision measurements with up to 14 functions. Robust digital I/O capabilities can be used for triggering, handshaking with other automation equipment, and alarm limit outputs.

- Combines functions of DMM, switch system, and datalogger
- True 6½-digit (22-bit) resolution
- Choice of 12 switch/control plug-in modules
- Up to 200 differential input channels (with 300V isolation) for measurement and control
- Convenient front panel inputs
- TestPoint-based start-up software
- Free LabVIEW, LabWindows/CVI, Visual Basic, C/C++, and TestPoint drivers (IVI style)
- Ethernet, RS-232 and GPIB communications capabilities

**Web-Enabled Data Acquisition and Control via Standard Ethernet**
A built-in 10/100BaseTX Ethernet interface makes the Model 2701 the best choice for distributed data acquisition applications thatdemand stable, high precision measurements. Just connect it directly to an Ethernet port - there's no need for additional interface cards,proprietary cables, or software. The Model 2701 is a cost-effective solution for industrial monitoring and control applications. It combines remotecommunications with high measurement precision for research and development tasks, such as remote equipment diagnostics and economicalmonitoring of lab environments.

A set of free software tools is included with every Integra Series instrument. These tools are designed to get optimal performance from Model 2700/2701 Multimeter / Switching systems. The software tools perform tasks that range from simple start-up routines and real-time graphing to supporting fully custom data acquisition and analysis solutions.

**KUSB-488** USB-to-GPIB Interface Adapter
GPIB interface solution that makes it easy to add standard IEEE-488.2 bus control to any PC. Can serve as a talk/listen device or can operate as a system controller, controlling as many as 14 GPIB instruments or other devices over a distance of up to 20 meters. Ideal for use with automated test equipment in laboratory and industrial applications.

- IEEE-488.2 compatible for fast data transfer
- Requires Windows 2000/XP/Me/98
- TestPoint, LabVIEW, and LabWindows/CVI support
- Compatible with any standard GPIB instrument

| Model | 2701 | 2700 |
|---|---|---|
| No. of Differential Input Channels | 80 | 80 |
| Matrix Crosspoints | 96 | 96 |
| Resolution (Ω) | 100μΩ | 100μΩ |
| No. of Slots | 2 | 2 |
| Resolution (Ω) | 450,000 rdgs | 55,000 rdgs |
| Size (2U height) | Half Rack Width | Half Rack Width |
| Comms | Ethernet, RS-232 | GPIB, RS-232 |
| Scan Rate (Memory) | 500 per sec | 180 per sec |
| Scan Rate (Bus) | 440 per sec | 145 per sec |
| Max. Internal Trigger Rate | 2800 per sec | 2000 per sec |
| Max. External Trigger Rate | 2000 per sec | 375 per sec |

419287

| Model | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 2701 Ethernet Multimeter | **108-7933** | 1,833.06 | 1,777.03 | 1,741.41 |
| 2700 Multimeter | **390-3692** | 1,026.12 | 1,001.03 | 975.36 |
| **Standard Calibration Charge** | | S C 20 | Price Each 108.78 | |
| **UKAS Calibration Charge** | | N C 20 | 128.40 | |

## USB-Based Data Acquisition Modules

KEITHLEY

**KUSB-3100 Series**



- USB 2.0 and USB 1.1, true plug-and-play compatibility
- Five different USB-based compact measurement systems
- Modules are hot-swappable and can be added / removed while the computer is running
- 12- and 16-bit resolution
- High and low programmable gains
- Input / output speeds up to 500kS/s
- Up to 96 digital lines for monitoring or control
- 500V isolation barrier protects the computer and module from voltage spikes, ESD, and surges
- Runs under Windows 2000 and XP platforms

Now, adding data acquisition capabilities to your PC is as easy as plugging in a mouse or keyboard. Just connect one of our compact data acquisition modules to your computer, install the supplied software, and connect your sensor directly to the module. In minutes, and withstate-of-the-art accuracy, you're measuring voltage, temperature, pressure whatever you need. And, you have done this without openingyour PC, without complicated programming, and without spending time configuring the module, power requirements, or connection schemes.

**KUSB-3100** (108-7937):
The economical solution, provides 8 single-ended inputs with 12-bit resolution, up to 50 kS/s throughput, two 12-bit ±10V analogue outputs, 16 digital I/O lines, and 1 counter/timer.
**KUSB-3102** (108-7938):
Offers 16 single-ended or 8 differential inputs with 12-bit resolution, up to 100kS/s throughput, two 12-bit analogue outputs, 17 digital I/O lines, and 2 counter/timers.
**KUSB-3108** (108-7941):
Features a variety of analogue input channels, including a Cold Junction Compensation (CJC) channel, as well as single-ended / differential analogue input channels. The CJC channel provides 10mV/ °C with an accuracy of 1°C. The differential analogue input channels can be used for B, E, J, K, N, R, S, or T type thermocouples. To measure other low-level analogue input signals, such as pressure and flow sensors, you can use these channels to connect up to 16 single-ended / 8 differential analogue inputs. In addition, the KUSB-3108 provides 2 analogue output channels for high-resolution, single-value output operations, 17 digital I/O lines, and 2 counter / timer channels.

**Software**
Every KUSB module includes the following software tools:

- The Quick DataAcq application provides a quick way to get the module up and running. It can collect A/D data, display data on the screen, and save data to disk.
- DataAcq Software Development Kit (SDK), allowing programmers to develop Windows application programs for the KUSB-3100 Series
- ActiveX controls for Microsoft VB or Visual C++
- LabVIEW™ VIs drivers
- Additional application software and examples are available at www.keithley.com

| Model | KUSB-3100 | KUSB-3102 | KUSB-3108 |
|---|---|---|---|
| Description | Low Cost | Low Gain | High Gain |
| Resolution | 12-bit | 12-bit | 16-bit |
| Sample Rate | 50 kS/s | 100 kS/s | 50 kS/s |
| Analogue Inputs | 8 SE | 16 SE / 8 Diff. | 16 SE / 8 Diff. |
| Analogue Outputs | 2 | 2 | 2 |
| Digital I/O Lines | 16 | 17 | 17 |
| Counters / Timers | 1 | 2 | 2 |
| Gain | 1, 2, 4, 8 | 1, 2, 4, 8 | 1, 10, 100, 500 |
| Connectivity | Screw Terminal | Screw Terminal | Screw Terminal |

419313

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| KUSB-3100 | **108-7937** | 265.49 | 258.85 | 252.22 |
| KUSB-3102 | **108-7938** | 541.62 | 535.57 | 530.71 |
| KUSB-3108 | **108-7941** | 794.25 | 774.39 | 762.71 |

# Frequency Counters

## 2.4GHz Frequency Counter

velleman INSTRUMENTS

**DVM13MFC2**



- 8-digit green LED display with annunciators
- 2-channel operating mode memory
- Adjustable range and gate time
- Frequency range: 0.01Hz - 2.4GHz
- Accuracy : time base error x frequency ± 1 digit
- Gate time: 100 msec - 10 sec
- Dimensions (WxHxD): 270 x 215 x 100mm. Weight: 1.6kg

**Input characteristics:**
channel A: Sensitivity: 50mVrms / Impedance: 50Ω / Max. input voltage: 30V
channel B: Sensitivity: 30mVrms / Impedance: 1 MΩ (<35pF) / Max. input voltage: 30V

446922.436856

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| Frequency Counter | **127-0137** | 53.99 | 48.18 |
| **Standard Calibration Charge** | S C 9 | Price Each 49.44 | |
| **UKAS Calibration Charge** | N C 9 | 72.14 | |

## 2.6GHz Universal Counter

HAMEG Instruments

**HM8123**



W=285 H=75 D=365mm. Weight = 4kg

- Frequency range from 0 Hz to 2.6 GHz
- 200 MHz time base with 0.2 ppm stability
- Two identical inputs, up to 200 MHz each
- 9-digit resolution at 1 sec. gate time
- 9 measurement functions, external gate and arming
- Input for external time base (reference signal 10 MHz)

**Input Characteristics (Input A and B)**

| | |
|---|---|
| Frequency Range | 0 to 200MHz (DC coupled)<br>10 to 200MHz (1 MΩ, AC coupled)<br>500kHz to 200MHz (50Ω, AC coupled) |
| Input Impedance | 1MΩ ll 30pF or 50Ω (switchable) |
| Attenuation | 1:1, 1:10, 1:100 (selectable) |
| Sensitivity (normal triggering) | 60$mV_{rms}$ (sine wave from 80MHz to 200MHz) |
| Max. Input Voltage | 1MΩ Input: 250V (DC+$AC_{peak}$) to 440Hz falling to 8$V_{rms}$ at 1 MHz<br>50Ω Input: 5$V_{rms}$ |
| Minimum Pulse Duration | ≤5ns for single pulse |
| Trigger Slope | positive or negative (selectable) |

**Input Characteristics (Input C)**

| | |
|---|---|
| Frequency Range | 100MHz to 3GHz |
| Input Sensitivity | 100$mV_{rms}$ (from 1GHz to 2.6GHz) |
| Max. Input Voltage | 5V (DC + $AC_{peak}$) |

**Measurement Functions**
Frequency A/B/C; Period Duration A; Width A; Duty Cycle A; Totalise A; RPM A;
Frequency Ratio A:B; Time Interval A:B; Totalise A during B; Time Interval A:B (average);
Phase A to B; Burst Measurements

**Frequency Measurement (Inputs A, B and C)**

| | |
|---|---|
| Frequency Range | 0 to 200MHz (2.6GHz) |
| Resolution | ±1 or 2 LSD |

**Period Duration Measurement**

| | |
|---|---|
| Range | 10,000s to 5ns |
| Resolution | ±1 oder 2 LSD |

**Totalisation A**

| | |
|---|---|
| Frequency Range | 0 to 200MHz (manual and external control) |
| Min. Pulse Duration | 10ns (LSD 1 count) |

## Frequency Counters - continued

### 2.6GHz Universal Counter - continued

**HM8123 - continued**

**RPM Measurement**

| | |
|---|---|
| Impulses per Revolution | 1 to 65,535 |
| Gate Time | 330 ms (fixed) |
| **Offset Range** | Covers the entire measurement range |
| **Gate Time** | 1ms to 65s (1ms resolution) |
| **Time Base** | 200MHz clock; 10MHz crystal; ageing ≤0.27ppm/month |

412340

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| HM8123 | **909-2056** | 627.79 |

### 3GHz Frequency Counter - Timer

**TF930**



New

The TF930 is a professional quality bench/portable frequency meter incorporating period, pulse width and totalise functions. It uses the advanced reciprocal measurement technique to provides high resolution regardless of input frequency. As well as frequency and period it can measure pulse width and has a totalise function. A USB interface for remote control and read-back is incorporated.

- VLF to 3000MHz frequency range
- Frequency, period, pulse width and totalise modes
- Reciprocal counting measurements
- Low pass filter, attenuator and trigger level control
- Large 10 digit LCD display with annunciators
- Rechargeable battery operation built-in, supplied with mains adapter/charger
- Low power consumption
- USB remote control

**Frequency Measurement**

| | Input A | Input B |
|---|---|---|
| Frequency range | 0.01Hz to 125MHz | 80MHz to 3GHz |
| Resolution | 10-7Hz to 100Hz | 1Hz to 10kHz |
| Accuracy | ± (1 digit + timebase accuracy) | ± (1 digit + timebase accuracy) |

**Period Measurement**

| | Input A |
|---|---|
| Period Range | 8ns to 330ms |
| Resolution | 10-7ns to 1µs |
| Accuracy | ± (1 digit + timebase accuracy) |

**Inputs**

| | Input A | Input B |
|---|---|---|
| Input impedance | 1MΩ / 20pF | 50Ω nominal |
| Frequency range | 3Hz to 125MHz | 80MHz to 3GHz |
| Sensitivity | Sinewave 15mV rms 10Hz to 125MHz | 15mV rms 80MHz to 2GHz 50mV rms 2GHz to 3GHz |
| Max. input voltage | 30Vdc; 30V rms 50/60Hz reducing to 1V rms above 1MHz | 30Vdc; 30V rms 50/60Hz |
| Coupling | AC | AC |
| Attenuator | Switchable 1:1 or 5:1 | |
| Low pass filter | Switchable 50kHz | |
| Trigger level control | 0 to 1.5V or 0 to 7.5V | |

**Count**

| | |
|---|---|
| Count range | >4,000,000,000 (232) |
| Frequency range | 0.01Hz to 125MHz |

**Pulse width**

| | |
|---|---|
| Range/resolution | 1us to 100 seconds/100ns |

**Timebase**

| | |
|---|---|
| Source | Internal 10MHz TCXO or external 10MHz |
| Temp. coefficient | Typically <±1ppm/°C over +5°C to +40°C range |
| Ageing | |

**General**

| | |
|---|---|
| AC line | 110-240V external adapter for UK, Euro, US or Australia |
| Battery | Internal rechargeable. Typically 24 hours operation per charge |
| Safety and EMC | Complies with EN61010-1 and EN61326 |
| Size: | 257(W) x 224(D) x 88(H) mm |
| Weight | 1.6kg |

230686

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| TF930 | **167-0769** | 245.00 | 230.00 |

### 3GHz Frequency Counter - Handheld

**PFM3000**



H = 178, W = 81, D = 30

New

CALIBRATION SERVICES

- 3 Hz to > 3000 MHz in two overlapping ranges
- High input sensitivity over the full frequency range
- High impedance measurement up to 125 MHz
- Reciprocal counting technique gives superior resolution
- Period measurement from 3 Hz to 125 MHz
- Battery operation; handheld format with tilt-stand
- Push-to-measure function with auto power-down
- Large 8+ digit display with full range of annunciators
- Selectable measurement time; display hold function
- Noise filter for low frequency measurements

The PFM3000 offers high sensitivity frequency measurement from 3Hz to more than 3GHz in two overlapping ranges. Period measurement is also provided from 8ns to 330ms. The PFM3000 uses a continuous reciprocal measurement technique to provide high resolution at all frequencies with rapid update.

Despite its wide frequency range the PFM3000 has a power consumption that enables it to operate for many hours from a PP3 size battery.A push-to-measure capability gives an instantaneous reading followed by an automatic power down after 15 seconds. This provides greatly extended battery life where continuous monitoring of the signal is not required.

**Frequency measurement**

| | Input A: | Input B: | |
|---|---|---|---|
| Frequency range | 3Hz to 125MHz | Frequency range | 80MHz to 3000MHz |
| Resolution | $10^{-7}$Hz to 100Hz | Resolution | 1Hz to 10kHz |

Measurement of accuracy is the sum of the timebase accuracy and measurement resolution plus one count.

**Period Measurement**

| | |
|---|---|
| Frequency range | 5Hz to 25MHz |
| Resolution | 100ns to 1µs |
| Accuracy | ±(1 digit + timebase accuracy) |

**Inputs**

| | Input A: | Input B: | |
|---|---|---|---|
| Input impedance | 1MΩ/20pF | Input impedance | 50Ω nominal |
| Sensitivity | Sinewave - 15mVrms 10Hz-125MHz 10Hz to 20MHz | Sensitivity | Sinewave - 15mVrms 80MHz-2GHz, 50mVrms to 3GHz 20MHz to 700MHz |

Input A and Input B: 30Vdc; 30Vrms 50Hz/60Hz reducing to 1Vrms above 1MHzNote that the inputs will not be damaged if subjected to an accidental short-term connection to a 50/60Hz line voltage not exceeding 250V rms.

**Timebase**

| | |
|---|---|
| Crystal oscillator frequency | 10MHz |
| Initial oscillator adjustment error | ±2ppm |
| Oscillator temperature coefficient | Typically less than ±0.3ppm/°C 18°C |
| Oscillator ageing rate | +5ppm/year |

**Power Requirements**

**Internal**

| | |
|---|---|
| Battery type | 9V PP3 alkaline |
| Battery life | Typically 20 hours |

**General**

| | |
|---|---|
| Operating temperature range | +5°C to +40°C |
| Operating humidity range | 20% RH to 80% RH |
| Storage temperature range | -20°C to +60°C |
| Weight | 190g |

509909

| Mftrs. List No. | Order Code | Price Each 1+ | + |
|---|---|---|---|
| PFM3000 | **160-1132** | 115.00 | – – |
| | | | Price Each |
| **Standard Calibration Charge** | | S C8 | 45.13 |
| **UKAS Calibration Charge** | | N C8 | 73.70 |

## Function Generators

### Function Generator

GW INSTEK



**Model:** SFG-1013

A great value DDS Function generator with voltage display with a high accuracy and high stability output. The waveform synthesis is based on DDS technology and output waveforms include sine, square, triangle and TTL types.

- 6 Digit LED display
- DDS Technology and FPGA design
- 0.1Hz to 3MHz frequency range
- Sine, Square, Triangle and TTL output
- High frequency accuracy and stability (+-20ppm)
- Voltage display

New

| | |
|---|---|
| Freq range (Sine, square) | 0.1Hz to 3MHz |
| Freq range (Triangle) | 0.1Hz - 1MHz |
| Resolution | 0.1Hz |
| Accuracy | ±20ppm |
| Display | 6 digits LED display -55dBc, 0.1Hz-200kHz; -40dBc, 0.2MHz-2MHz -35dBc, 2MHz-3MHz |
| Triangle wave | >98%, 0.1Hz - 100kHz; >95%, 100kHz - 1MHz |
| Square wave | 5% of period +4ns to 0.1Hz -100kHz |
| TTL output | >3Vpp; Fan out - 20 TTL load |
| Power | AC 240V, 220V, 110V ±10%, 50/60Hz |
| Dimensions (WxHxD) | 251x 91x 291mm |
| Weight | 2.1kg |

510025.509412

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| Function Generator | **156-3805** | 105.00 | 103.95 |

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## 2MHz Frequency Generator

**GFG-8015G**



H = 95, W = 230, D = 280mm

A low cost frequency generator with many features found on more expensive units. The units have an integral bench stand and carry handle and are ideal for many applications including education. Supplied with BNC to 2x crocodile clip lead.

- 0.2 Hz to 2MHz frequency range in 7 ranges
- Sine, Triangle, Square, Pulse and Ramp
- Variable and Fixed TTL output
- 1000:1 tuning range
- Two-step attenuator plus variable control
- Variable DC offset
- VCF (Voltage Controlled Frequency) input function
- Output overload protection

| | | | |
|---|---|---|---|
| **Main Output** | | Square | <2% |
| Amplitude | Up to 20V p-p | **Triangle Linearity** | 98% |
| Impedance | 50Ω | **TTL Output** | |
| Attenuator | -20dB, + 20dB | Rise/Fall time | <25ns |
| DC Offset | From -10V to +10V | Level | >3Vp-p |
| Range Accuracy | ±5% + 1Hz | **VCF** | |
| **Distortion** | | Input Voltage | 0V to 10V |
| Sine Wave | <1% | Impedance | 10kΩ |

339499

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| GFG-8015G | C8 **491-1684** | 95.37 | – – | – – |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## 20MHz Function Generator

**TG120**



The TG120 is a low-cost dial-set function generator which uses a new highly integrated design to achieve an upper frequency of 20MHz.

- Low cost 20MHz function generator
- 0.2Hz to 20MHz frequency range
- 10mV to 20V peak-to-peak from 50W
- Separate TTL/CMOS output
- DC offset control with zero detent
- Variable symmetry control
- External sweep input

**FREQUENCY**

| | |
|---|---|
| Frequency range: | 0.2Hz to 20MHz in 8 overlapping decade ranges with fine adjustment by a vernier |
| Vernier Range: | >10:1 on each range |
| Vernier Accuracy: | Typically ±5% of full range |

**SWEEP MODE (EXTERNAL)**

| | |
|---|---|
| Sweep Range: | Typically 20:1 |
| Input Sensitivity | Typically 0 to 2V for 10:1 sweep |

**WAVEFORM PERFORMANCE**

| | |
|---|---|
| Sine Distortion | Typically 2% on 200, 2k and 20k ranges |
| Amplitude Flatness: | ±0.2dB to 200kHz; ±2dB to 20MHz |
| Triangle Linearity: | Typically 99% on kHz ranges |
| Square Wave Rise/Fall | <22ns |
| Symmetry Range: | Typically variable from 1:6 to 6:1 up to 500kHz |

**OUTPUTS**

| | |
|---|---|
| 50Ω | 26dB vernier control within each range |
| 3 ranges | |
| 0dB Range: | 1V to 20V peak-to-peak (0.5V to 10V into 50Ω) |
| -20dB Range: | 100mV to 2V peak-to-peak (50mV to 1V into 50Ω) |
| -40dB Range: | 10mV to 0.2V peak-to-peak (5mV to 0.1V into 50Ω) |
| DC Offset Range: | ±10V from 50Ω |
| TTL/CMOS Output: | Capable of driving 4 standard TTL loads |

**GENERAL**

| | |
|---|---|
| Power: | 230V or 115V ±14%, 30VA max. Installation Category II |
| Safety and EMC: | Complies with **EN61010-1, EN55011** and **EN50082-1** |

222581

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| TG120 | **316-8487** | 210.00 | 203.70 | 197.59 |
| | | | **Price Each** | |
| **Standard Calibration** | | S C17 | 73.50 | |
| **UKAS Calibration** | | N C17 | 101.20 | |

## Coming soon

Register your interest for items that are 'Coming Soon' at **www.farnell.co.uk** and we'll email you to let you know that they're in stock.

## 2MHz Function Generator with LED Display

**GFG-8020H**



A low cost function generator with many features found on much more expensive units. The units have a LED display and integral bench stand/carry handle. Supplied with BNC to 2x croc. clip lead.

- Large 4 segment LED display
- 0.2Hz to 2MHz frequency range in 7 ranges
- Sine, Triangle, Square, TTL Pulse and CMOS output
- Coarse and fine tuning
- Built-in 4 digit counter (Internal only)
- Two-step attenuator plus variable control
- Variable DC offset
- VCF (Voltage Controlled Frequency) input function
- Output overload protection

| | | | |
|---|---|---|---|
| **Main Output** | | **CMOS Output** | |
| Amplitude | Up to 20V p-p | Rise/Fall Time | <120ns |
| Impedance | 50Ω | Level | 4V to 14.5Vp-p adjustable |
| Attenuator | -20dB | **VCF** | |
| DC Offset | From -10V to +10V | Input Voltage | 0V to 10V |
| Range Accuracy | ±5% + 1Hz | Impedance | 10kΩ |
| **Distortion** | | **Frequency Counter** | |
| Sine Wave | <1% | Mode | Internal |
| Square | <2% (<30ns rise/fall) | Range | 0.2Hz to 2MHz |
| **Triangle Linearity** | 98% | Accuracy | ±Time Base Accuracy±1 Count |
| **TTL Output** | | Resolution | 0.1Hz, 1Hz, 10Hz, 100Hz, 1kHz |
| Rise/Fall Time | <30ns | Sensitivity | <25ms Vrms |
| Level | >3Vp-p | **Dimensions (WxHxD)** | 230x95x280mm |

339500.267581

| Description | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| 2MHz Function Generator | C4 **491-1696** | 173.37 | 160.04 | 155.26 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## 3MHz Function Generator with LED Display

**72-7710**



- Frequency Range: 0.3Hz to 3MHz
- Waveforms: Sine, Triangle, Square, Ramp, TTL and CMOS output
- External Voltage Controlled Frequency (VCF) function
- Duty Cycle Control with signal inversion capability
- Variable DC offset control
- Two-step (-20dBx2) and Variable Attenuator
- Built-in 6 digit counter with INT/EXT function up to 150MHz / High resolution

| | | |
|---|---|---|
| **Main** | Frequency Range | 0.3Hz to 3MHz (7 ranges) |
| | Amplitude | >10V p-p (into 50Ω load) |
| | Impedance | 50Ω ±10% |
| | Attenuator | -20dB ± 1dB x 2 |
| | DC Offset | <-5V to >5V (into 50Ω load) |
| | Duty Control | 80% : 20% : 80% to 1MHz Continue variable |
| | Display | 6 digit LED display |
| | Range Accuracy | ±5% +1Hz (at 3 position) |
| **Sine Wave** | Distortion | ≤1%, 0.3Hz to 200kHz |
| | Flatness | <0.3dB, 0.3Hz to 300kHz; ≥95%, 100kHz to 3MHz |
| **Triangle Wave** | Linear | ≥98%, 0.3Hz to 100kHz; ≥95%, 100kHz to 3MHz |
| **Square Wave** | Symmetry | ±2%, 0.3Hz to 100kHz |
| | Rise or Fall Time | ≤100nS at maximum output (into 50Ω load) |
| **CMOS Output** | Level | 4V p-p ± 1V p-p to 14V p-p ±0.5V p-p adjustable |
| | Rise or Fall Time | ≤ 120nS |
| **TTL Output** | Level | ≥ 3V p-p |
| | Fan Out | 20 TTL Load |
| | Rise or Fall Time | ≤ 25nS |
| **VCF** | Input Voltage | 0V to 10V ±1V (100:1) |
| | Input Impedance | 10kΩ ±10% |
| **Frequency Counter** | **INT./EXT.** | Switch Selector |
| | Range | 0.3Hz to 3MHz (5Hz to 150MHz Ext.) |
| | Accuracy | Time base accuracy ± 1 count |
| | Time Base | ± 20ppm (23°C ± 5°C) after 30 minutes warm up |
| | Resolution | 10nHz for 1Hz and 0.1Hz for 100MHz |
| | Input Impedance | 1MΩ // 150pF |
| | Sensitivity | ≤ 35mV RMS (5Hz to 100Mz); ≤ 45mV RMS (100MHz to 150MHz) |
| **Power Source** | | 115/230V AC ± 10%, 50/60Hz |
| **Accessories** | | Power Cord, Manula, Probes |
| **Dimensions** | | 251 x 91 x 291mm |
| **Weight** | | 2.1kg |

339501.343952

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| 72-7710 | C4 **507-4502** | 188.70 | 178.50 | 168.66 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

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# Function Generators - continued

## Function Generators

GW INSTEK





Model: SFG-2000 Series

- Frequency range SFG-2004: 0.1Hz - 7MHz
- Frequency range SFG-2010/SFG-2110: 0.1Hz - 10MHz
- High frquency accuracy and stability: ±20ppm
- Maximum frequency resolution: 100mHz
- Low distortion sine wave: -55dBc, 0.1Hz-200kHz
- Built-in 6 digit 150MHz/high resolution counter
- Front panel setting save/recall with 10 groups of setting memories

**SFG-2110 extra features**

- INT/EXT AM/FM modulation
- LIN/LOG sweep mode

Technical Data

| | SFG-2004 | SFG-2010 | SFG-2110 |
|---|---|---|---|
| **Main** | | | |
| Freq range (Sine, square) | 4MHz | 10MHz | 10MHz |
| Freq range (Triangle) | 0.1Hz - 1MHz | | |
| Resolution | 0.1Hz | | |
| Accuracy | ±20ppm | | |
| Display | 9 digits LED display | | |
| Sine wave | -55dBc, 0.1Hz-200kHz; -40dBc, 0.2MHz-4MHz -30dBc, 4MHz-10MHz | | |
| Triangle wave | >98%, 0.1Hz - 100kHz | | |
| Square wave | ±1% period +4ns to 0.1 -100kHz | | |
| CMOS output | 4Vpp ±1Vpp - 14.5Vpp ±0.5Vpp | | |
| TTL output | >3Vpp; Fan out; TTL load | | |
| Power | AC115V, 230V ±15%, 50/60Hz | | |
| Dimensions (WxHxD) | 107 x 266 x 293mm | | |
| Weight | 3.1kg | | |
| **Sweep operation** | | | |
| Sweep/Rate | - | - | 100:1 ratio adjustable |
| Sweep/Time | - | - | 0.5 to 30sec adjustable |
| Sweep/Mode | - | - | Lin./Log selector |
| **Amplitude modulation** | | | |
| Depth and MOD freq. | - | - | 0 - 100%; 400Hz (INT) DC - 1MHz (EXT) |
| Carrier BW | - | - | 100Hz - 5MHz (-3dB) |
| EXT sensitivity | - | - | <10Vpp for 100% mod. |
| **Frequency modulation** | | | |
| Deviation, MOD freq. | - | - | 0-±5%; 400Hz(INT), 1kHz (EXT) |
| EXT sensitivity | - | - | <10Vpp for 10% mod. |
| **Frequency counter** | | | |
| Range | - | - | 5Hz - 150MHz |
| Accuracy | - | - | ±20ppm ±1 count |
| Time base | - | - | ±20ppm |
| Resolution | - | - | 10nHz to 0.1Hz |

381951.382005

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| 4MHz | SFG-2004 | **855-4854** | 176.15 | 167.18 |
| 10MHz | SFG-2010 | **855-4862** | 252.45 | 235.62 |
| 10MHz+sweep | SFG-2110 | **855-4870** | 290.60 | 269.28 |

## 2MHz Function Generator

**TG210**

TTi



A quality instrument which can generate a variety of precision waveforms over a wide range of frequencies and feature variable d.c. offset. Variable symmetry and sweep input

- 0.002Hz to 2MHz frequency range in 7 decades
- 20V pk-pk output from 50Ω or 600Ω, plus TTL/CMOS output
- 1000:1 frequency change by vernier or external voltage to sweep input
- Variable symmetry at constant frequency
- Variable dc offset with zero detent
- Sturdy ABS case with multiposition hand/stand

| | |
|---|---|
| Waveforms | Sine,Square,Triangle |
| Vernier range | 1000:1 on each range |
| Vernier accuracy | Typically ±5% of full scale |
| Sweep input | 0 to 3V for 1000:1 sweep Zin = 10Ω |
| Sine distortion | <0.5% on 200, 2K and 20K ranges<br><1% on the 2, 20, 200K ranges |
| Triangle linearity | >99% to 200kHz |
| Square wave | Rise and fall times <100nS<br>Mark space ratio 1:1 ±1% to 100kHz |
| Symmetry control | Variable 1:9 to 9:1 on top decade range |
| D.C. offset | ±10V (0dB) or ±1V (-20dB attenuator) |
| Auxillary output | 0 to +5V for driving CMOS and TTL loads |

222526.409429

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| TG210 | **184-378** | 165.00 | 160.05 | 155.25 |
| | | | **Price Each** | |
| **Standard Calibration** | | S C4 | 34.10 | |
| **UKAS Calibration** | | N C4 | 58.75 | |

## 3MHz Function Generator with Dual Digital Displays

**TG315**

TTi



H=88, W=260, D=235mm, Weight = 1.9kg

The TG315 is a low-cost 3MHz function generator which incorporates an LCD display that gives a simultaneous readout of frequency and amplitude (or DC offset).
Wide frequency range is matched by very high waveform quality at all frequencies and amplitudes. The digital display provides fast update even at low frequencies.

- 0.03Hz to 3MHz frequency range
- Simultaneous digital display of frequency and level
- High accuracy frequency readout with fast update
- 2mV to 20V pk-pk output fom 50Ω or 600Ω
- Level display compensated for attenuator setting
- 1000:1 frequency change by vernier or by voltage applied to the external sweep input
- Variable symmetry at constant frequency
- Display annunciators including clipping indicator

**FREQUENCY**

| | |
|---|---|
| Frequency Range | 0.03Hz to 3MHz in 7 overlapping decade ranges with vernier control |
| Vernier Range | 1000:1 on each range |
| External Sweep | 1000:1 linearly with applied voltage |
| Frequency Display | Auto-ranging reciprocal measurement giving 4 digit resolution.<br>Accuracy ±1 digit down to 2Hz, ± 1% below 2Hz |

**SWEEP**

| | |
|---|---|
| External Sweep | Linear control by external voltage, 1000:1 maximum on each range |

**WAVEFORMS**

(Specifications apply for the top decade of each frequency range)

**Sine**

| | |
|---|---|
| Distortion | Less than 0.5% on 300Hz, 3kHz and 30kHz ranges; less than 1% on 3Hz, 30Hz and 300kHz ranges; all harmonics >25dB below fundamental on 3MHz range |
| Amplitude Flatness | ± 0.2dB to 200kHz; 2dB to 3MHz |

**Triangle**

| | |
|---|---|
| Linearity | Better than 99% to 200kHz |

**Squarewave**

| | |
|---|---|
| Rise & Fall Times | <100ns |
| Mark-Space Ratio | 1:1 ±1% to 100kHz |

**DC**

| | |
|---|---|
| Range | ±10V (unterminated) |

**Symmetry**

| | |
|---|---|
| Symmetry Range | Variable typically between 1:9 and 9:1 (on top decade of each range), frequency divided by 10 when symmetry is selected |

**OUTPUTS**

| | |
|---|---|
| Output Impedance | 50Ω, alternative 600Ω output available |
| Amplitude | 2mV to 20V peak-peak (open circuit) in four ranges with 20dB control within each |
| DC Offset Range | ±10V (offset plus signal limited to ±10V),<br>Accuracy ±(2% + 1 digit) |
| Amplitude Display | 3 digit display showing pk-pk or rms amplitude or dc offset, compensated for attenuator setting. Accuracy ±5% of range |
| Aux Output | 0 to 5V TTL/CMOS levels (2 TTL loads) |

**GENERAL**

| | |
|---|---|
| Power Requirement | 230V or 115V ±14%, 50/60Hz, by internal adjustment. Installation Category II |
| Safety and EMC | Complies with EN61010-1 and EN61326 |

338041

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| TG315 | C4 **471-8495** | 203.00 | 196.91 | 191.00 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## 3MHz Function Generator with 120MHz Counter

**TG320**

TTi



H=88, W=260, D=235, Weight = 1.9kg

- Function generator specifications as TG315
- 7½ digit external frequency counter, 5Hz to 120MHz
- Recoprocal counting method for high resolution
- 50mV sensitivity up to maximum frequency

The TG320 has the same features and specifications as the TG315, but with the addition of a wide range frequency counter for external signals.
The full width of the display is used to provide a 7½ digit frequency readout, and a reciprocal counting technique is employed to achieve high resolution at all frequencies.

**EXTERNAL COUNTER**

| | |
|---|---|
| Frequency Range | 5Hz to >20MHz (range 1) and <20MHz to >120MHz (range 2) |
| Input Sensitivity | 50mV rms (sinewave) |
| Resolution | 6 digits at 0.5s gate time, 7 digits at 5s gate time |
| Timebase Accuracy | <±10ppm initial error (trimmable through front panel),<br>±5 ppm/year ageing rate; tempco typically less than 0.5ppm/°C |
| Counter Display | In external counter mode, a supressed digit between the two displays is enabled creating a single 8 digit display. Annunciators for Hz, kHz and MHz |

338172

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| TG320 | C12 471-8501 | 234.00 | 226.98 | 220.17 |
| | | | Price Each | |
| Standard Calibration Charge | | S C12 | 60.93 | |
| UKAS Calibration Charge | | N C12 | 89.27 | |

## 3MHz Function Generator with Counter, Sweep and AM

**TG330**



- Functon generator specifications as TG315
- Frequency counter specifications as TG320
- Internal sweep generator with lin or log sweep
- Amplitude modulation, internal or external source

H=88, W=260, D=235mm, Weight = 1.9kg

The TG330 has the same features and specifications as the TG320, but with the addition of an internal sweep generator and AM capability.

**SWEEP**

| | |
|---|---|
| Internal Sweep | Linear or logarithmic; Start and Stop frequencies displayed by button press |
| Sweep Out | Control voltage available as an output |
| Sweep Width | Up to 1000:1 within each range |
| Sweep Rate | Adjustable from typically 20ms to 20s |
| External Sweep | Linear control by external voltage |

**AMPLITUDE MODULATION**

| | |
|---|---|
| Modulation Depth | Variable 0 to 100% typical |
| Modulation Frequency | 400Hz internal. DC to 20kHz external |

338173

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| TG330 | C12 471-8513 | 269.00 | 252.94 | 242.10 |
| | | | Price Each | |
| Standard Calibration Charge | | S C12 | 60.93 | |
| UKAS Calibration Charge | | N C12 | 89.27 | |

## TG550 5MHz Function Generator with Sweep

**External Counter and Dual Display**



The TG550 can generate a variety of precision waveforms over a wide range of frequencies from mHz to MHz. Dual digital display shows frequency and level of frequency stability

- 0.005Hz to 5MHz frequency range
- Simultaneous display of frequency and amplitude
- Frequency locking for crystal controlled stability
- Precision internal linear or logarithmic sweep
- External frequency counter with a 7 digit resolution
- High waveform quality at all frequencies and levels
- 20V pK-pK from 50Ω or 600Ω, plus TTL/CMOS output
- 1000:1 frequency change by vernier or sweep voltage
- Internal or external amplitude modulation up to 100%

| | |
|---|---|
| Waveforms | Sine, Square, Triangle |
| Frequency Range | 0.005Hz to 5MHz |
| Vernier Range | 1000: |
| Sine Distortion | <0.5% on 500, 5K and 50K ranges; <1% on 5, 50 and 500K ranges<br>All harmonics >25dB below fundamental on 5M range |
| Triangle linearity | Better than 99% to 200kHz |
| Square wave | Rise/Fall <45ns, 1:1 ±1% to 100kHz |
| Symmetry control | Variable 1:9 to 9:1 |
| Sweep rate | 20ms to 20s, linear or logarithmic |
| AM | 0 to 100%, 400Hz internal, DC to 100KHz external |
| DC offset | ±10V unterminated |
| Auxiliary output | 0 to 5V signal, frequency/symmetry/phase as main output |
| Meter accuracy | Frequency ±1 digit 0.2Hz to 5MHz, 1% of range below 0.2Hz<br>Amplitude typically ±5%. Offset typically ±2% |
| Frequency Locking | <0.01% of displayed value. 0.5Hz to 5MHz |
| External Frequency | 5Hz to 20MHz, sensitivity 50mV, accuracy 10ppm ±1 digit |
| Resolution | 6 digits in 0.5 seconds, 7 digits in 5 seconds |
| **General** | |
| Input Voltage | 230V or 115V nominal 50/60Hz by internal adjustment |
| Operating Temperature | +5°C to + 50°C, 20%-80% RH |
| Weight | |
| Safety | Complies with **EN61010-1** |
| ENC | Complies with **EN55081-1, EN50082-1** |

222555

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| TG550 | 493-272 | 356.00 | 345.32 | 334.96 |
| | | | Price Each | |
| Standard Calibration Charge | | S C13 | 63.11 | |
| UKAS Calibration Charge | | N C13 | 95.81 | |

## 5MHz Function Generator

**MTX3000 Series**



The MTX3240's associated features give it stand-alone implementation which means that, when simply testing settings, one can avoid the systematic use of an oscilloscope or multimeter. The MTX3240 is also a rational investment for it is also a 100MHz frequency counter (CAT I 300V).

- Frequency control loop and display
- AMPLITUDE vpp (peak/peak) and OFFSET VDC check and display
- Duty cycle check and display
- Automatic range changing optimized for LEVEL and OFFSET amplitude
- Duty cycle adjustable without varying or dividing the frequency
- LOGIC function for a fast and simple answer to generating logic signals with directly adjustable thresholds
- A robust generator with protected 60VDC / 40VAC outputs
- Supplied with power cord, user's manual and an interactive presentation of the instrument on CD-ROM

| | |
|---|---|
| Display | LCD 50x140mm, Main Display 20mm 4 variables at a time |
| Frequency Range | 0.1Hz to 5.1MHz 7 ranges + fine-tuning to the nearest digit + accelerator. Accuracy : 0.05% |
| Signal Forms | Sine, Square, Triangle, Pulse, Ramp, TTL, LOGIC Distortrion: < 0.5% |
| Outputs | 1) Main: up to 20Vpp open circuit, automatic range<br>2) TTL Protection: overload 60VDC / 40VAC |
| Sweep | LIN or LOG CONTINU 1:50 Min 10ms to 10s Internal or External |
| External Frequency Meter | 0.1Hz to 100MHz Accuracy: 0.05% Input 300V, CAT I Automatic responsiveness |
| Power Supply | 115V - 230V - 240V 50/60Hz, 300V, CAT II |
| Dimensions (WxHxD) | 270x170x190mm |
| Weight | 2.8kg |
| Standards | IEC 61010-1, 2001 and EMC NF 61326-1, 1998 |

338548.343949

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|---|
| **EURO Versions** | | | | | |
| 5MHz Function Generator | MTX3240EURO | 411-0109 | 530.72 | 498.80 | 465.54 |
| 100MHz Oscilloscope | MTX3352-C | 423-2537 | 1,724.85 | 1,638.48 | 1,572.58 |
| Bench Top Multimeter | MTX3250EURO | 411-0110 | 488.01 | 475.16 | 462.98 |
| | | | | | Price Each |
| Standard Calibration Charge | | | S C4 | | 34.10 |
| UKAS Calibration Charge | | | N C4 | | 58.75 |
| Standard Calibration Charge | | | S C18 | | 89.27 |
| UKAS Calibration Charge | | | N C18 | | 123.00 |

## Function Generator - 0.5Hz to 20MHz

**FG100**



- Mircoprocessor controlled, with self test
- Versatile signal source
- Wide frequency range 0.5Hz to 20MHz
- 0.05% accuracy
- Sine, square, triangle, ramp
- Frequency sweep 1ms - 60s
- Quattro key operating concept.
- RS232 interface

241101

| Mftrs. List No. | Description | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|---|
| HUC65-00 FG100 | Function Generator | 413-0923 | 274.38 | 260.10 | 249.90 |
| | | | | Price Each | |
| Standard Calibration Charge | | S C13 | 63.11 | | |
| UKAS Calibration Charge | | N C13 | 95.81 | | |

## 40 MHz Function Generator

**TGA12101**



H=130, W=212, D=335mm Weight = 4.1kg

- Universal signal source architecture
- Up to 100MHz sampling frequency
- Sinewaves to 40MHz, Squarewaves to 50MHz
- 12 bit vertical resolution
- Up to 10 digits frequency resolution
- 656MB memory 500 waveforms and 500 set-up memory
- Waveform linking, looping and sequencing
- True variable clock architecture
- USB, RS232 and GPIB interfaces

| | |
|---|---|
| Sin, Cos, Haversin, Havercos Square | Range: 0.1mHz - 40MHz<br>Resolution: 0.1mHz or 10 digits<br>Range: 1mHz - 50MHz<br>Resolution: 1mHz (4 digits) |
| Triangle, Ramps and Sin(x)/x | Range: 0.1mHz - 500kHz<br>Resolution: 0.1mHz or 10 digits |
| Pulse and pulse train | Range: 40ns to 100s<br>Resolution: 4 digit |
| Arbirary waveforms | Up to 500 user defined waveforms |
| Waveform sequencing | Up to 1024 waveforms may be linked |
| Noise | 35 bit linear feedback |
| Output filter | 40MHz Elliptic, 20MHz Bessel or none |
| Inputs | Trig, Modulation, Sum, Hold, IN/Out, Arb Clock |
| Interface | RS232, USB and GPIB |

# Function Generators - continued

## 40 MHz Function Generator - continued

**TGA12101 - continued**

382010

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| TGA12101 | **847-3978** | 1,599.00 | 1,551.03 | 1,504.50 |

## RF Signal Generator

digimess®

**SG100**



W=293 H=90 D=240mm. Weight 3kg

- Microprocessor controlled signal generator
- 6 ranges: 100kHz to 150MHz (450MHz on 3rd harmonic)
- Fine adjust control allows precise frequency selection
- 4 digit LED readout of frequency
- Internal and external AM and FM modulation
- Audio signal output
- Supplied with operating manual and mains lead

CALIBRATION SERVICES

| | |
|---|---|
| Frequency Ranges | 6 ranges: 100kHz - 320kHz - 1MHz - 3.2MHz - 10MHz - 35MHz - 150MHz |
| Output Amplitude | >300mV rms (continuously variable) |
| Modulation AM, FM | Internal: 1kHz sine wave. External: 50Hz - 20kHz |
| Audio Output | Frequency: 1kHz Distortion: <3% Output Amplitude: >1.5V rms |
| Input Voltage | 110/220V ±10% 50Hz ±5% |

417520.418716

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| SG100 | RF Signal Generator | **107-6816** | 202.98 | 182.58 | 170.34 |
| | | | **Price Each** | | |
| **Standard Calibration** | | S C20 | 108.78 | | |
| **UKAS Calibration** | | N C20 | 128.40 | | |

## Fully Synthesised 1GHz RF Generator

**TGR1040**



The TGR1040 is a low cost, synthesised RF signal generator which offers exceptional frequency accuracy and stability, wide dynamic range, low phase noise and low leakage. These are the essential features required for most RF development, test and service work.

- 10MHz to 1000MHz frequency range with 1kHz setability
- ±2ppm accuracy over 5°C to 40°C, <1ppm per year ageing
- -127dBm to +7dBm amplitude range in 0.1dB steps
- FM modulation, internal or external; deviation 0.5kHz to 100kHz
- 80 character back-lit LCD display; keyboard and rotary encoder control
- Storage for 9 user set-ups; full remote control via RS-232
- Outstanding price/performance ratio

**FREQUENCY**

| | |
|---|---|
| Frequency range: | 10MHz to 1000MHz |
| Setting Resolution | 1kHz at all frequencies |
| Accuracy | ±2ppm for 5°C to 40°C |
| Stability | <1ppm/year ageing. |
| Phase Noise | -110dBc/Hz at 25kHz offset @ 500Mz |
| Residual FM (FM off) | Equivalent peak deviation in a 300Hz to 3.4kHz bandwidth:<br>10Hz at 100MHz carrier, 35Hz at 500MHz carrier<br>180Hz at 1000MHz carrier |

**OUTPUT LEVEL**

| | |
|---|---|
| Output Level Range | -127dBm to +7dBm (0.1µV to 500mV into 50W). |
| Setting Resolution | 0.1dB (0.01µV to 1mV) |
| Accuracy | Better than ±2dBm, (levels <-70dBm at 0.5 - 1GHz, ±3dBm) |
| Harmonics | Typically <-25dBc, maximum -20dBc, output level <0dBm |
| Non-Harmonic Spurii | <-60dBc at >8kHz offset |
| Carrier Leakage | <0.5uV into a 50W load by a 2 turn 25mm loop, output <-10dBm |
| Output Connection | 50Ω, Type N connector, 50V reverse protection |
| Output Switch | RF OUT on-off switch with status LED |

**FM MODULATION**

| | |
|---|---|
| Peak Deviation | 0.5kHz to 100kHz |
| Setting Resolution | 0.5kHz |
| Modulation Freq. | Internal 1kHz; External 300Hz to 50kHz |
| Deviation Accuracy | <±10% of setting ±0.5kHz, @ 1kHz mod. |
| External Modulation | ±1dB, 30Hz to 50kHz relative to 1kHz |
| Distortion | <2% THD at 1kHz modulation |

**GENERAL**

| | |
|---|---|
| RS232 | Variable Baud rate, 19200 Baud max. |
| Display | 20 character x 4 row backlit LCD |
| Data Entry | Keyboard or rotary control |
| Stored Settings | Up to 9 complete instrument set-ups |
| Power | 230V, 115V or 100V ±14% 50/60Hz Installation Category II |
| Safety | Complies with **EN61010-1** |
| EMC | Complies with **EN55011** and **EN50082-1** |

220434

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| TGR1040 | **316-8281** | 1,249.00 | 1,211.53 | 1,175.18 |

## 2GHz Function Generator

**TGR2050**



H=130mm, W=212, D=330 Weight = 4.6 Kg

- 150kHz to 2000MHz frequency range
- 10Hz resolution at any frequency
- ±1ppm accuracy over 15°C to 30°C
- -127dBm to +7dBm amplitude range
- Amplitude control in 0.1dB steps
- AM, FM & Phase modulation, internal/external
- Keyboard and rotary encoder control
- Non-volatile storage for 9 user set-ups
- Remote control via RS-232 and GPIB
- Outstanding price/performance ratio

The TGR 2050 is a wide range, synthesised RF signal generator covering from 150kHz up to 20000MHz with low phase noise and low leakage.
High reference stability is supplemented by an external reference input allowing the generator to be locked to an ultra-stable source or to other equipment.
Frequency and amplitude can be entered numerically or stepped at any required interval via keys or the rotary encoder.
Comprehensive modulation includes AM, FM and Phase modulation, internal or external. Nine user memories are provided and the unit is fully remote controllable via both RS-232 and GPIB (IEEE-488).

**FREQUENCY**

| | |
|---|---|
| Frequency Range | 150kHz to 2000MHz |
| Setting Resolution | 10Hz |
| Display Resolution | 10Hz. |
| Phase Noise | -116dBc/Hz at 25kHz offset, 500MHz carrier |
| Residual FM (FM Off) | Equivalent peak deviation for 300Hz to 3·4kHz B/W: 10Hz at 500MHz carrier |

**OUTPUT LEVEL**

| | |
|---|---|
| Output Level Range | -127dBm to +7dBm (0·1µV to 500mV into 50Ω) |
| Setting Resolution | 0·1dB (or 0·01µV to 1mV) |
| Accuracy | Better than ± 2dBm |
| Harmonics | <-25dBc at +7dBm |
| Non-Harmonic Spurii | ≤-60dBc at ≥62.5MHz |
| Carrier Leakage | <0.5µV generated into a 50Ω load by a 2 turn 25mm loop, output <-10dBm |
| Output | 50Ω, Type N connector, reverse power protected to 25W |
| Output Switch | RF OUT on-off switch with status LED |

**MODULATION**

| | |
|---|---|
| Source | Internal from sine wave generator (400Hz or 1kHz) or external via BNC. |
| AM Depth | 0 - 100% in 0.5% steps |
| AM Freq. Range | 50Hz to 200kHz ±1dB(external) |
| AM Accuracy | <±(5% setting+1%) at 1kHz |
| AM Distortion | <3% at 30% depth |
| FM Pk. Deviation | 0.5kHz to 800kHz |
| FM Freq. Range | 100Hz to 300kHz ±2dB (external) |
| FM Accuracy | <±(10%+0.5kHz) |
| Phase Pk. Deviation | 0.05rad to 80rad |
| Phase Freq. Range | 100Hz - 10kHz ±2dB (external) |
| Phase Accuracy | <±(10%+0.05rad) |

**GENERAL**

| | |
|---|---|
| RS232 Interface | Variable Baud rate, 19200 Baud max |
| GPIB Interface | Conforms with IEEE-488.2 |
| Display | 20 character x 4 row backlit LCD |
| Data Entry | Keyboard or rotary control |
| Stored Settings | Up to 9 complete instrument set-ups |
| Power | 230V, 115V or 100V ±14% 50/60Hz |
| Weight | 4.6kg |
| Safety | Complies with EN61010-1 |
| EMC | Complies with EN61326 |

337882

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| TGR2050 | **471-8537** | 2,280.00 |
| | | **Price Each** |
| **Standard Calibration** | S C20 | 108.78 |
| **UKAS Calibration** | N C20 | 128.40 |

## 1.2GHz and 3GHz HF Synthesizers

HAMEG Instruments

**HM8134-3 and HM8135**



W=285 H=75 D=365mm. Weight = 5kg

**HM8134-3 Features:**

- Frequency range 1Hz to 1.2GHz
- Output power from -127dbM to +13dBm
- Frequency resolution 1 Hz (accuracy 0.5 ppm)
- AM / FM / PM and gate modulation
- High spectral purity

**HM8135 Features:**

- Frequency range 1Hz to 3GHz
- Output power from -144dbM to +13dBm
- High frequency accuracy: 0.01ppm
- Modulation modes: AM, FM, µM, pulse modulation, FSK, PSK
- Rapid pulse modulation: 200 ns
- Internal 10 Hz to 300 kHz modulator
- High spectral purity: harmonics ≤ -40dBm
- 30dB electronic attenuator for broad output voltage range without switch peaks

**Frequency**

| | |
|---|---|
| Range | 1Hz - 1200MHz (HM8134-4) / 1Hz - 3000MHz (HM8135) |
| Resolution | 1 Hz |
| Settling Time | <10 ms |

**Spectral Purity (without modulation)**

| | |
|---|---|
| Harmonic | ≤-35dBc (HM8134-3) / ≤-40dBc (HM8135) |
| Phase Noise (at 20kHz from carrier) | HM8134-3: ≤-100dBc/Hz (500MHz-1.2GHz) HM8135: ≤-90dBc/Hz (2-3GHz) |

**Output Level**

| | |
|---|---|
| Range | -127 to +13dBm (HM8134-3) / -144 to +13dBm (HM8135) |
| Resolution | 0.1dB |
| Impedance | 50 Ω |

**Modulation Sources**

| | |
|---|---|
| Internal | HM8134-3: 10Hz -150kHz sine, 10Hz-20kHz Square, Triangle or Sawtooth HM8135: 10Hz -300kHz Sine, 10Hz-100kHz Square, Triangle or Sawtooth |
| External | on front panel ($2V_{rms}$ for full scale) |

**Amplitude Modulation**

| | |
|---|---|
| Modulation Depth | 0 - 100% |
| Resolution | 0.1% |
| Accuracy | ±4% of reading ±0.5% (AM depth ≤80%, $f_{mod}$≤1kHz) |
| Ext. Frequency Response (to -1dB) | 8134-3: 10Hz - 50kHz for AC 8135: 10Hz - 300kHz for AC |

**Frequency Modulation**

| | |
|---|---|
| Deviation | ±200Hz - 400kHz |
| Resolution | 100 Hz |
| Accuracy | ±5% + residual FM |
| Ext. Frequency Response (to -1dB) | DC Coupling: 0 - 100kHz (HM8134-3) / 300kHz (HM8135) AC Coupling: 10 - 100kHz (HM8134-3) / 300kHz (HM8135) |

**Phase Modulation**

| | |
|---|---|
| Deviation | 0 - 3.14 rad (≤16MHz) / 0 -10 rad (≥16MHz) |
| Resolution | 0.01 rad |
| Accuracy | ±5% to 1kHz + residual PM |
| Ext. Frequency Response (to -1dB) | DC Coupling: 0 - 100kHz (HM8134-3) / 300kHz (HM8135) AC Coupling: 10 - 100kHz (HM8134-3) / 300kHz (HM8135) |

**FSK Modulation**

| | |
|---|---|
| Range | 16 to 1200MHz (HM8134-3) / 3000MHz (HM8135) |
| Resolution and Accuracy | as Frequency Modulation |
| Max. Rate | 10kbit/s |
| Shift (F1 - F0) | 0 - 10MHz |

**PSK Modulation**

| | |
|---|---|
| Range | 16 to 1200MHz (HM8134-3) / 3000MHz (HM8135) |
| Resolution and Accuracy | as Phase Modulation |
| Max. Rate | 10kbit/s |
| Shift (Ph1 - Ph0) | 0 to ±3.14rad (≤16MHz) / 0 to ±10rad (≤16MHz) |

**Pulse Modulation**

| | |
|---|---|
| Dynamic Range | ≥ 60dB |
| Rise / Fall Times | ≤200ns |
| Delay | ≤100ns |
| Max. Frequency | 2.5MHz |
| Input Level | TTL |

**Sweep Mode**

| | |
|---|---|
| Range | 1 Hz to 1200MHz (HM8134-3) / 3000MHz (HM8135) |
| Depth | 500Hz to 1.2GHz (HM8134-3) / 3GHz (HM8135) |
| Sweep Time | 20 ms to 5 s |

**Miscellaneous**

| | |
|---|---|
| Interface | RS-232, 9-pin D-sub (also USB on HM8135 only) |
| Configuration Memories | 10 |

412286

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| HM8134-3 | **909-2021** | 2,745.88 |
| HM8135 | **909-2030** | 3,040.66 |

## 20 MHz DDS Function Generator

**TGA2000**



W=260 H=88 D=235mm. Weight = 2kg

Direct digital synthesis (DDS) is a technique for generating waveforms digitally using a phase accumulator, a look-up tableand a DAC. The accuracy and stability of the resulting waveforms is related to that of the crystal master clock. The DDS generator offers not only exceptional accuracy and stability but also high spectral purity, low phase noise and excellent frequency agility.

- 0.001Hz to 20MHz frequency range, 6 digits or 1mHz setting resolution.
- 1ppm stability and better than 10 ppm absolute accuracy for one year.
- Sine, square, triangle, positive pulse and negative pulse waveforms.
- Low distortion, high spectral purity sine waves.
- Internal sweep, linear or logarithmic, phase continuous, 0.1Hz to 20MHz in one range.
- Modulations modes of gated, AM, FSK and tone switching; built-in trigger generator.
- 5mV to 20V pk-pk output from 50Ω or 600Ω; plus fixed level auxiliary output.
- Storage for up to nine complete instrument set-ups in non-volatile memory.
- Fully programmable via RS-232 or USB interfaces.

| | |
|---|---|
| **Frequency** | *All waveforms are derived from a crystal clock using DDS* |
| Frequency Range | 1mHz - 20MHz (except triangle) |
| Resolution | 6 digits or 1mHz |
| Accuracy | ±10ppm for 1 year, 18°C to 28°C |
| Temp Coefficient | Typically <1ppm/°C outside 18°C to 28°C |

| Waveforms | Range | Resolution | Output Level |
|---|---|---|---|
| **Sinewave** | 1mHz - 20MHz | 6 digits or 1mHz | 5mV - 20V pk-pk from 50Ω |
| **Squarewave** | 1mHz - 20MHz | 6 digits or 1mHz | 5mV - 20V pk-pk from 50Ω |
| **Triangle** | 1mHz - 1MHz | 6 digits or 1mHz | 5mV - 20V pk-pk from 50Ω |
| **Pulse** | 1mHz - 20MHz | 6 digits or 1mHz | 5mV - 20V pk-pk from 50Ω |

**Modulation Modes**

| | |
|---|---|
| **Continuous** | *Continuous cycles of the selected waveform are output at the selected frequency* |
| **Gated** | *Non phase-coherent signal keying, output only ON when gate signal is HIGH* |
| Carrier | 0.1Hz to 20MHz (all waveforms) |
| Trigger Rep. Rate | dc to 100kHz external, dc to 5kHz internal |
| Gate Source | MAN TRIG key, internal gate generator, TRIG/GATE input, remote interface |
| **Sweep** | *Modes: Linear or logarithmic; single or continuous.* |
| Carrier | All waveforms |
| Sweep Width & Time | 0.2Hz - 20MHz (50ms - 999s) |
| Trigger Source | free run or MAN TRIG key, TRIG/GATE input, remote interface |

**Amplitude Modulation**

| | |
|---|---|
| Carrier | 1mHz to 20MHz (all waveforms) |
| Modulation Source | VCA IN socket |

**Frequency Shift Keying**

*Phase-coherent switching between 2 frequencies at a rate defined by the switch source*

| | |
|---|---|
| Carrier | 1Hz to 20MHz (all waveforms) |
| Switch Rep. Rate | dc to 1MHz external, dc to 5kHz internal |
| Switch Signal Source | MAN TRIG key, internal gate generator, TRIG/GATE input, remote interface |
| **Tone** | *Tone is output only when the trigger signal is HIGH* |
| Carrier | All waveforms |
| Frequency List | Up to 16 frequencies between 1Hz and 20MHz |
| Switching Source | MAN TRIG key, internal trigger generator, TRIG/GATE input, remote interface |

**Internal Trigger/Gate**

| | |
|---|---|
| Period | 0.2ms to 999s (resolution 0.2ms) |
| Waveform | Squarewave (1:1 duty cycle) |

**Main Output**

| | |
|---|---|
| Output Impedance | 50Ω or 600Ω switchable |
| Amplitude | 5mV to 20V pk-pk open circuit |
| Accuracy | ±3% ±1mV |
| Flatness | ±0.2dB to 500kHz; ±2dB to 20MHz |
| DC Offset | ±10V from 50Ω/600Ω |
| Resolution | 3 digits for both amplitude and offset |
| **Auxilliary Output** | *Multi-function output user definable to be any of the following:* |
| Waveform Sync | outputs a 50% duty cycle squarewave at the main waveform frequency |
| Trigger Out | outputs a replica of the current trigger signal |
| Sweep Sync | outputs a trigger signal or marker at the start of a sweep |

**Inputs**

| | |
|---|---|
| **Ext. Trigger / Gate** | max. input ±10V. Impedance: 10kΩ |
| **VCA IN** | dc to 100kHz, 2.5V. Impedance approx. 6kΩ |

**Interfaces**

| | |
|---|---|
| **RS232** | variable baud to 19200, 9-pin D connector |
| **USB** | Standard USB 1.1 connection |

**General**

| | |
|---|---|
| Display | 20 x 4 alphanumeric LCD |
| Data Entry | keyboard, number keys, rotary control |
| Memory | up to 9 complete instrument setups can be stored in battery-backed memory |
| Power Requirements | 100V, 110-120V or 220-240V, 50/60Hz, 40VA max |
| Operating Conditions | +5°C to 40°C, 20%-80% RH |

417469

| Mftrs. List No. | Order Code | | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|---|
| TG2000 | **979-8960** | | 499.00 | 484.03 | 469.51 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | S C19 | | 89.27 | |
| **UKAS Calibration Charge** | | N C19 | | 141.49 | |

## TG1010A Function Generators

**10MHz Programmable DDS**



The TG1010 generates high quality sine, square and pulse waveforms over the full frequency range of 0.1MHz to 10MHz with 7 digit resolution and accuracy better than 10ppm

- Eight standard waveforms, plus multiple "complex" waveforms, true arbitrary waveforms and noise
- Powerful modulation modes including Sweep, AM Gating, Trigger/Burst, FSK and Hop
- Variable symmetry, variable start/stop phase
- 20V pK-pK output 50Ω or 600Ω (switchable)
- Storage for five Arbitrary Waveforms (1024 x 10 bits)
- RS-232 interface as standard
- Housed in a half-rack 3U size metal case
- Supplied with mains lead and manuals

| Waveform | Frequency Range | Output Level |
|---|---|---|
| Sinewave | 0.1MHz to 10MHz | 6mV to 20V pK-pK open circuit |
| Squarewave | 0.1MHz to 10MHz | 5mV to 20V pK-pK open circuit |
| Triangular waveform | 0.1MHz to 500kHz | 6mV to 20V pK-pK open circuit |
| Positive and negative ramp | 0.1MHz to 50kHz | 3mV to 10V pK-pK open circuit |
| Positive and negative pulse | 0.1MHz to 10MHz | 2.5mV to 10V pK-pK open circuit |
| Multi-level squarewave | 0.1MHz to 30kHz | 6mV to 20V pK-pK open circuit |

**Output (BNC)**

| | |
|---|---|
| Output Impedance | 50Ω or 600Ω switchable |
| Amplitude | 5mV to 20V pK-pK (2.5MV to 10V pK-pK into 50/600Ω) |
| Accuracy | ±3% ±1mV at 1kHz into 50Ω/600Ω |
| DC offset | ±10V from 50Ω/600Ω signal peak limited to ±10V from 50Ω/600Ω |
| Resolution | 3 digits or 1mV |

**General**

| | |
|---|---|
| Display | 20 character x 4 row alphanumeric LCD |
| Data Entry | Keyboard selection, numeric keys, rotary control |

## Function Generators - continued

### TG1010A Function Generators - continued

**10MHz Programmable DDS - continued**

| | |
|---|---|
| Power Supply | 115Vac ±14% or 230Vac ±14% 50/60Hz |
| Weight | 4.1kg |
| Operating Temperature | +5°C to + 40°C, 20%-80% RH |
| Safety | Complies with **EN61010-1** |
| EMC | Complies with **EN55081-1, EN50082-1** |

222554

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| TG1010A | **493-284** | 709.00 | 687.73 | 667.10 |

| | | Price Each |
|---|---|---|
| **Standard Calibration** | S C20 | 108.78 |
| **UKAS Calibration** | N C20 | 128.40 |

### 2MHz Sweep Function Generator

*digimess*®

**FG200**



The ***digimess***® FG200 is a general purpose microprocessor controlled 2MHz sweep function generator. The unit features a power up self-test and is operated by a combination of soft touch buttons and rotary controls, resulting in a modern and easy to use instrument for engineers of all levels. This versatile instrument includes a 5 digit display for internal or external signals and a 3 digit output amplitude display. The frequency, amplitude and attenuation ranges are indicated by LEDS as well as the selected waveform shape, the unit also includes both internal and external frequency sweep modes. The instrument is supplied with an operating manual, BNC test lead and power cords (UK and Euro).

| | |
|---|---|
| Frequency Range | 0.2Hz to 2MHz in 7 decade ranges |
| Frequency Accuracy | ±0.5% |
| Output Waveforms | Sine, square and triangle |
| Output Impedance | 50Ω |
| Output Voltage | 1mVpp tp 10Vpp (into 50Ω load)1mVpp to 20Vpp (into 50Ω load) |
| Attenuation | 0dB, -20dB, -40dB, -60dB |
| TTL Output Voltage and Impedance | <0.8V and >3V, 600Ω |
| Offset | -5V to +5V |
| Duty Cycle | 20% to 80% |
| Sine Wave Distortion | <2% |
| Triangle Wave Non-linearity | <1% |
| Square Wave Rise Time | <100nS |
| Sweep Modes | Internal linear, Internal log, External sweep |
| External Counter Input | 0.2Hz to 20MHz |
| Input Voltage | 110/220Vac ±10% 50Hz max 30W |
| Dimensions & Weight | 265x215x90mm, 2kg |

339427.409541

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| FG200 | **501-9874** | 172.38 | 163.20 | 158.10 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C13 | 63.11 |
| **UKAS Calibration Charge** | N C13 | 95.81 |

### Arbitrary Function Generator - 0.01Hz to 12.5MHz

*digimess*®

**AFG100**



- Mircoprocessor controlled, with self test
- Sine, square, triangle, ramp, arb
- Produce freely defined waveforms, or download one off signals from an oscilloscope and reproduce as often as required.
- 0.01Hz - 12.5MHz
- 8192 points horizontal resolution
- 1024 points (10 bit) vertical resolution
- 0.01% accuracy
- Quattro key operating concept.
- RS232 interface

241104

| Mftrs. List No. | Description | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|---|
| HUC66-00 AFG100 | Arbitrary Function Generator | **413-0984** | 610.98 | 581.40 | 545.70 |

| | | Price Each |
|---|---|---|
| **Standard Calibration** | S C18 | 89.27 |
| **UKAS Calibration** | N C18 | 123.00 |

### 7MHz DDS Function Generator

BK PRECISION

**BK 4007 DDS**



- DDS Generator (Direct Digital Synthesis)
- Simple to use
- Functions: Sine, square, triangle, DC
- Max. frequency: 7MHz
- Variable offset and symmetry
- Linear and logarithmic sweep
- 20dB Attenuator
- Backlit LCD display
- 1-year warranty

476969

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| BK 4007DDS | **136-7291●** | 264.52 |

### 12MHz DDS Function Generator

BK PRECISION

**BK 40013 DDSB**



- DDS Generator (Direct Digital Synthesis)
- Simple to use
- Functions: Sine, square, triangle, DC
- Max. frequency: 12MHz
- Variable offset and symmetry
- Linear and logarithmic sweep
- 20dB Attenuator
- Backlit LCD display
- 1-year warranty

476975

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| BK 4013DDS | **136-7292●** | 274.50 |

### DDS 15MHz DDS Function Generator

Sefram INSTRUMENTS & SYSTEMES

**SEFRAM 4415**



- DDS Generator (Digital Direct Synthesis)
- Simple to use
- Functions: Sine, square, triangle, DC
- Max. frequency: 15MHz
- Variable offset and symmetry
- Linear and logarithmic sweep
- AM/FM Modulation
- Adjustable amplitude, offset and symmetry
- Backlit LCD graphic display
- RS232 Interface
- 100MHz External frequency meter
- 1-year warranty

476979

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| SEFRAM 4415 | **136-7294** | 454.64 |

### 20MHz DDS Function Generator

BK PRECISION

**BK 4040 DDS**



- DDS Generator (Digital Direct Synthesis)
- Simple to use
- Functions: Sine, square, triangle, DC
- Max. frequency: 20MHz
- Variable offset and symmetry
- Linear and logarithmic sweep
- 20 dB Attenuator
- Backlit LCD display

476977

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| BK 4040DDS | **136-7293●** | 574.49 |

### DDS Function Generator With Arbitrary 20MHz

Sefram INSTRUMENTS & SYSTEMES

**SEFRAM 4422**



- DDS Generator (Digital Direct Synthesis)
- Simple to use
- Functions: Sine, square, triangle, DC
- Max. frequency: 20MHz
- Variable offset and symmetry
- Linear and logarithmic sweep
- AM/FM Modulation

- Burst and pulse modes
- Adjustable amplitude, offset and symmetry
- Backlit LCD graphic display
- RS232 Interface
- 100MHz External frequency meter
- Arbitrary Mode: 50Msamples/s sampling - 1Kpoints memory - WaveX software
- 1-year warranty

476983

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| SEFRAM 4422 | **136-7295●** | 657.16 |

## Function generator HM8150

**Arbitrary 12.5MHz**

HAMEG Instruments



- Frequency range 10 mHz to 12.5MHz
- Output voltage 20mV$_{ss}$ to 20 V$_{ss}$ (idle-running)
- Rise and fall time ≤10 ns
- Pulse width setting; arbitrary generator 40 MSa/s
- Burst, gating, external triggering, wobbling
- RS-232 interface, optional: USB, IEEE-488

| | **Frequency ranges** |
|---|---|
| Sine | 10mHz to 12.5MHz |
| Square-wave | 10mHz to 12.5MHz |
| Pulse | 10mHz to 5MHz |
| Saw-tooth | 10mHz to 25kHz |
| Deltawave | 10mHz to 250kHz |
| Arbitrary generator | 10mHz to 250kHz |
| Inputs | Gate/trigger BNC, 5kΩ// 100pF ±30V |
| Output | BNC, resistant to short circuits 50Ω, 20mV$_{ss}$ to 20V$_{ss}$ |
| Trigger output | Wobble: 0 - 5V (saw-tooth) or 5V TTL |
| DC offset | 3 ranges: -7.5V to +7.5V (idle-running) |
| internal sweep | all signal forms (linear from 20ms to 100s) |
| Amplitude modulation | DC - 20kHz (-3dB); 0 to 100% |
| Gate asynchronous | Modulation on/off via ext. TTL signal |
| Trigger function | Burst operation via ext. trigger input or IF (≤500kHz) |

474963

| Mftrs' List No. | Order Code | Price Each 1+ |
|---|---|---|
| HM8150 | **137-1029** | 630.70 |

## 40 MHz DDS Arbitrary Function Generator

**TG4001**

TTi



W=212 H=130 D=335mm. 4.1kg

New

- 0.1mHz to 40MHz (50MHz square) range, 10 digit or 0.1mHz resolution
- Direct Digital Synthesis: 1ppm stability, resolution, sine purity
- Amplitude flatness better than ±0.2dB to 1MHz and ±0.4dB to 40MHz
- <10ppm absolute accuracy for one year
- Eight standard waveforms, plus "complex" waveforms, true arbitrary waveforms and noise
- Pulse train generation for up to 10 pulses
- Arbitrary waveforms of up to 64k points at up to 100MS/s
- Internal sweep, linear or logarithmic, phase continuous, 0.1mHz to 40MHz in one range
- Powerful modulation modes including Sweep, AM, Gating, Trigger/Burst, FSK and Hop
- Variable symmetry, variable start/stop phase
- 5mV to 20V pk-pk output from 50Ω; plus multi-function auxiliary output
- Storage for nine instrument setups in non-volatile memory
- Programmable via RS-232 and USB interfaces
- Optional GPIB interface

**Supplied with:** power lead, printed User Manual, multi-language manual on CD, software drivers (for LabView and LabWindows/CVI) and **Waveform Manager Plus** software for Windows.

**Waveform Manager Plus**

New waveforms can be built from standard waveforms, mathematical expressions or drawn waveforms. Existing waveforms can be edited, smoothed and resized. Completed waveforms can be printed, saved locally or downloaded to the function generator.

**Standard Waveforms**

Sine, square, triangle, DC, +ve & -ve ramp, sin(x)/x, pulse, pulse train, cosine, haversine & havercosine.

Frequency Accuracy: <10ppm for one year
Temperature Stability: Typically <1ppm/°C

| | Range | Resolution | |
|---|---|---|---|
| Sinusoids: | 0.1mHz to 40MHz. | 0.1mHz or 10 digits | THD: <-30dBc to 40MHz |
| Square: | 1mHz to 50MHz. | 1mHz or 7 digits | Rise & Fall Time: <8ns |
| Triangle: | 0.1mHz to 500kHz. | 0.1mHz or 7 digits | Linearity Error: <0.1% to 30kHz |

**Standard Waveforms**

| | | | |
|---|---|---|---|
| Ramps & Sin(x)/x: | 0.1mHz to 100kHz. | 0.1mHz or 10 digits | Linearity Error: <0.1% to 30kHz |
| Pulse & Pulse Train: | Period: 40ns to 100s | 7 digits or 10ns | Rise & Fall Time: <8ns |
| | Delay/Width: ±99.9s | 0.001% period or 10ns | |

Trains of up to 10 pulses may be specified, each having independently defined width, delay and level.

**Arbitrary Waveforms**

Up to 4 user defined waveforms may be stored.
Waveform Size: From 8 points to 65536 points
Vertical Resolution: 12 bits
Sample Clock Range: 100mHz to 100MHz. Resolution: 0.1mHz or 7 digits
Output Filter: Selectable between 40MHz Elliptic, 20 MHz Bessel or none.
Noise Function: Digital noise generated by 35-bit linear feedback register clocked at 100MHz

**Modulation Modes**

**Sweep** *Linear or logarithmic; continuous or triggered modes*
Carrier: All waveforms except pulse and pulse train
Sweep Range & Time: 1mHz - 40MHz (1ms - 999s) in one range. Phase continuous.
Trigger Source: Free run or manually from keypad. Externally from TRIG IN or remote interface
**Triggered Burst** *Each active edge of the trigger signal produces one burst of the waveform.*
Carrier: All standard and arbitrary waveforms. Max. Frequency 2.5MHz.
Cycles & Repetition: 1 to 1M cycles. Trigger rate: 0.005Hz to 100kHz (internal). DC to 1MHz (external)
Trigger Source: Free run or manually from keypad. Externally from TRIG IN or remote interface
**Gated** *Runs while GATE signal is TRUE, stops when FALSE.*
Carrier: All standard and arbitrary waveforms. Max. Frequency 2.5MHz.
Trigger Rate: 0.005Hz to 100kHz (internal). DC to 1MHz (external)
Gating Source: Internal from keypad or trigger generator. External from TRIG IN or remote interface
**Tone Switching** *Switching Modes: Gated, Triggered, FSK*
Carrier: All waveforms except pulse and pulse train
Frequency List: 16 frequencies from 1mHz to 40MHz
Trigger Rate: 0.005Hz to 100kHz (int.). DC to 1MHz (ext.). Usable rate depends on mode.
Trigger Source: Internal from keypad or trigger generator. External from TRIG IN or remote interface
**Internal Trigger/Gate** 0.005Hz to 100kHz squarewave adjustable in 10µs steps. Available on SYNC OUT.

**Outputs**

Output Impedance: 50Ω
Amplitude: 5mV to 20V pk-pk open circuit (2.5mV to 10V into 50Ω)
Accuracy: Better than 2%±1mV at 1kHz into 50Ω
Flatness: ±0.2dB to 1MHz; ±0.4dB to 40MHz
DC Offset: ±10V. Accuracy: ±(3%+10mV). Resolution: 1mV
**SYNC OUT** *Multi-function output user definable to be any of the following:*
Waveform Sync: outputs a 50% duty cycle squarewave at the main waveform frequency
Burst Done: produces a pulse coincident with the last cycle of a burst.
Trigger Out: outputs a replica of the current trigger signal
Sweep Sync: outputs a trigger signal or marker at the start of a sweep
Phase Lock Out: produces a pulse at 0° phase, used to phaselock two generators.

**Inputs**

TRIG IN: DC to 1MHz. Nominal TTL. Max. ±10V. Impedance: 10kΩ. Min. Pulse Width 50ns
MODULATION IN: DC to 500kHz. 1V pk-pk. Input Impedance: 1kΩ (typical)
SUM IN: DC to 30MHz. Approx. 2V pk-pk input for 20V pk-pk output. Impedance: 1kΩ (typ)
REF CLOCK: Input external 10MHz reference clock, or output internal version of same.

**Digital Interfaces**

Full remote control and waveform download functionality is possible via digital interfaces.
RS232: Variable baud rate to 9600 baud max., 9-pin D connector
USB: Standard USB 1.1 connection
GPIB (optional): Conforming to IEEE488.1 and IEEE488.2

**General**

Display: 20 character, 4 row, alphanumeric LCD
Data Entry: keyboard, number keys, rotary control
Memory: up to 9 complete instrument setups can be stored and recalled
Power Requirements: 100V, 110-120V or 220-240V, 50/60Hz, 60VA max
Operating Conditions: +5°C to 40°C, 20-80% RH

417469

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 2+ |
|---|---|---|---|
| TG4001 | **123-0642** | 995.00 | 965.15 |
| **Standard Calibration** | | S C11 | 55.16 |
| **UKAS Calibration** | | N C11 | 76.82 |

## Arbitrary Generators

**TGA1240 Series**

TTi



The TGA1240 series includes single channel, two channel and four channel generators. The single channel TGA1241 is housed in a half rack width case. The two channel TGA1242 and four channel TGA1244 are housed in a wider case, as illustrated. The following specifications apply to each channel.

- One, two or four independent waveform channels
- 40MHz clock speed and 12-bit vertical resolution
- Sinewaves and squarewaves up to 16MHz
- 64K points horizontal resolution per channel
- Interchannel triggering, summing and phase control
- Complex waveform sequencing and looping capability
- Storage for 100 waveforms and 9 set-ups
- Sophisticated waveform creation/editing tools built-in
- Windows based software supplied for waveform creation and editing
- Multiple "standard" waveforms including sine, square, triangle, haversine, ramp, pulse and sin(x)/x
- Pulse train pattern generation for up to 10 pulses
- Wide range sweep, AM, tone switching, signal summing
- Tone switching facilitates precision DTMF generation
- Built-in trigger generator, gated & triggered burst modes
- Fully interfaceable via RSS-232 and GPIB **(IEEE-488.2)**

# Function Generators - continued

## Arbitrary Generators - continued

### TGA1240 Series - continued

**Standard Waveforms**

| | | |
|---|---|---|
| Sinewave | 0.0001Hz to 16MHz | THD<0.1% to 100kHz |
| Squarewave | 0.001Hz to 16MHz | Rise/fall times <25ns |
| Triangle Wave | 0.0001Hz to >100kHz | Linearity better than 0.1% to 30kHz |
| Positive/Negative ramp | 0.0001Hz to >100kHz | Linearity better than 0.1% to 30kHz |
| Sine (x)/x | 0.0001Hz to >100kHz | Linearity better than 0.1% to 30kHz |
| Pulse and Pulse Train | 0.01Hz to 10MHz | Trains of up to 10 pulses can be defined with independent width, delay and level. |

Cosine, Haversine and Havercosine waveforms are also available

**Arbitrary Waveforms**

Up to 100 user defined waveforms may be stored in RAM. Arbitrary waveforms can be defined by front panel editing controls or by downloading of waveform data via digital interfaces.
Up to 4 waveforms may be linked. Each waveform can have a loop count of up to 32768.
A sequence of waveforms can be looped up to 1048575 times or run continuously.

| | |
|---|---|
| Memory Size | 64k points |
| Vertical Resolution | 12 bits (4096 points maximum) |
| Sample Clock Range | 0.1Hz to 40MHz |
| Resolution/Accuracy | 4 digits/±1 digit |
| Output Filter | 10MHz Elliptic, 10MHz Bezel, or None |

Basic arbitrary waveform creation and editing tools are built into the instrument. Arbitrary waveforms can be built up using insertion of standard waveforms between points, point by point value setting, and straight line drawing between points. Windows based arbitrary waveform editing software for Windows 98/95/3.1 is supplied. The graphical environment uses drawing tools, mathematical expressions and insertion from waveform libraries to rapidly create or modify waveforms which are then downloaded using RS-232 or GPIB interfaces.

Specifications

**Main Output**

| | |
|---|---|
| Amplitude Range | 5mV to 20V pk-pk from 50W or 600W |
| Amplitude Accuracy | ±2% ±1mV at 1kHz, terminated or unterminated |
| DC Offset | ±10V |
| Resolution | 3 digits or 1mV for Amplitude and Offset |

**Modulation**

| | |
|---|---|
| Sweep | 30ms to 999s phase continuous, Lin or Log, Marker |
| Amplitude Modulation | 0 to 100%, External only, DC to 1MHz |
| Triggered Burst | 1 to 1048575 cycles, dc to 50kHz internal, dc to 1MHz external |
| Gated | DC to 50kHz internal, DC to 1MHz external |
| Tone | 16 frequencies can be set up. Switching from external trigger |
| Signal Summing | Signal can be summed with the output of an external generator |

**Inputs/Outputs**

Trigger in, VCA in, Sum in, Hold, Ref Clock In/Out, Sync Out, Cursor/Marker Out

**Inter-channel operation**

| | |
|---|---|
| Phase locking | Two or more channels can be phase locked with independent phase control to a resolution of 0.1 degrees |
| Modulation | Channels can be used to modulate other channels AM or SCM or all channels can be modulated from external input |
| Summing | Each channel can be analogue summed into the next channel. Any channel(s) can be summed with the SUM input |
| Triggering | Any channel can be triggered from the previous or next channel |

**Interfaces**

| | |
|---|---|
| RS-232 | Variable Baud rate, 9600 maximum |
| GPIB | Conforming to **IEEE-488.1** and **IEEE-488.2** |

**Software**

Waveform Manager Plus software supplied on disk. Windows based program that provides full waveform creation, editing, management and transfer. Drawing tools, equation editor, waveform libraries. Built-in uploader for Tektronix DSOs.

**General**

| | |
|---|---|
| Display | Alpha-numeric LCD, 4 rows of 20 characters |
| Data Entry | Via Spin-wheel or Keyboard |
| Stored Settings | Up to 9 complete instrument set-ups can be stored |
| Power | 230V or 115V nominal 50/60Hz, internally adjustable |
| Safety | Complies with **EN61010-1** |
| EMC | Complies with **EN50081-1, EN40082-1** |

230694

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| TGA1241 | **351-0876** | 1,117.00 | 1,083.49 | 1,050.99 |
| TGA1242 | **351-0888** | 2,035.00 | 1,973.95 | 1,914.73 |
| TGA1244 | **351-0890** | 3,055.00 | 2,963.35 | 2,874.45 |
| | | | Price Each | |
| **Standard Calibration** | S C 20 | | 108.78 | |
| **UKAS Calibration** | N C 20 | | 128.40 | |

## Function/Arbitrary Waveform Generator

Agilent Technologies



33250A



33210A

The Agilent Technologies 33210A Function/Arbitrary Waveform Generator is the latest addition to the 332XX family. Waveforms are generated using direct digital synthesis (DDS) technology which creates stable, accurate low distortion sine waves as well as square waves with fast rise and fall times up to 10 MHz and linear ramp waves up to 100 kHz. For user defined waveforms, option 002 provides 14-bit, 50 MSa/s 8K point Arbitrary Waveform Generation.

New

**33250A**

- 80 MHz sine and square wave outputs
- Sine, square, ramp, noise and other waveforms
- 50 MHz pulse waveforms with variable rise/fall times
- 12-bit, 200 MSa/s, 64K-point deep arbitrary waveform

**33210A**

- 10 MHz Sine and Square waveforms
- Pulse, Ramp, Triangle, Noise, and DC waveforms
- Optional 14-bit, 50 MSa/s, 8K point Arbitrary Waveform Generator
- AM, FM, and PWM modulation types
- Linear & logarithmic sweeps and burst operation
- 10 mVpp to 10 Vpp amplitude range
- Graph mode for visual verification of signal settings
- Connect via USB, GPIB and LAN
- Fully compliant to LXI Class C specification

**33250A**

| | |
|---|---|
| **Frequency Characteristics** | |
| Sine | 1 [mu]Hz to 80 MHz |
| Square | 1 µHz to 80 MHz |
| Pulse | 500 µHz to 50 MHz |
| Arb | 1 µHz to 25 MHz |
| Ramp | 1 µHz to 1 MHz |
| White noise | 50 MHz bandwidth |
| Resolution | 1 µHz; except pulse, 5 digits |
| Accuracy (1 year) | 2 ppm, 18°C to 28°C<br>3 ppm, 0°C to 55°C |
| **General** | |
| Power supply | 100-240 V, 50-60 Hz<br>100-127 V, 50-400 Hz |
| Power consumption | 140 VA |
| Operating temp. | 0°C to 55°C |
| Storage temp. | -30°C to 70°C |
| Stored states | 4 named user configurations |
| Power on state | default or last |
| Interface | IEEE-488 and RS-232 std. |
| Language | SCPI-1997, IEEE-488.2 |
| Dimensions (WxHxD) | |
| Bench top | 254 x 104 x 374 mm |
| Rackmount | 213 x 89 x 348 mm |
| Weight | 4.6 kg |
| Safety designed to | EN61010-1, CSA1010.1, UL-311-1 |
| EMC tested to | IEC-61326-1<br>IEC-61000-4-3 criteria B<br>IEC-61000-4-6 criteria B |
| Vibration and shock | MIL-T-28800E, Type III, Class 5 |
| Acoustic noise | 40 dBA |

**33210A**

| | |
|---|---|
| **Waveform Characteristics** | |
| Sine frequency range | 1 mHz to 10 MHz |
| Square Frequency range | 1 mHz to 10 MHz |
| Ramp, Triangle Frequency range | 1 mHz to 100 kHz |
| Pulse Frequency range | 1 mHz to 5 MHz |
| Noise Bandwidth | 7 MHz typical |
| **General** | |
| Power supply | Cat II 100 - 240 V @ 50/60 Hz (-5%, +10%) 100 - 120 V @ 400 Hz (± 10%) |
| Power consumption | 50 VA max |
| Operating environment | IEC 61010<br>Pollution Degree 2 Indoor Location |
| Operating temperature | 0°C to 55°C |
| Operating humidity | 5% to 80% RH, non-condensing |
| Operating altitude | Up to 3000 meters |
| Storage temperature | -30°C to 70°C |
| State storage | Power off state automatically saved,<br>Four user-configurable stored states |
| Interface | LAN LXI-C Ethernet 10/100<br>USB 2.0, GPIB |
| Language | SCPI - 1993, IEEE-488.2 |
| **Dimensions (W x H x D)** | |
| Bench top | 261.1 mm x 103.8 mm x 303.2 mm |
| Rack mount | 212.88 mm x 88.3 mm x 272.3 mm |
| Weight | 3.4 kg (7.5 lbs) |
| Safety designed to | UL-1244, CSA 1010, EN61010 |
| EMC tested to | MIL-461C, EN55011, EN50082-1 |
| Vibration and shock | MIL-T-28800, Type III, Class 5 |
| Acoustic noise | 30 dBa |
| Warm-up time | 1 hour |

520305

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| 33250A | **163-7309** | 2,440.77 |
| 33210A | **163-7310** | 638.14 |

## Arbitrary Function Generator

Agilent Technologies

**33220A**



LATEST PRICING

W=261, H=104, D=303mm. Weight 3.4kg

Uses direct digital synthesis (DDS) techniques to create stable, low-distortion output signals so you get accurate results. The 33220A provides easy access to standard sine, square, ramp, triangle, and pulse waveforms plus you can create custom waveforms using the 50 MSa/s, 14 bit, 64 K-point arbitrary waveform function. The variable-edge pulse function, along with PWM gives you unmatched flexibility for your design, verification, and test applications. The 33220A also includes USB, LAN and GPIB interfaces standard and comes with free Intuilink software to enable simple generation of custom waveforms with your PC.

- LXI Class C Compliant
- USB, GPIB and LAN interfaces
- Graph mode for visual verification of signal settings
- IntuiLink software
- 20 MHz Sine and Square waveforms
- Pulse, Ramp, Triangle, Noise, and DC waveforms
- 4-bit, 50 MSa/s, 64 k-point Arbitrary waveforms
- AM, FM, PM, FSK, and PWM modulation types
- Linear & logarithmic sweeps and burst operation
- 10 mVpp to 10 Vpp amplitude range

**Standard Waveforms**

| | | | |
|---|---|---|---|
| Sine Wave | 1µHz to 20MHz | Square Wave | 1µHz to 20MHz |
| Ramp | 1µHz to 200kHz | Triangle Wave | 1µHz to 200kHz |
| Pulse Wave | 500µHz to 5MHz | Noise | 9MHz BW typical |

**Arbitrary Waveforms**

| | | | |
|---|---|---|---|
| Built-In: | Exponential rise, exponential fall, negative ramp, sin(x)/x, cardiac. | | |
| Frequency Range | 1µHz to 6MHz | Waveform Length | 2 to 64k points |
| Amplitude Resolution | 14-bits | Sample Rate | 50MSa/s |

**Common Characteristics**

| | Range | Resolution | Accuracy |
|---|---|---|---|
| Frequency | | 1µHz | ±(10ppm + 3pHz) |

**Common Characteristics**

| | | | |
|---|---|---|---|
| Amplitude | $10mV_{pp}$ to $10V_{pp}$ | 4 digits | ±(1% of setting + $1mV_{pp}$) |
| DC Offset | ±5V | 4 digits | ±(2% of setting + 0.5% of amp. + $2mV_{pp}$) |
| Phase Offset | +360° to -360° | 0.001° | 20ns |

**Modulation**
AM, FM, PM, PWM, FSK, Sweep, Burst

**Accessories Included:**
Operating Manual, Service Manual, Quick Reference Guide, Intuilink Waveform Editor software, test data, USB cable and power lead.

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

464421

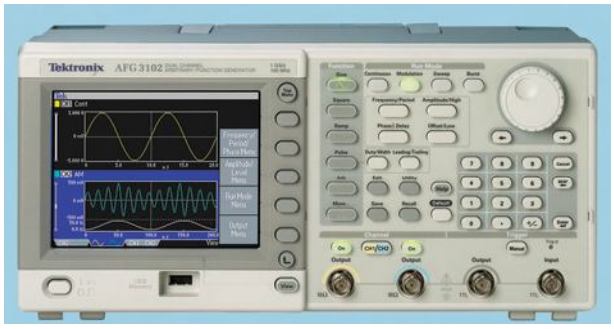
| Description | Mfrs. List No. | Order Code | 1+ | Price Each + | + | + |
|---|---|---|---|---|---|---|
| Function/Arbitrary Generator | 33220A | **133-5878** | 993.00 | – – | – – | – – |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C18 | 89.27 |
| **UKAS Calibration Charge** | N C18 | 123.00 |

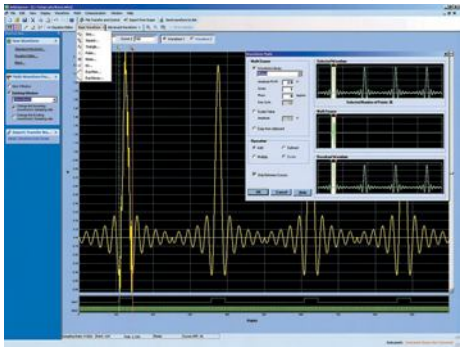
## Arbitrary Function Generators

Tektronix

**AFG3000 Series**



W=330 H=156 D=168mm Weight = 4.5kg



CALIBRATION SERVICES

LATEST PRICING

- 25 MHz, 100 MHz or 240 MHz Sine Waveforms
- 14 bits, 250 MS/s, 1 GS/s, or 2 GS/s Arbitrary Waveforms
- 5.6" Colour Display for Full Confidence in Settings and Waveform Shape (AFG3021B has monochrome display)
- Multi-language and Intuitive Operation Saves Set-up Time
- Pulse Waveform with Variable Edge Times
- AM, FM, PM, FSK, PWM
- Sweep and Burst
- Dual Channel Models Save Cost and Bench Space
- USB Connector on Front Panel for Waveform Storage on Memory Device
- USB, GPIB and LAN

The AFG3000 Arbitrary / Function Generator Series, with its large colour display and intuitive user interface, is both easy to learn and easy to use. Operation is intuitive, speeding design and time to market. Dual channel models allow a completely independent selection of waveforms and frequencies and represent a big advantage in versatility and cost. The front panel memory USB connectivity makes it easy to save and transfer waveforms and settings.

**All models include:** Quick-start user manual, power lead, CD-ROM with reference manual, service manual and ArbExpress software, NIST-traceable calibration certificate.

**ArbExpress Software** is included to create waveforms with ease. With this PC software waveforms can be seamlessly imported from any Tektronix oscilloscope, or defined by standard functions, equation editor, and waveform maths.

| | AFG3021B / AFG3022B | AFG3101 / AFG3102 | AFG3251 / AFG3252 |
|---|---|---|---|
| Channels | 1 / 2 | 1 / 2 | 1 / 2 |
| Sine Wave | 1μHz to 25MHz | 1μHz to 100MHz | 1μHz to 240MHz |
| Square Wave | 1μHz to 12.5MHz | 1μHz to 25MHz | 1μHz to 120MHz |
| Pulse Wave | 1μHz to 12.5MHz | 1μHz to 25MHz | 1μHz to 120MHz |
| Other Waveforms | 1μHz to 250kHz | 1μHz to 1MHz | 1μHz to 2.4MHz |
| Noise Bandwidth (-3dB) | 25MHz | 100MHz | 240MHz |
| DC (into 50Ω) | -5V to +5V | -5V to +5V | -2.5V to +2.5V |
| Arbitrary Waveforms | 1mHz to 12.5MHz | 1mHz to 25MHz | 1mHz to 120MHz |

**Modulation**
AM, FM, PM, FSK, Sweep, Burst

**Input / Output Ports**
Modulation input ch1& ch2, Ext. Trigger/Gated Burst input, 10MHz Reference In, Ext, Ch1 Add input
Ch1 trigger output, 10MHz reference output

449994

| Description | Mfrs. List No. | Order Code | 1+ | Price Each + | + | + |
|---|---|---|---|---|---|---|
| 1 channel, 25MHz | AFG3021B | **142-5300** | 1,180.00 | – – | – – | |
| 2 channel, 25MHz | AFG3022B | **142-5301** | 1,770.00 | – – | – – | |
| 1 channel, 100MHz | AFG3101 | **129-9081** | 2,330.00 | – – | – – | |
| 2 channel, 100MHz | AFG3102 | **129-9082** | 3,080.00 | – – | – – | |
| 1 channel, 240MHz | AFG3251 | **129-9083** | 4,290.00 | – – | – – | |
| 2 channel, 240MHz | AFG3252 | **129-9084** | 5,700.00 | – – | – – | |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C20 | 108.78 |
| **UKAS Calibration Charge** | N C20 | 128.40 |

## Sine wave Generator - 10Hz to 10kHz

digimess®

**TG100**



- Mircoprocessor controlled, with self test
- mV, V, dB, dBV, dBm
- 1Hz to 1MHz
- Frequency & Level display
- Low distortion for demanding LF applications
- 0.02% or less, distortion factor in the 10Hz to 10kHz range. 600 ohm output, ideal for use with MV100.
- Quattro key operating concept.
- RS232 interface

241102

| Mftrs. List No. | Description | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|---|
| HUC60-00 TG100 | Sine wave Generator | **413-0881** | 458.08 | 436.05 | 408.51 |

## Pulse Generator

TTi

**TGP110**



H = 140, W = 220, D = 230 Weight = 1.6 Kg

- 0.1Hz to 10MHz frequency range
- 50ns minimum pulse width
- Fully variable pulse delay and double pulse modes
- Squarewave, double pulse and delayed pulse modes
- Free-run, gated and trigger modes
- 50Ω output, variable 0.1V to 10V, TTL and sync. output
- Overlap indicators to give warning of illegal setting conditions
- Large diameter vernier controls for ease of setting

| | |
|---|---|
| **Period, pulse width delay** | |
| Period | 100ns to 10s (0.1Hz to 10MHz) |
| Pulse width | 50ns to 5s |
| Delay | 50ns to 5s |
| **Input Gate/Trig** | |
| Frequency range | dc to 10MHz |
| Signal range | between 2V and 5V peak |
| Min. pulse width | >30ns |
| Input impedance | typically 10KΩ |
| **Outputs 50Ω** | |
| Amplitude | 2 switch settings 0.1V-1.0V, 1V-10V |

| | |
|---|---|
| **Period, pulse width delay** | |
| Rise fall time | 10ns into 50Ω, Load 15ns max. |
| Aberration | <5% for output set at >20% of max into 50Ω |
| Timing | >20ns before TTL/50Ω output transition |
| Duration | 30ns |
| **General** | |
| Power | 230V ac or 115V ac ±14% (select by link) |
| Operating Temperature | +5°C to 40°C, 20-80% RH |
| Safety | **EN61010-1** |
| EMC | **EN55011, EN50082-1** |

222483

| Mftrs. List. No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| TGP110 | **892-786** | 229.00 | 222.13 | 215.47 |

| | | Price Each |
|---|---|---|
| **Standard Calibration** | S C19 | 89.27 |
| **UKAS Calibration** | N C19 | 141.49 |

## 30V pK-pK Waveform Amplifier

TTi

**WA301**



The WA301 is a wideband amplifier designed to increase the output of waveform generators. Most function generator have a maximum open-circuit voltage of 20V pk-pk; the WA301 enables this to be boosted to 30V. In most cases the WA301 would be used as a slave to a function generator with the gain set to x10.
Alternatively the variable gain can be used to provide an adjustable output from a fixed level source.

## Function Generators - continued

### 30V pK-pK Waveform Amplifier - continued

**WA301 - continued**

- 30V pK-pK maximum output
- DC to 1MHz bandwidth
- Variable gain 0dB to +20dB
- 50Ω and 600Ω output
- -20dB output attenuator
- Fully protected output

| | |
|---|---|
| Bandwidth | -3dB at 1MHz |
| Flatness | -dB at 100kHz |
| Rise/Fall Time | <0.5µs |
| Distortion | <0.1% at 1kHz |
| Gain | Vernier adjustment between x1 and x10 |
| Input impedance | 10KΩ |
| **Output** | |
| Output impedance | 50Ω and 600Ω (separate BNC sockets) |
| Output 0dB | 30V Pk-Pk from 50Ω (15V into 50Ω), 30V Pk-Pk. From 600Ω (15V into 600Ω) |
| Output -20dB | 3V Pk-Pk from 50Ω (1.5 into 50Ω), 3V Pk-Pk from 600Ω (1.600Ω) |
| DC offset | <5MV |
| **General** | |
| Power | 230V or 115Vac nominal 50/60Hz by internal adjustment |
| Operating Temperature | +5°C to + 40°C, 20%-80% RH |
| Weight | 1.1kg |
| Safety | Complies with **EN61010-1** |
| ENC | Complies with **EN55081-1, EN50082-1** |

222553

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| WA301 | **493-260** | 150.00 | 145.50 | 141.14 |
| | | | Price Each | |
| **Standard Calibration** | | S C5 | 39.11 | |
| **UKAS Calibration** | | N C5 | 61.97 | |

## Oscilloscopes

### 10MHz Oscilloscope - Single Channel

**CS10H**



H = 220, W = 83, D = 275mm

A good quality oscilloscope that offers excellent value and is ideal for professionals, students and general purpose use. The units is ideal for bench use and has an integral carry handle that is also used as a supporting leg to allow easy access to the display and controls.

- 10MHz bandwidth
- Intensity and focus control
- AC, DC and Gnd coupling
- 5mV/div to 5V/div vertical sensitivity
- 0.1µS/div to 0.1s sweep rate
- Auto, Norm and TV triggering modes
- Int, Line and Ext triggering sources
- X-Y mode
- Supplied with test probe and power cord

| | | | |
|---|---|---|---|
| **CRT** | | **Horizontal Axis** | |
| Area | 8x10div (1div = 6mm) | Sweep Time | 0.1µS/div to 0.1s/div |
| **Vertical Axis** | | Hold Off Time | 2.5:1 |
| Bandwidth | DC: 0 to 10MHz, AC: 10Hz to 10MHz | **X-Y Mode** | |
| Sensitivity | 5mV/div to 5V/div | Sensitivity | 0.2V/div to 0.5V/div |
| Input Impedance | 1MΩ ±3%, 30pF ±5pF | Bandwidth | DC: 0 to 1MHz, AC: 10Hz to 1MHz |
| Voltage Rating | 400V AC (IEC1010 CAT II) | **Triggering** | |
| Rise Time | ≤35ns | Slope | + Or - |
| Hold Off Time | ≥2.5:1 | Sensitivity | Int 1 div, Ext 0.3V |
| | | Voltage | 400V max. |

248877

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ |
|---|---|---|---|
| CS10H | **428-3934** | 97.85 | 91.67 |
| | | | Price Each |
| **Standard Calibration Charge** | S C17 | | 73.50 |
| **UKAS Calibration Charge** | N C17 | | 101.20 |

### 10MHz Analogue Oscilloscope

**MO10**



- 1kHz 0.5Vpp calibrator
- Supplied with operator's manual, power lead.
- Safety conformance to **EN 61010 CAT III 600V**
- 10 MHz bandwidth
- X-Y mode
- Simple to use
- Operating modes Int, Line, Ext

| | | | |
|---|---|---|---|
| Model Number | MO10 | Input ranges | 5mV - 5V/div 3% |
| Accelerating voltage: | 1.3kV | Trigger mode: | Auto, Normal, TV |
| Bandwidth per channel: | 0-10MHz | Vertical input: | 1Mohm 30pF >400Vdc 5mV - 5V/div 3% |
| Screen size | 8 x 10, 1div = 6mm | Vertical mode: | CH1 |
| Trigger source: | Int., Line, Ext. | Z axis input: | No |
| Horizontal: | 0.1S/div-0.1µS/div | Line voltage | 110/220V ± 10% AC |
| Calibration signal: | 1kHz 0.5Vpp Square wave | Weight approx: | 3kg |

246614

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|
| HUC70-01 MO10 | **430-0324** | 121.38 | 115.26 | 111.18 |
| | | | Price Each | |
| **Standard Calibration** | | S C17 | 73.50 | |
| **UKAS Calibration** | | N C17 | 101.20 | |

### 20MHz Dual Channel Oscilloscopes

**72-6800 & 72-6805**



H = 150, W = 310, D = 455mm



H = 150, W = 310, D = 455mm

A range of high quality 20MHz dual channel oscilloscopes featuring many functions found on much more expensive oscilloscopes. The 72-6805 also features a 1MHz function generator.

- 20MHz Dual channel
- 6" rectangular CRT with internal graticule (8x10 DIV display area)
- High sensitivity (1mV/DIV)
- X-Y operation
- Z axis input
- CH1 output
- TV synchronisation
- Multiple triggering function including ALT function
- 1MHz function generator (72-6805 only)

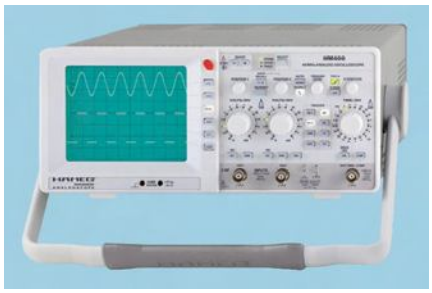
| | | | |
|---|---|---|---|
| **Vertical System** | | **Triggering** | |
| Operating Modes | CH1, CH2, DUAL (ALT/CHOP), ADD | Modes | AUTO, NORM, TV-V, TV-H |
| Input Voltage | 250V pk (300V pk on 72-6805) | Sources | CH1, CH2, ALT, LINE, EXT |
| Sensitivity | 5mV/div to 5V/div ±3% | Coupling | AC |
| Bandwidth | DC to 20MHz (-3dB) | Slope | + Or - |
| Rise Time | 17.5ns | **X-Y Operation** | |
| Input Impedance | 1MΩ | Sensitivity | 5mV to 5V/div ±4% |
| Coupling | AC, DC, GND | Bandwidth | DC to 500kHz |
| CH1 Output | 20mV/div | Phase Difference | <3 |
| **Horizontal System** | | **Z-Axis** | |
| Sweep Time | 0.2µS/div to 0.5s/div ±3% | Sensitivity | >5V pk-pk |
| X-Mag | x10 | Frequency Response | DC to 2MHz |

248881

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ |
|---|---|---|---|
| 72-6800 | **491-1842** | 199.00 | 192.00 |
| 72-6805 | **428-3958** | 252.45 | 235.62 |
| | | | Price Each |
| **Standard Calibration Charge** | | S C17 | 73.50 |
| **UKAS Calibration Charge** | | N C17 | 101.20 |

### 40 MHz Analog Oscilloscope

**HM400**



- Reference-Class in sensitivity and input voltage range
- 2 Channels with deflection coefficients 1 mV/div - 20 V/div, variable to 50 V/div.
- Time Base 0.2 s/div - 100 ns/div, with X magnification to 10 ns/div.
- Low noise measuring amplifiers with high pulse fidelity and minimum overshoot
- Peak to peak trigger for stable triggering 0 - 50 MHz at 0.5 div. signal level (to 80 MHz at 1 div.)
- Autoset, Save/Recall Memories for 6 instrument settings
- Yt- and XY-Mode with Z-Input for intensity modulation
- Component characterisation with component tester (two terminal network measurement) for use within service etc.
- Low power consumption, no fan

527115

| Mftrs. List No. | Order code | Price Each 1+ |
|---|---|---|
| HM400 | **163-6920●** | 407.04 |

## 35MHz Dual Channel Oscilloscope

**72-6810**



- Dual channel, dual trace
- 6" rectangular CRT with internal graticule
- 2kV acceleration voltage
- High sensitivity 1mV/div
- Display modes: CH-1, CH-2, DUAL, ALT, CHOP, ADD, CH-2 INV
- Input coupling: AC/DC/GND
- CH-1 output signal
- Sweep modes: A, X-Y, X10 magnification
- Trigger modes: AUTO, NORM
- Trigger sources: CH-1, CH-2, ALT, LINE, EXT
- Trigger hold off
- Trigger level lock
- TV synchronisation
- Trigger slope: + or -
- Z axis input for sensitivity modulation
- Supplied with 10:1 probes and instruction manual

| | |
|---|---|
| Vertical Bandwidth | DC coupled: DC - 35MHz (-3dB)<br>AC coupled: 10Hz - 35MHz (-3dB) |
| Sensitivity | 5mV/div - 5V/div (10 steps 1-2-5 sequence) |
| Rise Time | 10ns |
| Input Impedance | 1MΩ shunted by 25pF |
| Maximum Input Voltage | 300V (DC + AC peak) |
| Horizontal Sweep | Time Base: 0.1µs/div - 0.5s/div (21 steps 1-2-5 sequence) |
| Dimensions / Weight | 311 x 146 x 457mm / 8.65kg |

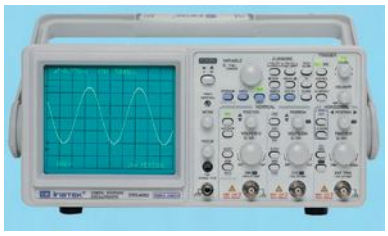
339507

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| 72-6810 | **491-1829** | 290.70 | 280.50 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C17 | 73.50 |
| **UKAS Calibration Charge** | N C17 | 101.20 |

## 50MHz Analogue/Digital Combination Oscilloscope

**72-7230**



A handy combination analogue/digital acquisition modes offers the best of both measurement worlds. Use analogue mode when you need true real time acquisition, use digital mode when you need to set pre trigger events, save and recall waveforms or freeze transients

- 6" high brightness CRT
- 10KV accelerating potential
- Front panel focus / intensity / illumination control
- Equivalent sampling time: 500MS/s MAX
- Pre-trigger function: 0-10 DIV
- Cursor readout and Z axis input
- Panel setting save/recall: 10 sets
- Waveform save/recall: 10 sets
- RS-232C interface
- Roll mode to 100S/DIV
- Averaging function: (2-256)
- Smoothing function: On/Off
- Roll mode to 100S/DIV
- Alt-mag function: x5, x10, x20
- Includes two 10:1 probes

| | |
|---|---|
| Sampling Rate | Digital Mode: 20MS/s, 2K/CH, Analogue Mode: 100MS/s |
| Max Sweep Rate | 10ns/DIV |
| Frequency Bandwidth (-3dB) | 1mV - 2mV/DIV: DC-7MHz<br>5mV - 20V/DIV: DC-50MHz |
| Input Voltage | Max. 400V (DC+ACpk) |
| Trigger Mode | AUTO, NORM, TV |
| Trigger Source | VERT, CH1, CH2, LINE, EXT |
| Acquisition Digitizer | 8 bit ADC x 2 |
| Max. Sampling Rate | 500MSa/s for equivalent time sampling<br>20MSa/s for normal sampling |
| Storage Bandwidth | Single Shot: DC-5MHz Repetitive: DC-50MHz |
| Operation Mode | Auto, Norm, Single, Single-Roll, Roll, X-Y |
| Storage Bandwidth | DC-50MHz (-3dB) |
| Dimensions / Weight | 130 x 275 x 371mm / 8.64kg |

339510.343961

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 72-7230 | **491-1982** | 610.98 | 484.50 | 459.00 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C17 | 73.50 |
| **UKAS Calibration Charge** | N C17 | 101.20 |

## Analogue/Digital CombiScopes HM1008 - HM1508-2

**100MHz and 150MHz**



- dual channel (HM1008) or 4 channel (HM1508-2 2 analogue, 2+2 logic)
- 1 GSa/s real-time sampling, 10 GSa/s random sampling
- pre/post trigger -100 % to + 400%
- low noise 8-bit flash A/D converter
- time base 50s/cm - 5ns/cm
- 1 MPts storage capacity per channel, zoom to 40,000:1
- operating modes: single-event, refresh, average, envelope, roll,peak-detect
- RS-232 IF, optional RS-232/USB, IEEE-488,ethernet
- signal displays: Yt and XY;interpolation: Sinx/x, pulse, dot join (linear)

**Vertical deflection**

| | |
|---|---|
| No. of channels | 4 Analogue, 2 Digital (HM1508) Digital 2 + 2 Logic |
| Analogue operating modes | CH1 or CH2 separately,DUAL (CH1 and CH2 alternating or chop.), addition |
| Digital operating modes | CH1 or CH2 separately,DUAL (CH1 and CH2) addition, (HM1508: CH3 and CH4 in addition) |
| Y in XY operating mode: | CH 1 |
| Invert: | CH 1, CH 2 |
| Bandwidth (-3dB): | 2x 0 - 150MHz (HM1508 to 150MHz) |
| Rise time: | ≤3.5ns (≤2.3ns HM1508) |
| Overshoot: | max. 1% |
| Deflection coefficient (K 1, 2): | 14 calibrated settings |
| Input impedence: | 1MΩ // 15 pF |
| Input connection: | DC, AC, earth |
| Max. input voltage: | 400V (DC+Peak AC) |
| **Triggering analogue and digital operation** | |
| Automatic and normal (peak value): | |
| Min. signal height: | 5mm |
| Frequency range: | 10Hz to 200MHz (to 250MHz HM1508) |
| Level adjustment range: | -10 to +10cm (HM1508 peak-to-peak +) |
| Operating modes: | Flank/Video (HM1508 additional logic) |
| Flank direction: | positive, negative, both |
| Sources: | CH 1, CH 2, alternating 1/2, mains, external |
| Connection: | AC, DC, HF, LF, connectable noise filter |
| Video: | pos./neg. sync. pulse |
| **Horizontal deflection** | |
| Analogue operating modes: | A, ALT (alternating A/B), B |
| Time coefficient A: | 0.5s/cm - 50ns/cm (1-2-5 sequence) |
| Time coefficient B: | 20ms/cm - 50ns/cm (1-2-5 sequence) |
| accuracy A and B: | ±3% |
| Digital operating modes: | |
| Time base refresh: | 20ms/cm - 5ns/cm (1-2-5 sequence) |
| Accuracy of time base: | 50ppm |
| **Digital storage** | |
| Sampling rate (real time) | 2x 500MSa , 1GS inter. (HM1508 logic: 2x 500MSa additional) |
| Storage capacity: | 1MSa per channel |
| **Operating/Measurement/Interfaces** | |
| Operating: | Auto set, menu, help functions (multi-lingual) |
| Save/Recall (equipment settings): | 9 |
| Signal display: | max. 4 signal shapes |
| Frequency counter: | |
| 6 Digit resolution: | ≤1 MHz - 200MHz (250MHz HM1508) |
| Accuracy: | 50ppm |
| Automatic measurement function: | Frequency/Period/Udc/Upp/Up+/Up- |
| Analogue cursor measurement function: | ΔV, Δt, 1/Δt (f), V to earth, ratio X, Y |
| additionally in digital operation: | Pulse counter, Vt referred to the trigger point, Sp-Sp, Sp+, Sp- |
| **General:** | |
| Mains connection: | 105 to 253V, 50/60Hz, CAT II |
| Power consumption: | 37W at 230V, 50Hz (41W HM1500) |
| Protection class: | Protection class I (EN61010-1) |
| Weight: | 5.6kg |
| Housing: | B: 285 H: 125 D: 380 mm |

403186.502132

| Mftrs. List No. | Order code | Price Each 1+ |
|---|---|---|
| HM1008 incl. H0720 Dual USB/RS232 IF | **125-1928** | 1,084.89 |
| HM1508-2 NEW | **137-1026** | 1,943.40 |

## 25MHz Digital Storage Oscilloscope

New



A great value, high performance, 2 channel digital storage oscilloscope that is an ideal replacement or upgrade for analogue scopes in service, quality testing, repair and education environments.

## Oscilloscopes - continued

### 25MHz Digital Storage Oscilloscope - continued

- 5.7" (320x240) mono LCD display
- 500MS/s Real time or 25GS/s ET sampling rate
- Long memory - 1Mb (2x 512k) length, 2 x 25K depth
- FFT, ADD, SUB, MULT, DIV and REV maths functions
- Extensive cursor measurements
- Storage for 10 x settings
- USB and RS232 interface for extended analysis
- Supplied with 2 x probes and user manual

| | |
|---|---|
| Bandwidth | DC-25MHz |
| Sample Rate | 500MS/s |
| Rise Time | <14ns |
| Triggers | Edge, Pulse, Glitch, Video and Alternate + EXT |
| Input Voltage | 400V max |
| Vertical Resolution | 8 bits |
| Vertical Sensitivity | 2mV/div to 5V/div |
| Time Base Range | 10ns/div to 50s/div |
| Waveform Storage | 10 |
| Dimensions (WxHxD) | 320x150x130mm |
| Weight | 2.5Kg |

510047.509525

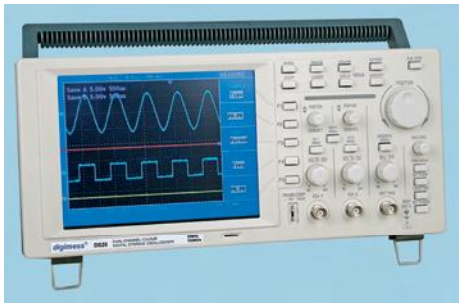
| Mftrs. List No. | Bandwidth MHz | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| UT-2025B | 25 | **156-3727** | 299.00 | 296.01 |

### Colour 25MHz Digital Oscilloscopes

**DS25**

digimess®

CALIBRATION SERVICES



W=350 H=157 D=120mm. Weight 1kg

- 25 MHz bandwidth
- 2 channels
- 100MSa/s (12.8GSa/s repetitive)
- 7.8" colur LCD screen (640x480 resolution, 256 colours)
- Compact and lightweight portable design (battery option available)
- Auto-Setup and Auto-Calibration
- Storage for 4 waveforms
- USB interface
- Safety conformance to **EN 61010 CAT II 300V**
- Supplied with 2x x1/x10 probes, USB lead, PC software, operator's manual and power lead.

| | |
|---|---|
| Input Coupling | AC, DC |
| Input Impedance | 1MΩ ±2%, 20pF ±3pF |
| **Vertical** | |
| Resolution | 8-bit |
| Sensitivity | 5mV/div - 5V/div |
| Rise Time | ≤17.5 ns |
| Accuracy | 5% |
| **Horizontal** | |
| Sampling Range | 10Sa/s - 100MSa/s |
| Record Length | 6k points per channel |
| Timebase Range | 5ns/div - 5s/div |
| Timebase Accuracy | ±(sample time interval + 0.01%rdg + 0.6ns) |
| **Triggering** | |
| Trigger source: | CH1, CH2, EXT, EXT/5 |
| Trigger mode: | Auto , Normal, Single, Edge, TV |
| Trigger coupling | AC, DC, HF Rej, LF Rej |
| **Measurements** | |
| Cursor | Voltage difference (ΔV), Time difference (ΔT) |
| Auto | Pk-pk value, Average value, RMS value, Frequency and Period |
| Waveform Maths | CH1-CH2, CH2-CH1, CH1+CH2 |
| **General** | |
| Power Supply | 100 - 240V AC RMS 50/60Hz |
| Battery (129-3259 only) | 7.4V lithium rechargeable |
| Power consumption | < 15W |

450153.460910

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| DS25 | **129-3258** | 355.98 | 321.30 | 304.98 |
| DS25-BATT | **129-3259** | 406.98 | 367.20 | 345.78 |
| | | | Price Each | |
| **Standard Calibration** | | S C17 | 73.50 | |
| **UKAS Calibration** | | N C17 | 101.20 | |

### 30MHz Oscilloscope with Frequency Counter

TENMA™

New



**Model:** 72-6802

A great value analogue oscilloscope with innovative functions such as LCD readout display, frequency counter, auto time base setting. The Scope also features a wide range of triggering functions, XY mode, MAG and Z Axis. Ideal for R&D, service, maintenance and education environments.

- 6" high brightness CRT screen with 8x12 internal graticule
- LCD readout with backlight showing voltage, time base and frequency
- 5 Digit, real time 30MHz frequency counter
- Intelligent auto time base
- Horiz/Vert limit buzzer alarm
- Supplied with probes ans a user manual

| | |
|---|---|
| **Vertical System** | |
| Operating Modes | CH1, CH2, DUAL, ADD, X-Y |
| Input Voltage | 300V (DC + AC peak) |
| Sensitivity | 1mV/div sesctable in 12 steps |
| Bandwidth | DC to 30MHz |
| Rise Time | 11.7ns |
| Input Impedance | 1MΩ |
| Coupling | AC, DC, GND |
| **Horizontal System** | |
| Sweep Time | 0.2µs to 0.5s/div in 20 steps |
| **Triggering** | |
| Modes | Auto, norm, TV-v, TV-h |
| Sources | CH1, CH2, ALT, Line, Ext |
| Slope | '+' or '-' |
| **Function Counter** | |
| Frequency Range | 50Hz to 30MHz |
| Measuring sensitivity | 2div |
| Dimensions (WxHxD) | 310 x 146 x 458mm |

510026.509401

| Mftrs. List No. | Bandwidth MHz | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| 72-6802 | 30 | **156-3801** | 219.30 | 217.11 |

### 60MHz LCD Oscilloscopes

**GDS-806**

GW INSTEK





H=142, W=310, D=254mm Weight = 3.8kg

A 60MHz bandwidth oscilloscope with choice of colour or monochrome displays. With the easy-to-use menu tree and analogue style front panel design this is an ideal scope to meet most of the waveform applications on the market.

- 60MHz bandwidth
- 125k long memory
- 12 division horizontal display
- 25GS/s sampling rate for repetitive waveforms
- Advanced trigger: Pulse width, TV line, Event delay and Time delay
- Go / NoGo and auto setup sequence
- FFT function
- RS232C interface
- GDS-806S: Monochrome screen
- GDS-806C: Colour screen

| | |
|---|---|
| **Vertical system** | |
| Bandwidth | 60MHz |
| Channels | 2 |
| Rise time | <5.8ns |
| Input impedance | 1MΩ ±2% |
| **Horizontal system** | |
| Time base range | 1ns/div - 10s/div |
| Time base accuracy | ±0.01% |
| **Trigger** | |
| Trigger source | CH1, CH2, Line, Ext |
| Coupling | AC, DC, HF, LF, Noise Reject |
| Sensitivity | DC - 25MHz: 0.5div or 5mV<br>25MHz - 60MHz: 1.5div or 15mV |
| **X-Y mode** | |
| X-Axis Input / Y-Axis input | Channel 1 / Channel 2 |
| Phase shift | ±3° at 100kHz |
| **Frequency** | |
| Readout resolution | 6 digits |
| Frequency range | AC coupled, 20Hz - rated bandwidth; resolution: 10Hz |
| **General** | |
| Interface | RS-232C |
| Power | 100V - 240V AC 47Hz - 63Hz, Auto selection |

381950.382004

| Display | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Monochrome | GDS-806S | **855-4838** | 504.90 | 488.07 | 476.85 |
| Colour | GDS-806C | **855-4846** | 559.88 | 538.56 | 532.95 |

Over 480,000 products online GO

## Colour Digital Storage Oscilloscopes

New



High performance, 2 channel portable digital storage oscilloscopes that are an ideal replacement for upgrade for analogue scopes in service, quality testing, repair and education environments.

- 5.7" (320x240) Colour LCD display
- Tough case with integral stand/handle
- 500MS/s Real time or 25GS/s ET sampling rate
- Long memory - 1Mb (2x 512kb) length, 2 x 25K depth
- FFT, ADD, SUB, MULT, DIV and REV maths functions
- Extensive cursor measurements
- Storage for 10 x settings
- USB and RS232 interface for extended analysis
- Supplied with 2 x probes and user manual

| | |
|---|---|
| Bandwidth | DC-60MHz |
| Rise Time | <5.8ns |
| Sample Rate | 500MS/s |
| Triggers | Edge, Pulse, Glitch, Video and Alternate + EXT |
| Input Voltage | 400V max |
| Vertical Resolution | 8 bits |
| Vertical Sensitivity | 2mV/div to 5V/div |
| Waveform Storage | 10 |
| Dimensions (WxHxD) | 320x292x150mm |
| Weight | 4.9Kg |

510052.509531

| Mftrs. List No. | Bandwidth MHz | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| | 60 | **156-3733** | 475.00<br>599.00 | 470.25<br>593.01 |

## Colour Digital Storage Oscilloscopes

New



High performance, 2 channel digital storage oscilloscopes that are an ideal replacement for upgrade for analogue scopes in service, quality testing, repair and education environments.

- 5.7" (320x240) Colour LCD display
- 500MS/s Real time or 25GS/s ET sampling rate
- Long memory - 1Mb (2x 512k) length, 2 x 25K depth
- FFT, ADD, SUB, MULT, DIV and REV maths functions
- Extensive cursor measurements
- Storage for 10 x settings
- USB and RS232 interface for extended analysis
- Supplied with 2 x probes and user manual

| | U-T2042C | U-T2062C | U-T2102C |
|---|---|---|---|
| Bandwidth | DC-40MHz | DC-60MHz | DC-100MHz |
| Rise Time | <8.7ns | <5.8ns | <3.5ns |
| Time Base | 10ns/div | 10ns/div | 5ns/div to 50s/div |

| | U-T2152C | U-T2202C |
|---|---|---|
| Bandwidth | DC-150MHz | DC-200MHz |
| Rise Time | <2.3ns | <1.8ns |
| Time Base | 2ns/div to 50s/div | 2ns/div to 50s/div |

| | |
|---|---|
| Sample Rate | 500MS/s |
| Rise Time | <14ns |
| Triggers | Edge, Pulse, Glitch, Video and Alternate + EXT |
| Input Voltage | 400V max |
| Vertical Resolution | 8 bits |
| Vertical Sensitivity | 2mV/div to 5V/div |
| Waveform Storage | 10 |
| Dimensions (WxHxD) | 320x150x130mm |
| Weight | 2.5Kg |

510051.509526

| Mftrs. List No. | Bandwidth | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| UT-2042C | 40MHz | **156-3728** | 399.00 | 395.01 |
| UT-2062C | 60MHz | **156-3729** | 535.87 | 503.99 |
| UT-2102C | 100MHz | **156-3730** | 675.76 | 632.97 |
| UT-2152C | 150MHz | **156-3731** | 743.45 | 711.01 |
| UT-2202C | 200MHz | **156-3732** | 822.42 | 787.96 |

## Digital Storage Oscilloscopes

GW INSTEK

New



**Model:** GDS-1000 Series
General purpose, 2 channel oscilloscopes that are ideal replacements and upgrades for analogue scopes in service, quality testing, education and industrial environments.

- 5.6" (320x234) TFT Colour Display,' A+' class
- 250MS/s Real Time or 25GS/s ET sampling rate
- 4k memory length per channel
- Advanced triggering
- Extensive voltage and time cursor measurements
- 6 Digit real time frequency counter
- Save / recall of 15 front panel settings
- USB interface and SD card slot
- Lightweight
- Supplied with 2x probes and a user manual

| | GDS-1022 | GDS-1042 | GDS-1062 | GDS-1102 |
|---|---|---|---|---|
| Bandwidth | 25MHz | 40MHz | 60MHz | 100MHz |
| Channels | 2 | 2 | 2 | 2 |
| Sample Rate | 250 MS/s | 250 MS/s | 250 MS/s | 250 MS/s |
| Rise Time | | | | |

| | |
|---|---|
| Record length | 4k points on all models |
| Vertical Sensitivity | 2 mV/div to 5 V/div |
| Vertical Resolution | 8 bits |
| Timebase range | 1ns/div - 10s/div |
| Dimensions | |
| Weight | |

510027.509378

| Mftrs. list no | Bandwidth MHz | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| GDS-1022 | 25 | **156-3796** | 265.00 | 262.35 |
| GDS-1042 | 40 | **156-3797** | 375.00 | 371.25 |
| GDS-1062 | 60 | **156-3799** | 425.00 | 420.75 |
| GDS-1102 | 100 | **156-3800** | 535.00 | 529.65 |

## 150MHz Digital Storage Oscilloscope

GW INSTEK

**GDS-820S**



A 150MHz bandwidth oscilloscope featuring a mono LCD display designed to meet the demands of a modern DSO. The user friendly desing and versatile interface make the GDS-820 a useful tool for most applications in circuit design, production test, repair and education.

- 150MHz bandwidth with monochrome LCD display
- 125k long memory and 12 divisional horizontal display
- 25GS/s sampling rate for repetitive waveforms
- 15 auto measurements and simultaneous ΔT/ΔV cursors
- Advanced trigger: Pulse width, TV line, Event delay and Time delay
- Go/NoGo and Auto Setup Sequence
- FFT Function
- Zoom IN / OUT
- Built-in Help menu
- USB, RS232C and printer port

| | | | |
|---|---|---|---|
| Display | 5.7" LCD | Time Base Range | 1ns - 10s/div |
| Bandwidth | 150MHz | Waveform Memory | 2 |
| Record Length | 125k/CH | Panel Setup Memory | 15 |
| Sample Rate | 100MS/s, 25GS/s | Interface | USB, RS-232C, Printer port (GDS-820S only) |
| Vertical Resolution | 8-bits | Dimensions / Weight | 254 x 142 x 310mm / 4.1kg |
| Vertical Sensitivity | 2mV - 5V | | |

339509.343959

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| 150MHz + Interface | GDS-820S | **491-1921** | 627.20 | 600.27 | 583.44 |
| **Standard Calibration Charge** | S C18 | | 89.27 | | |
| **UKAS Calibration Charge** | N C18 | | 123.00 | | |

## Troubleshooting tips

WWW

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

## Oscilloscopes - continued

### 150MHz & 250MHz Digital Storage Oscilloscopes

**72-7235 & 72-7240**



These colour display DSO's have been designed for a wide multitude of applications in industrial, education and service applications. For ease of operation the "Autoset" function allows for signal related automatic setup of measuring parameters. On screen readout and cursor functions for voltage, frequency and frequency measurement provide extraordinary operational convenience. Fifteen different user defined instrument settings can be saved and recalled without restriction. The valuable "Program" mode is able to help users record all the necessary measuring steps and replay all steps again. The special "Go-No-Go" function is useful for distinguishing pass or failure conditions. These scopes offer the right combination of triggering control, frequency response and time base versatility to facilitate measurements in a wide range of applications in laboratory as well as in field service use.

- 2 channel 150MHz & 250MHz bandwidth
- Sample rate up to 25GS/s ET
- 125K record length per channel
- Large LCD 5.7" colour display
- Built in learn mode for tracking and training
- Built in FFT function
- Built in help menu
- Six digit frequency counter
- Built in Go-No-Go function for manufacturing
- RS-232, USB and printer port interfaces included

| | | 491-1945 | 491-1969 |
|---|---|---|---|
| | | 72-7235 | 72-7240 |
| **Vertical System** | Bandwidth | 150MHz | 250MHz |
| | Channels | 2 | |
| | Vertical Sensitivity | 2mV/ div - 5V/ div | |
| | Rise Time | <2.3ns | <1.4ns |
| | Input Coupling | 1M ohm | |
| | Max. Voltage Between Signals | 300V (DC+AC peak) CAT II | |
| **Signal Acquisition** | Real Time Sample Rate | 100MS/s Max. on each channel | |
| | Equivalent Sample Rate | 25GS/s Max. on each channel | |
| | Record Length | 125K / CH | |
| **Horizontal System** | Time Base Range | 1 ns/ div to 10 s/div | |
| | Time Base Accuracy | + r - 0.01% | |
| **Trigger** | Trigger Source | CH1, CH2, LINE, EXT | |
| | Mode | Auto Level, Auto, Normal, Single, TV, Time Delay, Event Delay, Edge, Pulse Width | |
| | Coupling | AC, DC, HF, LF, Noise Reject | |
| **X-Y-Mode** | X- Axis Input / Y- Axis Input | CH1 / CH2 | |
| **Frequency Counter** | Readout | 6 digit | |
| **Control Panel** | | Autoset, Save/Recall, Waveform Trace, Save/Recall | |

339502.343960

| Mftrs. List No. | | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|---|
| 72-7235 | C18 | **491-1945** | 675.00 | 635.00 | 620.00 |
| 72-7240 | C18 | **491-1969** | 879.00 | 835.00 | 820.00 |
| **Standard Calibration Charge** | | **S** C18 | | Price Each 89.27 | |
| **UKAS Calibration Charge** | | **N** C18 | | 123.00 | |

### Digital Storage Oscilloscopes

**GDS-2000 Series**



W=310 H=142 D=254mm Weight = 4.3kg

- 60 MHz, 100 MHz, and 200 MHz bandwidths
- 2 or 4 input channels
- 1GSa/s Real-Time and 25GSa/s Equivalent-Time Sampling
- 25k Points Record Length Maximum
- Large 5.6" TFT Color Display
- Removable data storage / printing via front panel USB host port
- 27 automatic measurements
- 4 types of FFT: flattop, blackman, hanning and rectangular windows
- Go/NoGo test function
- Remote control via RS-232 or USB

| | GDS-2062 | GDS-2102 | GDS-2104 | GDS-2204 |
|---|---|---|---|---|
| Display | 5.6" Colour TFT LCD, 320x234 pixel resolution | | | |
| Bandwidth | 60MHz | 100MHz | 100MHz | 200MHz |
| Channels | 2 | 2 | 4 | 4 |
| Sample Rate | 1 GS/s | 1 GS/s | 1 GS/s | 1 GS/s |
| Record length | 25k points on all models | | | |
| Rise Time | 5.8ns | 3.5ns | | 1.75ns |
| Vertical Sensitivity | 2 mV to 5 V/div | | | |
| Vertical Accuracy | ±3% | | | |
| Maximum Input | 300 Vrms CAT II | | | |
| BW limit | 20 MHz (-3dB) | | | |
| Input coupling | AC, DC, GND | | | |
| Input impedance | 1MΩ in parallel with 16pF | | | |
| Trigger Sources | CH1, CH2, Line, Ext (2 ch models only), CH3, CH4 (4 ch models only) | | | |
| Trigger Modes | Auto-level, auto, normal, single, TV, edge, PW time & event delays (2ch only) | | | |
| Timebase range | 1ns to 10s/div (ROLL MODE: 250ms/div - 10s/div) | | | |
| Time base acc. | 0.01% | | | |
| Voltage Measurements | $V_{pp}$, $V_{amp}$, $V_{avg}$, $V_{rms}$, $V_{hi}$, $V_{lo}$, $V_{max}$, $V_{min}$, Rise & Fall preshoot/overshoot | | | |
| Time Measurements | Freq, Period, Rise & Fall Time, +ve Width, -ve Width, Duty Cycle, 8 delay measurements | | | |
| Interface | TTL Go/NoGo Output, RS-232, USB2.0 Host/Device | | | |

447801.460909

| Mftrs. List No. | Description | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| **Oscilloscopes** | | | | | |
| 60 MHz, 2 Channel | GDS-2062 | **127-7402** | 667.59 | 645.15 | 599.07 |
| 100 MHz, 2 Channel | GDS-2102 | **127-7403** | 869.55 | 800.65 | 743.46 |
| 100 MHz, 4 Channel | GDS-2104 | **127-7404** | 1,004.19 | 975.99 | 906.28 |
| 200 MHz, 4 Channel | GDS-2204 | **127-7407** | 1,228.59 | 1,162.99 | 1,113.14 |
| **Standard Calibration Charge** | | **S** C18 | | Price Each 89.27 | |
| **UKAS Calibration Charge** | | **N** C18 | | 123.00 | |

### 100MHz Oscilloscope with Colour Screen

**MTX3552**





Centred on the user's environment, the MTX3352 digital oscilloscope is equipped with a wide, colour LCD screen and provides a very large useful surface area.
21 shortcut keys on the front offer direct access to the main functions. The instruments can also be controlled on the screen, using a mouse and "Windows-like" menus. In addition to the Oscilloscope Metrix have also produced a bench top digital multimeter and function generator.

- 5.7" colour LCD display
- CCFL backlighting - 4 graphs + 4 references on screen
- Bandwidth 100MHz - 2 channels class 1 CATII 300V
- Sensitivity 25mV - 100V/div + "Winzoom" vertical expansion
- Sweep speed of 1ns at 200s/div
- Auto, Normal, Single-sweep trigger - CH1, CH2, EXT, LINE
- Max. sampling 20Gsam/s = repetitive; 100Msam/s = single sweep
- Capacity 50000 counts - 4 references + 4 graphs of 50k
- GLITCH, ENVELOPE, AVERAGING, DIGITAL XY
- Complete autoset, FFT, MATH, V/T/Phase cursors, 18 automatic measurements
- Logger and harmonic anaylzer available as options

**VERTICAL**

| | |
|---|---|
| Bandwidth | 100MHz |
| Channels | 2 channels - "class 1" |
| Input Impedance | 1MΩ |
| Maximum Permanent Input Voltage | Cat II / 300V and 400V (with HX0003 probe) - Derating 40Vcc at 20MHz |
| Vertical Sensitivity | 2.5mV - 100V/div + vertical <<Winzoom>> expansion |
| Vertical Accuracy | ±2% |
| Vertical Zoom | YES, unique and direct <<1 click>> area zooming from mouse |
| Probes Factors | Complete physical signal scaling + unit definition (Virtual << windows>> keyboard) |

**HORIZONTAL**

| | |
|---|---|
| Time Base Speed | From 1ns up to 200 s/div. |
| Horizontal Total Accuracy | ±0.02% |
| Horizontal Zoom | YES, up to 200 times factor (real acquisition points) - Direct <<1 click>> area zoom in from mouse |

**TRIGGER**

| | |
|---|---|
| Mode | Auto, Normal, Single |
| Source | CH1, CH2, EXT, LINE |
| Type | Edge, TV-V, TV-H, Auto 50% |
| Coupling | AC, DC, LFR, HFR, noise reduction |
| Sensitivity | 0.5 div |

**GENERAL**

| | |
|---|---|
| Centronics Printout | Standard / 7 printers modes and "printing in file" |
| PC Communication | Standard RS232C (up to 230.4 kbauds) |
| Power Supply | 90-264V / 47-64Hz / <12W |
| Dimensions (WxHxD) | 270x170x190mm |
| Weight | 2.5kg |

338213.343947

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| **EURO Versions** | | | | | |
| 100MHz Oscilloscope | MTX3352-C | **423-2537** | 1,724.85 | 1,638.48 | 1,572.58 |
| 5MHz Function Generator | MTX3240EURO | **411-0109** | 530.72 | 498.80 | 465.54 |
| Bench Top Multimeter | MTX3250EURO | **411-0110** | 488.01 | 475.16 | 462.98 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C18 | 89.27 | |
| **UKAS Calibration Charge** | | | N C18 | 123.00 | |
| **Standard Calibration Charge** | | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | | N C4 | 58.75 | |

## Digital Storage Oscilloscopes

**DS 3000 Series**

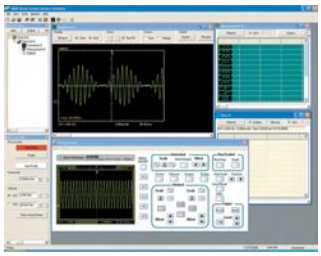
Agilent Technologies

LATEST PRICING

CALIBRATION SERVICES



W=346 H=182 D=290mm
Weight = 4.8kg



3000 Series scopes provide outstanding performance and a high resolution colour display at a very affordable price. Perfect for engineers, technicians and students who require a quality view into their circuits and end products. Supplied with manual, CD-ROM, power lead, accessory pouch and two passive probes.

- 60 to 200 MHz bandwidths
- 1 GSa/s maximum sample rate
- 2 channels
- Large 15-cm (5.7-in) colour display
- Advanced triggering including edge, pulse width, and line-selectable video
- 4 kpts of waveform memory
- 20 automatic measurements plus hardware counter and Measure All
- Four maths functions, including FFTs supplied as standard
- Mask test supplied as standard
- USB, GPIB and RS-232 connectivity available
- Multi-language support
- Sequence mode (segmented memory) standard

**Optional Accessories**

**112-0777 - Communications Module**

Provides GPIB and RS-232 connectivity and pass/fail output for automatic testing.

| | DSO3062A | DSO3102A | DSO3152A | DSO3202A |
|---|---|---|---|---|
| Colour Display | 1/4 VGA colour LCD (320 x 240 pixels) | | | |
| Bandwidth | 60MHz | 100MHz | 150MHz | 200MHz |
| Channels | 2 | 2 | 2 | 2 |
| Sample rate | 1 GSa/s | 1 GSa/s | 1 GSa/s | 1 GSa/s |
| Record length | 4k points per channel | | | |
| Vertical res. | 8-bit | | | |
| Vertical sens. | 2 mV to 5 V/div | | | |
| Max input volt. | 300 Vrms CAT II; derated at 20 dB/decade >100kHz to 13 Vp-p AC at ≥3MHz | | | |
| BW limit | 20 MHz | | | |
| Input coupling | AC, DC, GND | | | |
| Input impedance | 1MΩ in parallel with 13pF | | | |
| Time base range | 2 ns/div to 50 s/div | | | |
| Time base acc. | 100 ppm | | | |
| Trigger Sources | CH1, CH2, Ext., Ext/5, Line (Edge mode only) | | | |
| Operating temp | 0 to +50°C | | | |
| Power Requirements | 100 - 240 Vac. 50VA. | | | |

Please call your local Farnell InOne sales office for quantity pricing (2+).

423793.428865

| Mftrs. List No. | Desc. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| **Oscilloscopes** | | | | | |
| 60MHz Oscilloscope | DSO3062A | **112-0771** | 638.00 | 631.62 | 625.30 |
| 100MHz Oscilloscope | DSO3102A | **112-0772** | 783.00 | 775.17 | 767.42 |
| 150MHz Oscilloscope | DSO3152A | **112-0774** | 870.00 | 861.30 | 852.69 |
| 200MHz Oscilloscope | DSO3202A | **112-0775** | 957.00 | 947.43 | 937.96 |
| **Accessories** | | | | | |
| GPIB/RS232 Comms Module | N2861A | **112-0777** | 201.00 | 198.99 | 197.00 |
| Rackmount Kit | N2864A | **112-0778** | 144.00 | 142.56 | 141.13 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | | S C18 | 89.27 |
| **UKAS Calibration Charge** | | | | N C18 | 123.00 |

## Fluke 113 Digital Multimeter

FLUKE



New

The new 113 Digital Multimeter has the features needed to repair most electrical problems. This meter is simple to use. With features such as VCHEK™, from Fluke, which includes added measurement functions, backlight, conformance to the latest safety standards, and a much larger display that's easier to view, this new meter is a must-have for the utility user's toolbox.

**Fluke 113 Digital Meter Includes:**
Fluke 113 digital multimeter
TL75 test leads
One 9V battery
Printed user manual

L=167.1, W=85.1, D=46, Weight=404g

- VCHEK™ LoZ low impedance measurement function to simultaneously test for voltage or continuity
- True-rms for accurate ac measurements on non-linear loads
- A large backlit display allows for easy visibility in low-lit areas
- Record signal fluctuations using the min / max function
- Diode test for testing general-purpose germanium, silicon, and power diodes
- Integral holster with probe holders for easy storage
- Auto and Manual ranging for added user functionality
- Meets Measurement Category CAT III 600V and Category IV 300V standards for a higher level of safety
- The optional TPAK magnetic hanger allows the user hands-free flexibility

| Measuring Range | | Resolution | | Temperature | |
|---|---|---|---|---|---|
| Capacitance | 1μF to 999μF | Capacitance | 1μF to 1nF | Operating Range | -10°C to +50°C |
| Resistance | 600R to 60kR | Resistance | 0.01R to 0.1R | Storage Range | -40°C to +60°C |
| Voltage | 6V to 600V | Voltage | 0.001V to 0.1V | | |
| Test Diode Range | 2V | | | | |

| | |
|---|---|
| **Maximum Voltage** | 600V |
| **Display** | 3 3/4-digits, 6000 counts, updates 4/sec |
| **Relative Humidity** | 95 % to 30 °C, 75 % to 40 °C, 45 % to 50 °C |
| **Battery Type** | 9 Volt Alkaline, ANSI 1604A / IEC 6F22 |
| **Battery Life** | Alkaline: 300 hours typical, without backlight |
| **Shock** | 1 Meter drop per IEC 61010-1-2001 |
| **Vibration** | Per MIL-PRF-28800 for Class 2 instrument |
| **Safety** | UL 61010-1 (2004) and IEC/EN 61010-1 2nd Edition for measurement Category III, 600 V, EMC EN61326-1. |

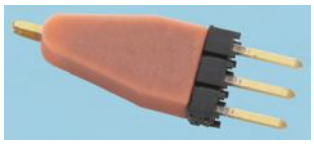
* Between any terminal and earth ground

509931

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|
| FLUKE 113 | **157-8321** | 94.00 | 91.18 | 88.45 |
| **Accessories** | | | | |
| TL223.. Test Lead Set | **431-4219** | 41.00 | – – | – – |
| C50 Case | **424-006** | 22.00 | 21.34 | 20.70 |
| TPAK Magnetic Hanger | **302-9578** | 22.00 | 21.34 | 20.70 |

## Wedge Probe Adapter

Agilent Technologies



New

- Easy connection to 0.5 mm packages
- Reliable contact with little chance of shorting to adjacent pins
- 3-signal version

520334

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| E2613B | **163-7329** | 101.00 |

## Current Probes and Power Supply

**AC/DC**

Agilent Technologies



N2779A

New

- Various bandwidths: DC to 2 MHz, 10 MHz, 50 MHz, 100 MHz
- DC and AC measurements
- Superior 1% accuracy and high signalto-noise ratio
- Overload-protect function preventsprobe damage from excessive input
- Direct connection to high-impedance1 MΩ BNC input of oscilloscope
- Demagnetize button to remove any residual magnetism that builds up in the magnetic core
- External power supply (N2779A) lets you connect up to three N278xA current probes to a single power supply



N2781A



N2782A



1147A



N2780A

## Oscilloscopes - continued

### Current Probes and Power Supply - continued

**AC/DC - continued**



1146A

| Current, max A | Bandwidth | Mftrs. List No. | Order Code |
|---|---|---|---|
| 100 | 100 kHz | 1146A | 163-7324 |
| 15 | 50 MHz | 1147A | 163-7325 |
| Current, RMS A | | | |
| 500 | 2 MHz | N2780A | 163-7334 |
| 150 | 10 MHz | N2781A | 163-7335 |
| 30 | 50 MHz | N2782A | 163-7336 |
| 30 | 100 MHz | N2783A | 163-7337 |

520332

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| N2779A | **163-7333** | 577.00 |
| 1146A | **163-7324** | 395.00 |
| 1147A | **163-7325** | 1,248.00 |
| N2780A | **163-7334** | 2,453.00 |
| N2781A | **163-7335** | 2,043.00 |
| N2782A | **163-7336** | 1,341.00 |
| N2783A | **163-7337** | 1,518.00 |

### Portable Oscilloscopes

**5000 Series**

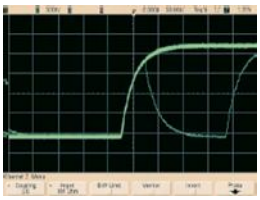
Agilent Technologies

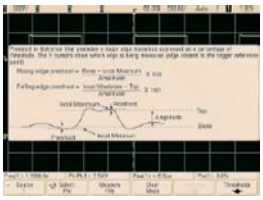


LATEST PRICING



The 5000 Series oscilloscopes leverage the same third generation MegaZoom III technology blocks used in Agilent's higher performance bench and lab oscilloscopes - responsive deep memory, fast update rates with minimal "dead time", and analogue-like display systems - and deliver them in a compact package, at a price similar to oscilloscopes with older technology blocks.







N2760A



N2917B

- High-definition XGA (1024 x 768) display with 256 levels of intensity grading
- 100 MHz, 300 MHz, and 500 MHz bandwidths
- 2 or 4 channels
- Full remote control, including web browser
- LXI-class C compliant
- Manuals and in-scope help available in 11 languages
- Secure environment option
- Up to 1 Mpts acquisition memory
- Up to 100,000 waveforms per second real-time update rate
- Up to 12 bits of vertical resolution, even in single-shot acquisitions

**Oscilloscope Specifications**

| | DSO5012A | DSO5014A | DSO5032A | DSO5034A | DSO5052A | DSO5054A |
|---|---|---|---|---|---|---|
| Bandwidth | 100MHz | 100MHz | 300MHz | 300MHz | 500MHz | 500MHz |
| Channels | 2 | 4 | 2 | 4 | 2 | 4 |
| Max. Sample Rate | 2 GSa/s per channel | | | | 4 GSa/s (half channel), 2 GSa/s per channel. | |
| Rise Time | 3.5ns | 3.5ns | 1.17ns | 1.17ns | 700ps | 700ps |
| Memory Depth | 500 kPts/ch / channel | | 500 kPts/ch / channel | | 500 kPts/ch / channel | |
| **Vertical System** | | | | | | |
| Vertical Range | 2mV/div to 5V/div | | 2mV/div to 5V/div | | 2mV/div to 5V/div | |
| Vertical Resolution | 8 bits | | | | | |
| Input Impedance | 1MΩ // 12pF or 50Ω selectable | | | | | |
| DC Vertical Gain Accuracy | ±2% full scale | | | | | |
| **Horizontal System** | | | | | | |
| Horizontal Range | 5 ns/div to 50 s/div | | 2 ns/div to 50 s/div | | 1 ns/div to 50 s/div | |
| Horizontal Resolution | 2.5 ps | | | | | |
| Horizontal Accuracy | 25 ppm (±0.0025%) | | | | | |
| **Triggering** | | | | | | |
| Trigger Source | All channels, line, ext. | | | | | |
| Trigger Modes | Auto, Normal, Single | | | | | |
| Selections | Edge, Pattern, Pulse Width, TV, Duration | | | | | |
| **Automatic Measurements** | | | | | | |
| Voltage | pk-to-pk, max, min, amplitude, top, base, overshoot, preshoot, RMS, mean and standard deviation | | | | | |
| Time | frequency, period, width, duty cycle, rise time, fall time, delay and phase shift | | | | | |
| Counter | Built-in 5-digit frequency counter on any channel | | | | | |
| Waveform Maths | 1-2, 1x2, FFT, differentiate, integrate | | | | | |
| FFT | Rectangular, Hanning, and Flat Top windows | | | | | |
| **I/O** | | | | | | |
| USB2.0 device port, 2x USB1.1 host ports, LAN, IEEE488.2 GPIB, XGA Video o/p | | | | | | |

**Includes:** 3-year return-to-Agilent warranty, Hardcopy user's guide, power lead, one probe per channel, Agilent IO Libraries, Service guide CD-ROM, Protective front cover.

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

462831.501605

| Description | Mfrs. List No. | Order Code | Price Each 1+ | + | + | + |
|---|---|---|---|---|---|---|
| 100MHz, 2ch. | DSO5012A | **133-5879** | 2,260.00 | – – | – – | – – |
| 100MHz, 4ch. | DSO5014A | **133-5880** | 2,734.00 | – – | – – | – – |
| 300MHz, 2ch. | DSO5032A | **133-5882** | 3,069.00 | – – | – – | – – |
| 300MHz, 4ch. | DSO5034A | **133-5883** | 3,850.00 | – – | – – | – – |
| 500MHz, 2ch. | DSO5052A | **133-5884** | 4,576.00 | – – | – – | – – |
| 500MHz, 4ch. | DSO5054A | **133-5885** | 5,577.00 | – – | – – | – – |
| | | | 1+ | | | |
| Soft Carry Case | N2760A | **163-7338** | 143.00 | | | |
| Rack Mount Kit, 5000/6000 series | N2916B | **163-7339** | 382.00 | | | |
| Transit Case, 5000/6000 series | N2917B | **163-7340** | 565.00 | | | |

| | | | Price Each |
|---|---|---|---|
| **Standard Calibration Charge** | S | C19 | 89.27 |
| **UKAS Calibration Charge** | N | C19 | 141.49 |

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**www.electronicsdesignworld.com**

### 200MHz CombiScope with FFT

**HM2008**

HAMEG Instruments



1636917

New



1636918

- 2 GSa/s Real Time Sampling, 20 GSa/s Random Sampling
- 2 MPts Memory per Channel, Memory Zoom up to 100,000:1
- FFT for spectral analysis
- 2 Channels + 4 Logic Channels with Option HO2010
- Deflection coefficients: 1 mV/cm - 5 V/cm, with adjustable DC offset voltage; Time Base: 50 s/cm - 2ns/cm
- Acquisition modes: Single, Refresh, Average, Envelope, Roll, Peak-Detect
- Front USB-Stick Connector for Screenshots
- USB/RS-232, optional: IEEE-488, Ethernet/USB
- Signal display: Yt, XY and FFT; Interpolation: Sinx/x, Pulse, Dot Join (linear)
- Adjustable input impedance 1 MΩ/50Ω

526878

| Mftrs. List No. | Order code | Price Each 1+ |
|---|---|---|
| HM2008 | **163-6917●** | 1,469.16 |
| HO2010 Option | **163-6918●** | 140.98 |

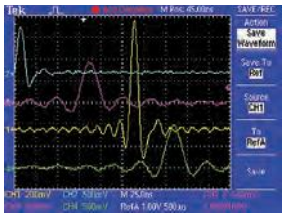
## Digital Storage Oscilloscopes

**TDS1000B and 2000B Series**

Tektronix

LATEST PRICING





W=326 H=158 D=229mm Weight = 2kg

An unbeatable combination of performance and ease-of-use, at a price you can afford. Up to 200 MHz bandwidth and 2 GS/s maximum sample rate. The TDS1000B and TDS2000B Series oscilloscopes provide accurate real-time acquisition up to their full bandwidth, the same record length at all time base settings, advanced triggers to isolate signals of interest, and 11 standard automatic measurements on all models. Their Fast Fourier Transform (FFT) and waveform add, subtract, and multiply math functions allow you to analyze, characterize, and troubleshoot circuits.

The simple user interface with classic analogue-style controls makes these instruments easy to use, reducing learning time and increasing efficiency. With USB host and device ports which enable removable data storage, seamless PC connectivity, and direct printing, no other digital storage oscilloscope offers as much flexibility and ease of data transfer for the price.

Easily capture, save and analyse measurement results with OpenChoice PC Communications Software (freely downloadable from the Tektronix website). Simply pull screen images and waveform data into the stand-alone desktop application or directly into Microsoft Word and Excel.

- 40 MHz, 60 MHz, 100 MHz, and 200 MHz bandwidths
- Sample rates up to 2 GS/s
- 2 or 4 channels
- Colour or monochrome LCD display
- Removable data storage via front panel USB port
- Seamless PC connectivity via USB device port
- Advanced triggers, including pulse width trigger and line-selectable video trigger
- FFT function standard on all models
- 11 Automatic Measurements
- Multi-language user interface and context-sensitive help
- Direct printing to PictBridge® compatible printers via USB device port

| | TDS1001B | 1002B | 1012B | 2002B | 2004B | 2012B | 2014B | 2022B | 2024B |
|---|---|---|---|---|---|---|---|---|---|
| Display | Mono | Mono | Mono | Colour | Colour | Colour | Colour | Colour | Colour |
| Mono Display | 1/4 VGA backlit passive LCD with adjustable contrast and inverse video | | | | | | | | |
| Colour Display | 1/4 VGA passive colour LCD on black background with adjustable contrast | | | | | | | | |
| Bandwidth | 40MHz | 60MHz | 100MHz | 60MHz | 60MHz | 100MHz | 100MHz | 200MHz | 200MHz |
| Channels | 2 | 2 | 2 | 2 | 4 | 2 | 4 | 2 | 4 |
| Sample rate | 500 MS/s | 1 Gs/s | 1 Gs/s | 1 Gs/s | 1 Gs/s | 1 Gs/s | 1 Gs/s | 2 Gs/s | 2 Gs/s |
| Record length | 2.5k points on all models | | | | | | | | |
| Vertical res. | 8-bits | | | | | | | | |
| Vertical sens. | 2 mV to 5 V/div | | | | | | | | |
| DC vert. acc. | ±3% | | | | | | | | |
| Vertical zoom | Vertically expand or compress a live or stopped waveform | | | | | | | | |
| Max input volt. | 300 Vrms CAT II; derated at 20 dB/decade >100kHz to 13 Vp-p AC at ≥3MHz | | | | | | | | |
| Position range | 2mV to 200mV/div ±2V; >200mV to 5V/div ±50V | | | | | | | | |
| BW limit | 20 MHz | | | | | | | | |
| Input coupling | AC, DC, GND | | | | | | | | |
| Input impedance | 1MΩ in parallel with 20pF | | | | | | | | |
| Time base range | 5ns to 50s/div | 5ns to 50s/div | 5ns to 50s/div | 5ns to 50s/div | 5ns to 50s/div | 5ns to 50s/div | 5ns to 50s/div | 2.5ns to 50s/div | 2.5ns to 50s/div |
| Time base acc. | 50 ppm | | | | | | | | |
| Horizontal zoom | Horizontally expand or compress a live or stopped waveform | | | | | | | | |
| Operating temp | 0 to +50°C | | | | | | | | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

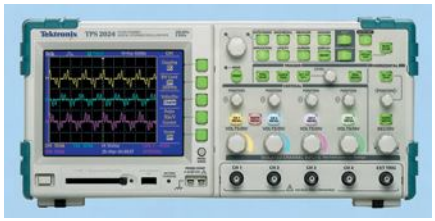
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| Description | Mftrs. List No. | Order Code | Price Each 1+ | + | + |
|---|---|---|---|---|---|
| TDS1001B | 40 MHz, 2 Channel, Mono | **122-5083** | 558.00 | – – | – – |
| TDS1002B | 60 MHz, 2 Channel, Mono | **122-5084** | 682.00 | – – | – – |
| TDS1012B | 100 MHz, 2 Channel, Mono | **122-5085** | 818.00 | – – | – – |
| TDS2002B | 60 MHz, 2 Channel, Colour | **122-5086** | 818.00 | – – | – – |
| TDS2004B | 60 MHz, 4 Channel, Colour | **122-5087** | 1,070.00 | – – | – – |
| TDS2012B | 100 MHz, 2 Channel, Colour | **122-5088** | 998.00 | – – | – – |
| TDS2014B | 100 MHz, 4 Channel, Colour | **122-5089** | 1,290.00 | – – | – – |
| TDS2022B | 200 MHz, 2 Channel, Colour | **122-5090** | 1,200.00 | – – | – – |
| TDS2024B | 200 MHz, 4 Channel, Colour | **122-5092** | 1,490.00 | – – | – – |
| **Accessories** | | | | | |
| RM2000 | Rack mount kit | **393-3520** | 162.00 | – – | – – |
| TEK-USB-488 | GPIB to USB Converter | **129-5623** | 392.00 | – – | – – |
| AC2100 | Soft carry case | **798-4243** | 59.00 | – – | – – |
| HCTEK4321 | Hard Carry Case | **129-5624** | 369.00 | – – | – – |
| RM2000B | Rack Mount Kit | **129-5625** | 194.00 | – – | – – |
| TNGTDS01 | Operator Training Kit | **129-5626** | 217.00 | – – | – – |
| SIGEXPTE | Signal Express Software | **129-5628** | 433.00 | – – | – – |
| | | | | Price Each | |
| **Standard Calibration Charge** | | S C18 | | | 89.27 |
| **UKAS Calibration Charge** | | N C18 | | | 123.00 |

## Digital Storage Oscilloscopes - Portable

**TPS2000 Series**

Tektronix



H=267, W=476, D=229mm Weight = 3.7kg



Analogue style knobs



Hot swappable batteries



Portable and lightweight



Versatile hanger

The TPS2000 series are 4-isolated-channel, full featured, battery powered oscilloscopes. Make floating and differential measurements much more quickly and accurately, and speed verification of power supply performance, complex control circuits and the effects of neutral current for differential voltages, up to 30$V_{RMS}$ floating on 4 channels simultaneously when paired with P2220 passive probe (supplied), or 600$V_{RMS}$ when paired with the optional P5120 high voltage probe.

LATEST PRICING

The series easily addresses high voltages and currents and potentially hazardous floating measurements with the use of the optional power bundle TPS2PBND. These oscilloscopes can be used on the bench, in the lab or in the field, with a very high battery life (8 hours) and beyond it is a highly mobile package.

- 100MHz and 200MHz bandwidths
- Sample rate up to 2GS/s real-time
- 2 or 4 fully isolated and floating channels, plus isolated external trigger
- 8 hours of continuous battery operation with 2 batteries, hot swappable for virtually unlimited freedom from an ac power source
- Optional power application software allows a broad range of power measurements
- Quickly document and analyse measurement results with Openchoice software or integrated CompactFlash memory
- FFT function
- Advanced triggers to capture events of interest
- Analogue style knobs
- Simple to set up, Autoset menu, Autorange waveforms and built in help
- Backlit display, brightness and contrast control

**Supplied with**

**P2220** - 200MHz passive probe, 1x/10x attentuation
**TPSBAT** - Hot swappable battery
**TDSPCS1** - OpenChoice software

**Optional Accessories**

**TPS2PBND** - Power bundle. Includes 4x P5120 passive high voltage probes and TPS2PWR1 power measurement and analysis software
**TPS2PWR1** - Power measurements application package. Instantaneous power waveform analysis, waveform analysis, harmonics analysis, switching loss, phase angles, dv/dt and di/dt cursors
**WSTRO** - WaveStar software; Windows 98/2000/ME/NT/ XP application for waveform capture, analysis, documentation and control from your PC. Provides enhanced oscilloscope data measurement, analysis, remote setup and charting features
**TDSPCS1** - OpenChoice PC connectivity software; A collection of programs that enable fast and easy communication between MS Windows PCs and TPS2000 series oscilloscopes

| Feature | TPS2012 | TPS2014 | TPS2024 |
|---|---|---|---|
| Isolated Channels | 2 | 4 | 4 |
| Bandwidth (MHz) | 100 | 100 | 200 |
| Sample rate (GS/s) | 1 | 1 | 2 |
| Record Length | 2.5 K | | |
| Display | Colour | | |
| Battery operation | Capacity for 2 hot swappable battery packs, 4 hours use per pack | | |
| Automatic measurements | 11 | | |
| Vertical resolution | 8-bits (normal or with averaging) | | |
| Vertical sensitivity | 2mV to 5V/div on all models with calibrated fine adjustment | | |
| DC vertical accuracy | ±3% | | |
| Vertical zoom | Vertically expand or compress a live or stopped waveform | | |
| Max input voltage (1MΩ) | 300$V_{RMS}$ CAT II at BNC signal to BNC shell, 1000$V_{RMS}$ CAT II at probe tip to earth ground with optional P5120 passive high voltage probe | | |
| Float Voltage | 600$V_{RMS}$ CAT II or 300$V_{RMS}$ CAT III BNC shell to earth ground 1200$V_{RMS}$ CAT II between 2ch commons (of not > ±600$V_{RMS}$ from ground) | | |
| Position range | 2mV to 200 mV/div ±2V; >200mV to 5V/div ±50V | | |
| Bandwidth limit | 20 MHz | | |
| Linear dynamic range | ±5 div | | |
| Time base range | 5 nS to 50s/div | 5nS to 50s/div | 2.5nS to 50s/div |
| Time base accuracy | 50 ppm | | |
| Imput impedance | 1MΩ ±2% in parallel with 20 pF | | |
| Input coupling | AC, DC, GND | | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

**Quantity break discounts available, please contact your local Farnell InOne office**

## Oscilloscopes - continued

### Digital Storage Oscilloscopes - Portable - continued

**TPS2000 Series - continued**

385999

| Description | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| **Oscilloscopes** | | | |
| 100MHz 2ch | TPS2012 | **798-4146** | 1,790.00 |
| 100MHz 4ch | TPS2014 | **798-4154** | 1,980.00 |
| 200MHz 2ch | TPS2024 | **798-4162** | 2,160.00 |
| **Accessories** | | | |
| Accessory bundle | TPS2PBND | **798-4170** | 1,050.00 |
| Power package | TPS2PWR1 | **798-4189** | 316.00 |
| Additional Li-Ion battery | TPSBAT | **798-4197** | 149.00 |
| Fast battery charger | TPSCHG | **798-4200** | 259.00 |
| WaveStar software | WSTRO | **184-573** | 242.00 |
| Versatile hanger | 343-1689-00 | **798-4235** | 5.00 |
| Carry case, soft | AC2100 | **798-4243** | 59.00 |
| **Probes** | | | |
| High voltage, 1000V | P5120 | **798-4227** | 260.00 |
| High voltage diff 1300V,25MHz | P5200 | **872-477** | 484.00 |
| High voltage diff 5600V,50MHz | P5100 | **207-470** | 242.00 |
| AC current 1000A, 50kHz | A621 (A2:L0) | **798-6866** | 326.00 |
| AC/DC current, 100A, 100kHz | A622 (A2:L0) | **798-6874** | 326.00 |
| AC current, 15A, 60MHz | P6021 A2 L0 | **802-0515** | 806.00 |
| AC current, 6A, 120MHz | P6022 (A2:L0) | **798-6882** | 874.00 |
| AC/DC current, 15A, 50MHz | TCP202 | **207-482** | 1,130.00 |
| AC/DC current, 15A, 15MHz | TCP303 | **436-0266** | 1,430.00 |
| AC/DC current, 50A, 50MHz | TCP305 | **436-0254** | 744.00 |
| AC/DC current 30A, 100MHz | TCP312 | **436-0242** | 880.00 |
| AC/DC current 500A, 2MHz | TCP404XL | **436-0280** | 1,940.00 |
| DC to 100MHz current measure system | TCPA300 | **436-0230** | 1,200.00 |
| DC to 500MHz current measure system | TCPA400 | **436-0278** | 1,200.00 |
| BNC probe power supply , 2 channel | 1103 A2 | **332-0194** | 1,150.00 |
| | | | **Price Each** |
| **Standard Calibration Charge** | | **S** C18 | 89.27 |
| **UKAS Calibration Charge** | | **N** C18 | 123.00 |

### Oscilloscope

**DPO / MSO**

Tektronix



DPO2012



DPO2024



MSO2012



MSO2024

**Features & Benefits**

- Key Performance Specifications
- 100 MHz and 200 MHz bandwidth models
- 2 or 4 analog channels
- 16 digital channels (MSO2000 Series)
- Sample rates up to 1 GS/s on all channels
- 1 Mega sample record length on all channels
- 5,000 wfm/s maximum waveform capture rate
- Suite of advanced triggers

New

The MSO2000 and DPO2000 Series digital phosphor oscilloscopes (DPOs) deliver the performance and tools you need to visualize your signals and find answers quickly. The DPO2000 Series are the first oscilloscopes to provide 1 M points of usable record length on all channels, serial trigger and decode analysis options, a variable low-pass filter that also allows you to see signal details to the oscilloscope's full bandwidth and all in a compact form factor. The MSO2000 Series adds 16 integrated digital channels, enabling you to visualize and time correlate analog and digital signals on a single instrument. This integration extends triggering functionality across all 20 channels - which is ideal for debugging mixed analog and digital designs.

| | MSO2012 DPO2012 | MSO2014 DPO2014 | MSO2014 DPO2024 |
|---|---|---|---|
| **Vertical System Analog Channels** | | | |
| Input Channels | 2 | 4 | 4 |
| Analog Bandwidth*1 (-3 dB) | 100 MHz | 100 MHz | 200 MHz |
| Calculated Rise Time | 3.5 ns | 3.5 ns | 2.1 ns |
| Hardware Bandwidth Limits | | 20 MHz | |
| Input Coupling | | AC, DC, GND | |
| Input Impedance | | 1 MΩ ±2%, 11.5 pF ±2 pF | |
| Input Sensitivity Range | | 2 mV/div to 5 V/div | |
| Vertical Resolution | | 8 bits | |
| **Horizontal System - Analog Channels** | | | |
| Maximum Sample Rate (all channels) | | 1 GS/s | |
| Minimum Peak Detect Pulse Width | | 7.0 ns | 3.5 ns |
| Maximum Record Length (all channels) | | 1 M points | |
| Timebase Range | | 4 ns to 100 s | 2 ns to 100 s |
| Timebase Delay Time Range | | -10 div to 5000 s | |
| Channel-to-Channel Deskew Range | | ±100 ns | |
| Timebase Accuracy | | ±25 ppm | |

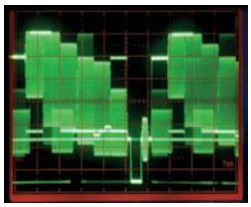
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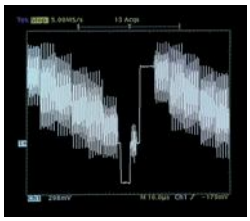
| Mftrs. List No. | Description | Order Code | Price Each 1+ |
|---|---|---|---|
| DPO2012 | Oscilloscope, DPO 2CH 100MHz | **165-0367** | 1,600.00 |
| DPO2014 | Oscilloscope, DPO 4CH 100MHz | **165-0368** | 1,920.00 |
| DPO2024 | Oscilloscope, DPO 4CH 200MHz | **165-0369** | 2,310.00 |
| MSO2012 | Oscilloscope, MSO 2CH 100MHz | **165-0370** | 2,220.00 |
| MSO2014 | Oscilloscope, MSO 4CH 100MHz | **165-0371** | 2,670.00 |
| MSO2024 | Oscilloscope, MSO 4CH 200MHz | **165-0372** | 3,190.00 |
| **Accessories** | | | 1+ |
| DPO2AUTO | Module, Automotive Serial Trigger | **166-5104** | 431.00 |
| DPO2COMP | Module, Computer Serial Trigger | **166-5105** | 431.00 |
| DPO2CONN | Module, Ethernet & External Monitor | **166-5106** | 245.00 |
| DPO2EMBD | Module, Embedded Serial Trigger | **166-5107** | 431.00 |
| P2221 | Passive Probe, 1X/10X 200MHz | **166-5109** | 64.00 |
| RMD2000 | Rackmount Kit | **166-5111** | 257.00 |
| ACD2000 | Sort Large Case | **166-5112** | 118.00 |

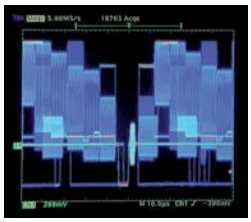
### DPO Technology™

**Tektronix TDS3000 Series**

Tektronix







A new oscilloscope breakthrough from Tektronix, the Digital Phosphor Oscilloscope (DPO) combines the best of analogue and digital oscilloscopes. With one instrument it is now possible to capture all of the salient information about a waveform in three dimensions in real time: amplitude, time and the distribution of amplitude over time. DPO technology offers all the traditional benefits of the Digital Storage Oscilloscope (DSO) from data storage to sophisticated triggering combined with the strengths of the Analogue Real Time scope (ART) in such ways as its intensity-graded display and real time behaviour, this is done by emulating the chemical phosphorescence process of an analogue scope.

Its unique parallel processing architecture means that the DPO refreshes it's display database upto 5,000 times a second. It takes those fast waveform captures and overlays them into a dynamic three-dimensional database, and adds intensity grading to tell you relatively how often the signal events are happening.

The new TDS3000 family is equipped to meet the broad based needs of today's engineers, setting new standards for flexibility and ease of use. The TDS3000 has the ability to display store and analyse complex signals in real time combined with high speed acquisition and advanced triggering and analysis capabilities. The DPO is specifically designed to easily negotiate the challenges created by fast waveforms and complex signals.

Random and infrequent events can be captured making the DPO an ideal tool for debugging advanced electronic circuits and designs. The grey scaling capability emphasises just how frequent any transients are, relative to the other signal components displayed on screen, design engineers and technicians need no longer to worry about missing infrequent signal events. For the first time complex signal behaviour, such as video signals or high speed anomalies on digital waveforms are accurately shown.

As seen from the three oscilloscope screen shots the analogue oscilloscope (fig 1) provide good representation of a complex waveform but the information is purely visual with no transient capture capability. The digital oscilloscope (fig 2) can capture and store the waveform but the limited waveform capture rate and two dimensional display provide insufficient data for interpretation. The Digital Phosphor Oscilloscope (fig 3) combines the real time response of the analogue oscilloscope with the waveform storage of the digital oscilloscope providing the user with unprecedented information and performance.

The new Tektronix Digital Phosphor Oscilloscopes surpass the strengths of analogue and digital oscilloscopes. It's integrated acquisition and display architecture provides previously unseen insights into signal behaviour.

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### TDS3000C Series Digital Phosphor Oscilloscopes

**With USB Storage Capabilities**

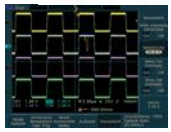
Tektronix

LATEST PRICING

3 YEAR GUARANTEE







- 100, 300, and 500MHz bandwidths
- Sample rates up to 5 GS/s
- 2 or 4 channels
- Full VGA colour LCD
- 25 automatic measurements
- 9-bit vertical resolution
- Multi-language User Interface
- QuickMenu Graphical User Interface for Easy Operation
- Built-in Ethernet Port
- e*Scope™ Web-based Remote Control
- WaveAlert™ Automatic Waveform Anomaly Detection
- Timebase accuracy 20ppm
- FFT and extended triggering functions
- Logic pattern, State, edge delay, runt pulse and slew rate advanced triggering functions

The TDS3000C Series oscilloscope offers digital phosphor waveform acquisition technology, automatic anomaly detection, web-based remote control and 7 application-specific modules into a lightweight, battery-capable design.The new 3000C Series comes equipped with a USB host port so you can easily store and transfer measurement information to your PC.

The Series offers a host of features aimed at users doing the hands-on work of electronic design, production, and maintenance, including WaveAlert™ Waveform Anomaly Detection, which automatically detects anomalous waveforms. WaveAlert makes it easy to detect, display and capture events that fall outside the normal repetitive patterns of waveform activity and can also be programmed to beep, then stop acquisition and freeze the anomaly on the screen, save the anomalous wave to a USB memory stick, or print a hardcopy of it.

The e*Scope™ web-based remote control capability enables remote instrument control via Internet browser, as well as information sharing and monitoring. The e*Scope web-based remote control feature facilitates contact with service technicians at customer sites, remote control by distributed engineering teams. A built-in Ethernet connection is also provided.

**Accessories**

**TDSPCS1 OpenChoice Software**
Software for providing a simple and powerful interface between the oscilloscope and PC, allows the user to import and manipulate data captured though the scope.

**TDS3GV Communications Module + OpenChoice**
Offers GPIB, VGA and RS-232 interfaces and supplied with OpenChoice software

**P6243 1GHz Active Probe**
1.3m 1 GHz Active probe for use with TDS3064, to enhance the features of the oscilloscope

| Order Code | 1554155 | 1554156 | 1554157 | 1554158 | 1554159 | 1554160 |
|---|---|---|---|---|---|---|
| Mftrs. List No. | TDS3012C | TDS3054C | TDS3032C | TDS3034C | TDS3052C | TDS3054C |
| Bandwidth | 100MHz | 500MHz | 300MHz | 300MHz | 500MHz | 500MHz |
| Channels | 2 | 4 | 2 | 4 | 2 | 4 |
| Sample rate per chan. | 1.25GS/s | 5GS/s | 2.5GS/s | 2.5GS/s | 5GS/s | 5GS/s |
| Time base | 4ns-20s | 1ns-20s | 2ns-10s | 2ns-20s | 1ns-20s | 1ns-20s |
| Time base accuracy | 20ppm | 20ppm | 20ppm | 20ppm | 20ppm | 20ppm |
| BW limit | 20MHz | 20MHz | 20, 150MHz | 20, 150MHz | 20, 150MHz | 20, 150MHz |

| | |
|---|---|
| Maximum Record Length | 10K points on all models |
| Vertical resolution | 9-bits on all models |
| Vertical Sensitivity/div | 1mV-10V on all models |
| Vertical accuracy | +/-2% on all models *1 |
| Max. Input Voltage(1MR) | 150 Vrms CAT I on all models (300 V CAT II with standard 10X probe) |
| Position range | ± 5 div on all models |
| Input coupling | AC, DC, GND on all models |
| Input Impedance select. | 1 MΩ in parallel with 13 pF or 50Ω |
| Display monitor | Colour LCD |

**For full specification please contact our data department**
Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

**Quantity break discounts available, please contact us**

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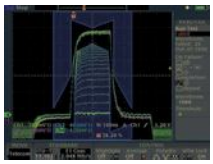
| Description | Calibration | Mftrs. List No. | Order Code | Price Each 1+ | Price Each + |
|---|---|---|---|---|---|
| **Oscilloscopes** | | | | | |
| 100MHz, 2Ch | SC18 / NC18 | TDS3012C | **155-4155** | 2,640.00 | – – |
| 100MHz, 4Ch | SC18 / NC18 | TDS3014C | **155-4156** | 3,130.00 | – – |
| 300MHz, 2Ch | SC18 / NC18 | TDS3032C | **155-4157** | 3,780.00 | – – |
| 300MHz, 4Ch | SC20 / NC20 | TDS3034C | **155-4158** | 4,560.00 | – – |
| 500MHz, 2Ch | SC20 / NC20 | TDS3052C | **155-4159** | 5,460.00 | – – |
| 500MHz, 4Ch | SC20 / NC20 | TDS3054C | **155-4160** | 6,510.00 | – – |
| **Accessories** | | | | | |
| Comms+Openchoice | | TDS3GV | **369-3880** | 295.00 | – – |
| 1GHz Active Probe | | P6243 | **207-433** | 525.00 | – – |
| | | | | | **Price Each** |
| **Standard Calibration Charge** | | | | S C20 | 108.78 |
| **UKAS Calibration Charge** | | | | N C18 | 123.00 |
| **UKAS Calibration Charge** | | | | N C20 | 128.40 |

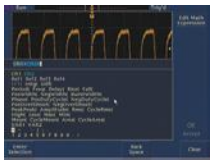
## TDS3000 Accessories

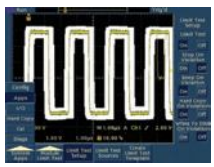












Application modules and a range of accessories are available that simply plug into the TDS3000 oscilloscope to customise the instrument to user needs.

**TDS3VID** is especially useful for professionals servicing or maintaining video systems who need to extend the basic PAL, NTSC and SECAM triggering to include triggering on individual lines and fields and custom scan rates. Video autoset automatically adjusts the settings to display a video waveform. IRE or mV format graticules are available to simplify the measurement and analysis of video waveforms.
New features: Video Picture, Vectorscope, HDTV Triggering. These three capabilities, originally available in the TDS3SDI module, have been added to the TDS3VID module.

**Video Picture Mode** The Video Picture feature enabled by the TDS3SDI or TDS3VID module lets you quickly check out a monochrome image of the originating camera or other source. Then use the on-screen line select to move quickly to any line in the picture.

**Built-in Vectorscope Capabilities** Enabled by the TDS3SDI or TDS3VID module, a TDS3000B Series oscilloscope can function as a vectorscope with built in graticules for 100% and 75% colour bars. It's easy to measure chroma levels. The TDS3000's digital phosphor display makes it easy to see your white balance problem so you can adjust the camera to solve it.

**Analogue HDTV Triggering** The TDS3SDI and TDS3VID also let you work with emerging analog HDTV standards. Trigger on a range of HDTV formats - 1080i, 1080p, 720p, and 480p. Use the vectorscope on analogue HDTV with graticules for both 100% and 75% colour bars.

**TDS3AAM** Advanced Analysis Module
The TDS3AAM module adds advanced analysis capability to your TDS3000B. With it you can define waveforms as arbitrary math expressions - including a variety of mathematical functions plus constants and measurements. The TDS3AAM also adds Area and Cycle Area measurements, differentiation and integration functions, measurement averaging, and measurement statistics. Enhanced XY cursor capabilities and the FFT capabilities of the TDS3FFT module are also included.

Math Capabilities:
- Grayscale Display of math waveforms
- User-created Waveform expressions
- Arbitrary math, Math on Math, Scalar math using constants or measurements
- Differentiation, Integration

Measurement Additions:
- Area and cycle area
- Measurement averaging, statistics
- Includes TDS3FFT functionality

**TDS3GM** provides GPIB(IEEE-488.2) and RS-232-c for programmability: full talk/listen capability.

**TDS3GV**- Triple communications module with OpenChoice™ software.
Provides GPIB(IEEE-482.2) and RS-232-C for programmability: full talk/listen capability. Plus VGA output for direct display on VGA equipped monitors. The OpenChoice™ software allows the capture of data, waveforms and screen images and is compatible with standard Excel and Word packages.

**TDS3LIM** Limit Test Module
The TDS3LIM module offers fast, simple verification that your circuit is operating within its intended parameters. You can easily create waveform reference templates to compare to your live waveforms. Compare any number of input channels with any combination of four references. And you can set actions for the TDS3000B to take if a waveform strays outside the reference limits: stop acquisition, sound a beep, print a hardcopy, or save the waveform to disk. The TDS3LIM is excellent for manufacturing test and other repetitive testing applications where quick Go/No-Go decisions are required.

**TDS3PRT** Plug-In Thermal Printer
The TDS3PRT plug-in printer adds easy, portable documentation capability to your TDS3000B oscilloscope. Just plug it into the back of your oscilloscope and press Hardcopy to get a print of your screen. The printer works where your TDS3000B works - even when operating on battery power. And the new printer is compatible with existing TDS3000 instruments1*.
1*Requires firmware update available at: http://www.tektronix.com / Software & Drivers/ Oscilloscopes/TDS oscilloscopes/TDS3000 series latest firmware upgrade. Battery operation of printer is not available with TDS3000 (non-B) models.

**WaveStar** for Oscilloscopes (WSTRO) PC software. Windows™ based application software allowing engineers to connect, capture and incorporate important waveform information into field reports or archive files(requires W95/NT).

Additional **Printer Paper** (rolls of 5)
**TDS3CHG** fast charger for battery pack
**AC3000** soft carry case for TDS3000
**RM3000** rackmount kit for TDS3000
**ADA400A** 100x, 10x, 1x, 0.1x high gain differential preamplifier probe
**P6243** 1GHz 1pF input C 10x active probe
**P5205** 1.3kV, 50MHz high voltage differential probe
**P5210** 5.6kV, 50MHz high voltage differential probe
**P5100** 2.5kV, 100x high voltage passive probe
**TCP202** 15A DC+peak AC 50MHz AC/DC current probe
**TDS3BATC** Battery Pack, 3000 Series

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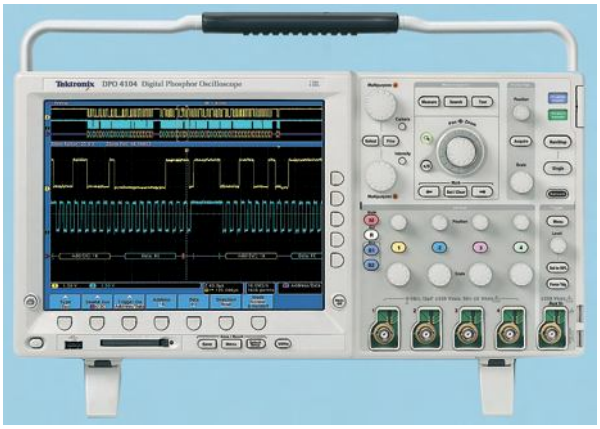
| Mftrs. List No. | Order Code | Price Each 1+ | Price Each + |
|---|---|---|---|
| TDS3VID | **207-172** | 341.00 | – – |
| TDS3AAM. | **369-3867** | 341.00 | – – |
| TDS3GV | **369-3880** | 295.00 | – – |
| TDS3LIM | **369-3879** | 341.00 | – – |
| TDS3PRT | **369-3892** | 421.00 | – – |
| WSTRO | **184-573** | 242.00 | – – |
| TDSCHG A2 | **207-263** | 87.00 | – – |
| AC3000 E1 | **207-330** | 118.00 | – – |
| RM3000 | **207-342** | 226.00 | – – |
| ADA400A | **207-421** | 936.00 | – – |
| P6243 | **207-433** | 525.00 | – – |
| P5205 | **207-457** | 713.00 | – – |
| P5210 | **207-469** | 1,430.00 | – – |
| P5100 | **207-470** | 242.00 | – – |
| TCP202 | **207-482** | 1,130.00 | – – |
| P6139A | **312-3730** | 233.00 | – – |
| P3010 | **312-3704** | 94.00 | – – |
| TDS3BATC | NEW **166-5113** | 322.00 | – – |

# Oscilloscopes - continued

## Digital Phosphor Oscilloscopes

Tektronix

### DPO4000 Series



W=439 H=229 D=137mm Weight = 5kg

CALIBRATION SERVICES

LATEST PRICING



- 1 GHz, 500, 350 MHz Bandwidth Models
- 2 and 4 Channel Models
- Sample Rates Up to 5 GS/s on All Channels
- 10 Megasample Record Length on All Channels
- 3,700 wfms/s Maximum Waveform Capture Rate
- $I^2C$, SPI, CAN Serial Triggering and Analysis Options
- 10.4" (264 mm) XGA Color Display
- Small Footprint and Lightweight - only 137mm deep and 5 kg
- USB and CompactFlash on Front Panel for Quick and Easy Storage
- Built-in Ethernet Port
- Plug 'n' Play Connectivity and Analysis Software Solutions
- USB 2.0 Device Port for Direct PC Control of Oscilloscope using USBTMC
- Suite of Advanced Triggers
- e*Scope Remote Viewing and Control
- Interoperability with Tektronix Logic Analyzers
- TekVPI Probe Interface Supports Active, Differential and Current Probes for Automatic Scaling and Units

The DPO4000 Series, with innovative Wave Inspector® controls, delivers the performance you need to visualize even your most demanding signals. Debug faster and easier than ever before with Wave Inspector's unique ability to zoom, pan, play, pause and set marks - helping you to efficiently navigate through long serial data records. This makes it an ideal choice when working with today's most common serial buses, such as CAN, SPI and $I^2C$.

**All models include:** One P6139A 500 MHz, 10x Passive Probe per Channel, Front Cover, CompactFlash Memory Card; ≥32 MB, User Manual, Documentation CD, OpenChoice Desktop Software, National Instruments SignalExpress Tektronix Edition Software, Calibration Certificate Documenting Traceability to National Metrology Institute(s) and ISO9001 Quality System Registration, Power Lead, Accessory Bag, Three Year Warranty.

| | DPO4032 | DPO4034 | DPO4054 | DPO4104 |
|---|---|---|---|---|
| Display | 10.4" XGA (1024x768) LCD TFT colour display | | | |
| Bandwidth | 350 MHz | 350 MHz | 500 MHz | 1 GHz |
| Channels | 2 | 4 | 4 | 4 |
| Sample rate | 2.5GS/s | 2.5GS/s | 2.5GS/s | 5GS/s |
| Rise Time | 1 ns | 1 ns | 700 ps | 350 ps |
| Record length | 10M points on all models | | | |
| **Vertical System** | | | | |
| Bandwidth Limits | 20MHz, 250MHz | | | |
| Input coupling | AC, DC, GND | | | |
| Input impedance | 1MΩ ±1%, 50Ω ±1% | | | |
| Vertical sensitivity | 1mV to 10V/div | | | |
| Vertical res. | 8-bits | | | |
| Max input volt. | 250 Vrms (with peaks ≤400V | | | |
| DC Gain Accuracy | ±1.5% | | | |
| **Horizontal System** | | | | |
| Time base range | 1ns to 1000s | | | 400ps to 1000s |
| Time base accuracy | ±5ppm over any ≥1ms interval | | | |
| **Trigger System** | | | | |
| Main Trigger Modes | Auto, Normal and Single | | | |
| Trigger Coupling | DC, HF reject, LF reject, noise reject | | | |
| Acquisition Modes | Sample, Pk detect, Averaging, Envelope, Hi-res, Roll | | | |
| Trigger Modes | Edge, Pulse width, Runt, Logic, Setup & hold, Rise/Fall time, Video | | | |
| **Measurements & Maths** | | | | |
| Waveform Measurements | Cursors, 25 automatic measurements, Statistics, Reference levels, Gating | | | |
| Waverform Maths | Arithmetic, Integrate, Differentiate, FFT, Advanced Maths | | | |
| Acquisition Modes | Sample, Pk detect, Averaging, Envelope, Hi-res, Roll | | | |
| **Input / Output Ports** | | | | |
| CompactFlash drive, 3x USB host port, USB device port, RJ45 LAN connection, XGA video output | | | | |
| BNC Auxilliary input, Probe compensator output, Trigger Out, Kensington lock point | | | | |
| Acquisition Modes | Sample, Pk detect, Averaging, Envelope, Hi-res, Roll | | | |

**DPO4AUTO** - Automotive Serial Triggering and Analysis Module. Enables triggering on packet level information on CAN bus as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with timestamp information.
**DPO4EMBD** - Embedded Serial Triggering and Analysis Module. Enables triggering on packet level information on I2C and SPI buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with timestamp information. SPI is available on four channel models only.

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| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| **Oscilloscopes** | | | | | |
| DPO4032 | 350MHz, 2 Channel | **129-9085** | 5,269.84 | – – | – – |
| DPO4034 | 350 MHz, 4 Channel | **129-9087** | 6,010.00 | – – | – – |
| DPO4054 | 500 MHz, 4 Channel | **129-9088** | 7,380.00 | – – | – – |
| DPO4104 | 1GHz, 4 Channel | **129-9089** | 9,050.00 | – – | – – |
| **Accessories** | | | | | |
| DPO4AUTO | Automotive Module | **129-9090** | 806.00 | – – | – – |
| DPO4EMBD | Embedded Module | **129-9091** | 806.00 | – – | – – |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C18 | 89.27 | |
| **UKAS Calibration Charge** | | | N C18 | 123.00 | |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

## Tektronix Probes

Tektronix









Only genuine Tektronix probes measure up to your Tektronix oscilloscope with designed-in compatibility and identical standards for quality and performance you can always depend on. Choosing the right kind of probe is equally important; passive and active voltage probes, current probes, differential probes and high voltage probes. All are well built, reliable and offer a long life.

Precision Measurements start right at the probe tip. The right probes matched to the oscilloscope and the device-under-test (DUT) allow the signal to be brought to the oscilloscope cleanly for the greatest signal fidelity and measurement accuracy.

To measure typical signal and voltage levels, passive probes provide ease-of-use and a wide range of measurement capabilities at an affordable price. The pairing of a passive voltage probe with a current probe will provide you with an ideal solution to measure power.

However, general-purpose passive probes cannot accurately measure signals with the fastest rise times, and may excessively load sensitive circuits. To measure signals with fast rise times, a high-speed active or differential probe will provide more accurate results. The P5120 has isolated channel performance for the measurement from earth ground and full isolation between the channels. The P2220 probe also provides floating measurement capability up to 30Vrms with TPS2000 series only.

Tektronix is the leader in probing technologies. Offering world's most advanced high-bandwidth differential and active probes - up to 5 GHz differential and 6 GHz active - to access dense, high-speed circuitry with the highest signal fidelity currently achievable, all matched perfectly to Tektronix oscilloscopes.

**Passive Probes**

| Mftrs. List No. | Cable Length | Atten. | Bandwidth 3dB | Input Res. | Input Cap. | Max Voltage | Compensation Range | Read Out | Tip/head Style |
|---|---|---|---|---|---|---|---|---|---|
| P3010 | 2m | 10 | 100MHz | 10MΩ | 13pF | 420 $V_{RMS}$ | 15 to 35pF | ✓ | 5 mm (Min.) |
| P6109B | 2m | 10 | 100MHz | 10MΩ | 13pF | 420 V | 15 to 35pF | ✓ | 5 mm (Min.) |
| P6112 | 2m | 10 | 100MHz | 10MΩ | 13.3pF | 300 $V_{RMS}$ 420 $V_{RMS}$ | 15 to 35pF | × | 5 mm (Min.) |
| P6114B | 2m | 10 | 400MHz | 10MΩ | 14.1pF | 300 $V_{RMS}$ 420 $V_{RMS}$ | 15 to 35pF | ✓ | 5 mm (Min.) |
| P6117 | 2m | 10 | 200MHz | 10MΩ | 13.3pF | 300 $V_{RMS}$ 420 $V_{RMS}$ | 15 to 35pF | × | 5 mm (Min.) |
| P6131 | 1.3m | 10 | 300MHz | 10MΩ | 10.8pF | 300 $V_{RMS}$ 150 $V_{RMS}$ | 14 to 18pF | ✓ | 2.5 mm (Sub.) |
| P6139A | 1.3m | 10 | 500MHz | 10MΩ | 8pF | 300 $V_{RMS}$ | 8 to 12pF | ✓ | 3.5 mm (Comp.) |
| P2220 | 1.5m | 1/10 | 6/200MHz | 1/10MΩ | 110/17pF | 300 $V_{RMS}$ | 15 to 25pF | ✓ | 5 mm (Min.) |
| **High Voltage Passive Probes** | | | | | | | | | |
| P5120 | 3m | 20 | 200MHz | 5MΩ | 11.2pF | 1000 $V_{RMS}$ | 15 to 25pF | × | Various supplied |
| P5100 | 3.1m | 100 | 250MHz | 10MΩ | 2.75pF | 1000 V/2500V | 7 to 30pF | ✓ | SMD |

**Low Capacitance 50 Ω Probes**

| Mftrs. List No. | Cable Length | Atten. | Bandwidth 3dB | Input Res. | Input Cap. | Max Voltage | Instrument Input | Read Out | Tip/head OutStyle |
|---|---|---|---|---|---|---|---|---|---|
| P6158 | 1.2m | 20 | 3GHz | 1kΩ | 1.5pF | 22 $V_{RMS}$ | 50Ω | ✓ | 3.5 mm (Comp.) |

**Active Probes**

| Mftrs. List No. | Cable Length | Atten. | Bandwidth 3dB | Input Res. | Input Cap. | Max Voltage | Linear Range | DC offset Range | Tip/head OutStyle |
|---|---|---|---|---|---|---|---|---|---|
| P6243 | 1.3m | 10 | 1GHz | 1MΩ | ≤1pF | ±15V | ±8V | N/A | SMD Active |

**Differential Probes**

| Mftrs. List No. | Cable Length | Atten. | Bandwidth 3dB | Input Res. | Input Cap. | Diff input Voltage | Common mode voltage | Typical CMRR | Interface style |
|---|---|---|---|---|---|---|---|---|---|
| ADA400A | | 100 | 1MHz | 1MΩ | 55pF | ±10V RMS | 0.01V | >80dB | TekProbe |
| | | 10 | | | | ±10V RMS | 1V | | |
| | | 1 | | | | ±40V RMS | 10V | | |
| | | 0.1 | | | | ±40V RMS | 80V | | |
| P5200 | 1.8m | 50 / 500 | 25MHz | 4MΩ | 7pF | 1300$V_{RMS}$ | 1000$V_{RMS}$ | >50dB | TekProbe |
| P5205 | 1.8m | 50 / 500 | 100MHz | 4MΩ | 7pF | 1300$V_{RMS}$ | 1000$V_{RMS}$ | >50dB | TekProbe |
| P5210 | 1.8m | 100 / 1000 | 50MHz | 8MΩ | 7pF | 4400$V_{RMS}$ | 2200$V_{RMS}$ | >50dB | TekProbe |
| P6246 | 1.2m | 1 / 10 | 400MHz | 200kΩ | <1pF | ±850mV/8.5V | ±7V | >80dB | TekProbe |

**Current Probes**

| Mftrs. List No. | Cable length | Bandwidth | Peak pulse | Max ACp-p | Max DC | Rise time | Insertion impedance | Max barewire voltage |
|---|---|---|---|---|---|---|---|---|
| TCP312 | 1.5m | 100MHz | 50A | 60A | 5-1A/V 30-10A/V | ≤3.5ns | 0.08Ω | Insulated only |
| TCP305 | 1.5m | 50MHz | 50A | 100A | 25-5A/V 50-10A/V | ≤7ns | 0.035Ω | Insulated only |
| TCP303 | 2m | 15MHz | 150A | 424A | 25-5A/V 150-50A/V | ≤23ns | 0.01Ω | 600V, 300V |
| TCP404XL | 8m | 2MHz | 750A | 1414A | 750*[6]-1A/mV 500-1A/mV | ≤175ns | 0.1mΩ | 300V |
| TCP202 | 2.2m | 50Mhz | 50A | 40A | 15A | ≤7ns | 0.07Ω | 3kV |
| P6021 | 1.5m | 60MHz | 250A | 15A | 0.5A | ≤5.8ns | 0.03Ω | 600V |
| P6022 | 2.75m | 120MHz | 100A | 6A | 0.2A | ≤2.2ns | 0.03Ω | 600V |
| CT1 | 1.07m | 1000MHz | 12A | 1.4A | 0.3A | ≤0.35ns | 1Ω | 175$V_{RMS}$ |
| A621 | | 50kHz | | 2000A | | | | 600V |
| A622 | | 100kHz | | 100A | | | | 600V |

249567.460888

| Mftrs. List No. | Bandwidth | Order Code | Price Each 1+ |
|---|---|---|---|
| **Passive Scope Probes** | | | |
| P3010 | 100MHz | **312-3704** | 94.00 |
| P6109B | 100MHz | **390-8549** | 100.00 |
| P6112 | 100MHz | **312-3716** | 97.00 |
| P6114B | 400MHz | **320-4170** | 239.00 |
| P6117 | 200MHz | **312-3728** | 117.00 |
| P6131 | 300MHz | **390-8550** | 226.00 |
| P6139A | 500MHz | **312-3730** | 233.00 |
| P2220 | 200MHz | **798-4219** | 64.00 |
| **High Voltage Probes** | | | |
| P5120 | 200MHz | **798-4227** | 260.00 |
| P5100 | 250MHz | **207-470** | 242.00 |
| **Low Capacitance 50Ω Probes** | | | |
| P6158 | 3GHz | **390-8574** | 285.00 |
| **Active Scope Probes** | | | |
| P6243 | 1GHz | **207-433** | 525.00 |
| **Differential Probes** | | | |
| ADA400A | 1MHz | **207-421** | 936.00 |
| P5200 | 25MHz | **872-477** | 484.00 |
| P5205 | 100MHz | **207-457** | 713.00 |
| P5210 | 50MHz | **207-469** | 1,430.00 |
| P6246 E1 | 400MHz | **207-445** | 1,710.00 |
| **Current Probes** | | | |
| TCP312 | 100MHz | **436-0242** | 880.00 |
| TCP305 | 50MHz | **436-0254** | 744.00 |
| TCP303 | 15MHz | **436-0266** | 1,430.00 |
| TCP404XL | 2MHz | **436-0280** | 1,940.00 |
| TCP202 | 50MHz | **207-482** | 1,130.00 |
| P6021 | 60MHz | **802-0515** | 806.00 |
| P6022 | 120MHz | **798-6882** | 874.00 |
| CT1 | 1GHz | **390-8501** | 341.00 |
| A621 | 50kHz | **798-6866** | 326.00 |
| A622 | 100kHz | **798-6874** | 326.00 |
| **Accessories** | | | |
| TCPA300 | Current measuring system (requires TCP305) | **436-0230** | 1,200.00 |
| TCPA400 | Current measuring system (requires TCP404XL) | **436-0278** | 1,200.00 |
| 1103 A2 | Probe power supply 240V, 50Hz | **332-0194** | 1,150.00 |

## Digital Oscilloscope

**LeCroy WaveAce**

LeCroy

New



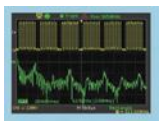


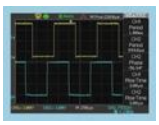
**Key Features:**

- Simple to use with auto set-up
- Easyscope remote control software included
- Unique waveform sequence recorder
- Pass/Fail testing
- 5.7" colour display with zoom on all models
- 60 MHz, 100 MHz, 200 MHz and 300 MHz B/W
- Sample rates up to 2 GS/s
- Long Waveform Memory - 4 kpts/Ch and 8 kpts/Ch configurations
- Advanced Triggering - Edge, Width, Video, Rise Time
- 32 automatic measurements
- Multi-language User Interface and Context Sensitive Help
- Large internal waveform and setup storage
- 4 math functions plus FFT
- USB host and device connections for printers, memory sticks and PC remote control









| Long Memory | Mask Test | | Math | | Parameter | |
|---|---|---|---|---|---|---|
| **Model No.** | **102** | **112** | **202** | **212** | **222** | **232** |
| Order Code | 163-3307 | 163-3308 | 163-3309 | 163-3310 | 163-3311 | 163-3312 |
| Input Channels | 2 | | | | | |
| Bandwidth | 60 MHz | 100 MHz | 60 MHz | 100 MHz | 200 MHz | 300 MHz |
| Rise Time | 5.8 ns | 3.5 ns | 5.8 ns | 3.5 ns | 1.75 ns | 1.2 ns |
| Input Coupling | 1 MΩ " 13 pF | | | | 1 MΩ " 13 pF, 50 Ω | |
| Display | 5.7" Color, 320 x 240 resolution | | | | | |
| Sample rate (Equivalent Time) | 50 GS/s | | | | | |
| Peak Detect Period | 10 ns | | | | | |
| Memory Length | 4 kpts/Ch | | 9 kpts/Ch | | | |
| Vertical Resolution | 8 bits | | | | | |
| Vertical Sensitivity | 2 mV/div-5 V/div Bandwidth Limiting | | | | | |
| Bandwidth Limiting Filter | 20 MHz | | | | | |
| Maximum Input Voltage | 400 V CAT II | | | | | |
| Probes | 10:1, 1:1 Switchable Passive Probe (one per channel) | | | | | |
| Timebase Range | 5 ns/div-50 s/div | | 2.5 ns/div-50 s/div | | | |

519300

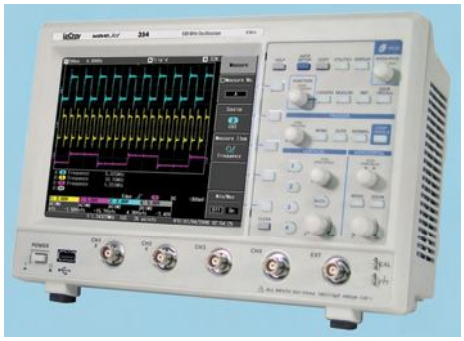
| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| WAVEACE 102 | **163-3307** | 715.00 |
| WAVEACE 112 | **163-3308** | 865.00 |
| WAVEACE 202 | **163-3309** | 865.00 |
| WAVEACE 212 | **163-3310** | 1,090.00 |
| WAVEACE 222 | **163-3311** | 1,320.00 |
| WAVEACE 232 | **163-3312** | 1,795.00 |

## Digital Oscilloscopes

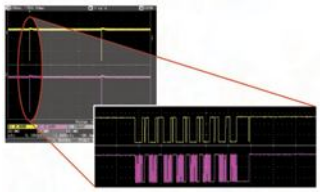
**WaveJet Series**

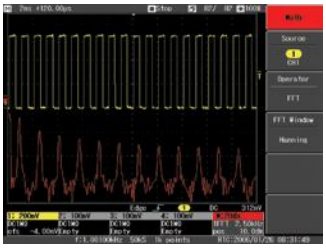
LeCroy

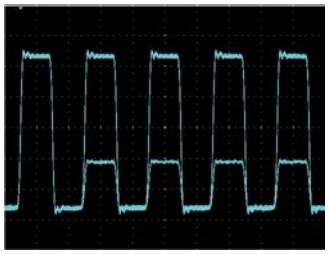
LATEST PRICING



W=285mm H=190mm D=102mm. Weight 3.2kg







The WaveJet 300 Series features unmatched performance and debugging tools not usually found in low bandwidth portable oscilloscopes. Engineers can simplify and shorten their debugging process with the Replay feature and long capture time not available in other oscilloscopes with 100 MHz bandwidths. On top of great performance and capabilities the WaveJet is lightweight and portable, it is only 4" deep and features a large 7.5" colour display.

- 100 MHz - 500 MHz Bandwidth
- 2 or 4 channels
- Single shot sampling rate up to 2 GS/s
- 7.5" LCD Display
- Replay feature allows users to look back in time and view rare events such as runts and glitches
- 500kPts standard memory allows long periods to be captured, even at high sampling rates
- Save time with 26 automatic measurements
- Waveform maths and FFT as standard
- Save captured wavefroms and settings to internal memory or USB memory device
- Capture glitches as small as 1ns with peak detect mode
- 100 GS/s sampling rate with equivalent time mode
- Built in 6-digit frequency counter
- 3 year guarantee and 7 years technical support

# Oscilloscopes - continued

## Digital Oscilloscopes - continued

### WaveJet Series - continued

| Model No. | WAVEJET WJ312 | WAVEJET WJ314 | WAVEJET WJ322 | WAVEJET WJ324 | WAVEJET WJ334 | WAVEJET WJ354 |
|---|---|---|---|---|---|---|
| Order Code | 113-2564 | 113-2565 | 113-2566 | 113-2567 | 113-2571 | 113-2573 |
| Channels | 2 | 4 | 2 | 4 | 4 | 4 |
| Bandwidth | 100MHz | | 200MHz | | 350MHz | 500MHz |
| Sample rate | 1 GS/s | | 2GS/s | | | |
| Rise Time | 3.5 ns | | 1.75 ns | | 1 ns | 750 ns |
| Memory Length | 500 kpts/ch | | | | | |
| Display Monitor | 7.5" colour flat-panel TFT-LCD (640x480 SVGA) | | | | | |
| Vert. resolution | 8 bit | | | | | |
| Vert. Sensitivity/div | 2mV/div - 10V/div | | | | 2mV/div - 10V/div 2mV/div - 10V/div 2mV/Teil. - 10V/Teil. | |
| Vert. accuracy | +/- (1.5% + 0.5% of full scale) | | | | | |
| Max. Input Voltage | 400V CAT I | | | | | |
| Input Coupling | GND, DC (1MΩ), AC (1MΩ) | | | | GND, DC (1MΩ), AC (1MΩ), DC (50Ω)GND, CC (1MΩ), CA (1MΩ), CC (50Ω)Masse, DC (1MΩ), AC (1MΩ), DC (50Ω) | |
| Input Impedance | 1MΩ ±1.5% / 20pF | | | | 1MΩ ±1.5% / 16pF ±1.5%1MΩ ±1.5% / 16pF ±1.5%1MΩ ±1,5% / 16pF ±1,5% | |
| Time base range/div | 5ns/div - 50s/div | | 2ns/div - 50s/div | | 1ns/div - 50s/div1ns/div - 50s/div1ns/Teil. - 50s/Teil. | 500ps/div - 50s/div500ps/div - 50s/div500ps/Teil. - 50s/Teil. |
| Time base accuracy | 10 ppm | | | | | |

425412

| | Mftrs. List No. | Order Code | Price Each 1+ | 2+ |
|---|---|---|---|---|
| 100MHz, 2 ch | WAVEJET WJ312 | **113-2564** | 1,945.00 | 1,906.10 |
| 100MHz, 4 ch | WAVEJET WJ314 | **113-2565** | 2,435.00 | 2,386.30 |
| 200MHz, 2 ch | WAVEJET WJ322 | **113-2566** | 2,530.00 | 2,479.40 |
| 200MHz, 4 ch | WAVEJET WJ324 | **113-2567** | 2,955.00 | 2,895.90 |
| 350MHz, 4 ch | WAVEJET WJ334 | **113-2571** | 4,395.00 | 4,307.10 |
| 500MHz, 4 ch | WAVEJET WJ354 | **113-2573** | 5,495.00 | 5,385.10 |

## Digital Oscilloscopes

### WaveSurfer XS Series

LATEST PRICING



- 200 MHz, 400 MHz, 600 MHz and 1 GHz Bandwidth
- 2.5 GS/s sample rate
- 2 or 4 channels
- 10.4" colour SVGA touch screen
- WavestreamTM fast viewing mode uses a fast 256 level display to simulate the look of an analogue scope, ideal for viewing waveforms with signal jitter or anomalies
- Long memory and superior signal capture
- Save time with one touch access to 23 measurements
- Save waveforms and settings to local hard drive, external USB memory or send over LAN
- Waveform maths, FFT and simple zooming as standard
- 3 year guarantee and 7 years technical support

| Model No. | WS24XS | WS42XS | WS44XS | WS62XS | WS64XS | WS104XS |
|---|---|---|---|---|---|---|
| Order Code | 130-0622 | 146-8088 | 113-2561 | 113-2562 | 113-2563 | 127-2489 |
| Channels | 4 | 2 | 4 | 2 | 4 | 4 |
| Sample rate | 2.5 GS/s | | | | | |
| Record length std. | 2 MPts/ch | | | | | |
| Display Monitor | 10.4" colour touchscreen SVGA TFT-LCD / Windows XP operating system | | | | | |
| Rise Time | 1.75 ns | 1.75 ns | | 625 ns | | 400 ns |
| Vert. resolution | 8-bits | | | | | |
| Vert. Sensitivity | 2mV/div - 10V/div (1MΩ); 2mV/div - 2V/div (50Ω) | | | | | |
| Vert. accuracy | +/- (1.5% + 0.5% of full scale) | | | | | |
| Max. Input Voltage | ±400V (CAT I) | | | | | |
| BW limit 20 | 20 MHz, 200 MHz | | | | | |
| Input Coupling | 50Ω: DC, GND; 1MΩ: AC, DC, GND | | | | | |
| Input Impedance | 1MΩ/16pF, or 50Ω ±1% | | | | | |
| Time base range/div | 200ps/div - 1000s/div (roll mode from 500ms/div to 1000s/div) | | | | | |
| Time base accuracy | 10 ppm | | | | | |

450147

| | Mftrs. List No. | Order Code | Price Each 1+ | 2+ |
|---|---|---|---|---|
| **Oscilloscopes** | | | | |
| 200MHz, 4 ch | WS24XS | **130-0622** | 5,070.00 | 4,968.60 |
| 400MHz, 2 ch | WS42XS | **146-8088** | 4,865.00 | 4,767.70 |
| 400MHz, 4 ch | WS44XS | **113-2561** | 5,920.00 | 5,801.60 |
| 600MHz, 2 ch | WS62XS | **113-2562** | 6,135.00 | – – |
| 600MHz, 4 ch | WS64XS | **113-2563** | 7,355.00 | 7,207.90 |
| 1GHz, 4 ch | WS104XS | **127-2489** | 8,880.00 | 8,702.40 |
| | | | | **Price Each** |
| **Standard Calibration Charge** | | | **S** C17 | 73.50 |
| **UKAS Calibration Charge** | | | **N** C17 | 101.20 |
| **Standard Calibration Charge** | | | **S** C18 | 89.27 |
| **UKAS Calibration Charge** | | | **N** C18 | 123.00 |

## Digital Oscilloscopes

### WaveSurfer MXs Series

New



With all the features of the XS series but with all these features pre-loaded.

- External Memory
- ADVTRIG
- MATHSURF
- HDTVTRIG
- LabNotebook Feature

- 200 MHz, 400 MHz, 600 MHz and 1 GHz Bandwidth
- 2.5 GS/s sample rate
- 4 channels
- 10.4" colour SVGA touch screen
- **Wavestream**TM fast viewing mode uses a fast 256 level display to simulate the look of an analogue scope, ideal for viewing waveforms with signal jitter or anomalies
- Long memory and superior signal capture
- Save time with one touch access to 23 measurements
- Save waveforms and settings to local hard drive, external USB memory or send over LAN
- Waveform maths, FFT and simple zooming as standard
- 3 year guarantee and 7 years technical support

510222

| | Order Code | Price Each 1+ |
|---|---|---|
| **Oscilloscopes** | | |
| 200MHz, 4 ch | **160-3949** | 5,920.00 |
| 400MHz, 4 ch | **160-3950** | 6,760.00 |
| 600MHz, 4 ch | **160-3951** | 8,090.00 |
| 1GHz, 4 ch | **160-3952** | 9,785.00 |
| | | **Price Each** |
| **Standard Calibration Charge** | **S** C17 | 73.50 |
| **UKAS Calibration Charge** | **N** C17 | 101.20 |
| **Standard Calibration Charge** | **S** C18 | 89.27 |
| **UKAS Calibration Charge** | **N** C18 | 123.00 |

## Oscilloscope Accessories and Software

### WaveSurfer 400 and XS Series

**Mathsurfer - WS-MATHSURF**

LATEST PRICING

For engineers who need to add additional math capability, or desire a graphical set up of math and measurements with rescale capability. MathSurfer provides additional math capability. Chain math functions together, or create custom calculations using math, measurements or rescaling. MathSurfer also adds more than 10 additional functions, such as integral and derivative. This capability can be especially helpful to the design engineer who desires more understanding of his circuit. *Please contact our Customer Service department for further information.*

**Electrical Telecomm Mask - WS-ET-PMT**

Electrical Test software program instantly transforms your digital oscilloscope into a dedicated masktesting device, specifically designed for manufacturing, type approval and field testing. The testers exclusive finder function allows pulses or patterns to be easily isolated.

Mask allignment is totally automatic, saving valuable testing time. Included with the software package are hardware connectors and cables you'll need for quality cable termination and exact amplitude scaling. *Please contact our Customer Service department for further information.*

**Advanced Trigger Package - WS-ADVTRIG**

For those desiring more triggering flexibility, you can optionally add Runt, Slew Rate, Qualified Edge, Qualified State, Interval and Dropout triggers the standard triggering package. *Please contact our Customer Service department for further information.*

**32 Digital Channel Logic Pod**

The first oscilloscope solution to combine 4 analogue channels with 32 digital channels. Ideal for the most efficient testing of 16-bit embedded controllers, where all 16 ADDR and 16 DATA lines can be viewed one at a time. A multitude of ADDR and DATA lines can also be viewed, in addition to control lines and low speed serial data lines (SPI,$I^2C$ etc). Testing and debugging efficiency is greatly enhanced by eliminating the need to continuosly disconnect/reconnect signal to observe different behaviours. (This option is only available for WS434, 454 and for all 44XS and 64XS as it requires 4 channels and 350 MHz min. bandwidth)

**Probes**

- Current Probes (AP015, CP030, CP031 & CP150)

Current probes measure the current passing through a wire; current probes do not use the traditional probing style of placing a tip onto a test point. Rather, a wire is placed inside of the jaw of the probe

- Active Probes (AP031, AP034, HFP1000, ZS1000 & ZS1500)

There are 3 different types of active probes, single ended and differential

*Single ended* is associated with high voltages. Measurement requires a test point and a ground point

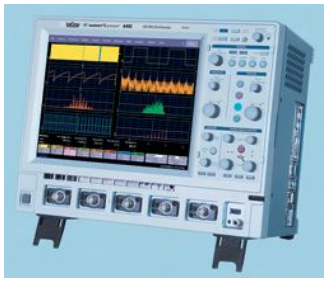
*Single ended High Impedance* high (1MΩ) impedance probes with low (<0.9pF) capacitance to reduce circuit loading particularly at high frequencies. *Differential* are like 2 probes in one, they measure the difference in voltage of a test point in relation to another test point.

425439

| | Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|---|
| **Accessories** | | | | |
| USB/GPIB Interface | WS-GPIB | **832-9532** | 425.00 | – – |
| Cherry USB Mini Keyboard | G84-4100 | **870-6115** | 54.65 | 54.26 |
| **Passive/Active Probes** | | | | |
| Passive, 10:1 | PP007-WS-1 | **895-4968** | 275.00 | 269.50 |
| Active, 1GHz | HFP1000 | **582-6780** | 715.00 | 697.13 |
| Active, Hi-Z, 1GHz | ZS1000 | **127-2492** | 520.00 | 509.60 |
| Active, Hi-Z, 1.5GHz | ZS1500 | **127-2493** | 1,220.00 | 1,195.60 |
| Active Differential, 1GHz | AP034 | **582-6792** | 2,575.00 | 2,510.63 |
| Differential HV, 15MHz | AP031 | **582-6810** | 330.00 | 323.40 |
| Current, 150A, 10MHz | CP150 | **582-6834** | 2,830.00 | 2,773.40 |
| Current, 30A, 50MHz | CP030 | **130-8239** | 1,690.00 | – – |
| Current, 30A, 50MHz | AP015 | **582-6858** | 2,110.00 | 2,067.80 |
| Basic Adaptor Kit | PK701 | **582-6743** | 30.00 | 29.25 |
| Advanced Adaptor Kit | PK702 | **582-6755** | 173.09 | 165.74 |
| SMD Adaptor Kit | PK703 | **582-6767** | 135.20 | 131.82 |
| **Upgrade Options** | | | | |
| Adv Trigger Module | WS-ADVTRIG | **582-6706** | 408.93 | 408.93 |
| MathSurfer Module | WS-MATHSURF | **582-6718** | 451.29 | 451.29 |

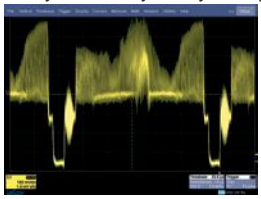
## Digital Oscilloscopes

### WaveRunner Xi Series



W=340 H=260 D=152mm. Weight=6.95kg

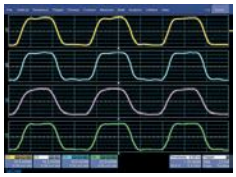
- 4 channels
- WavestreamTM fast viewing mode uses a fast 256 level display to simulate the look of an analogue scope, ideal for viewing waveforms with signal jitter or anomalies
- Local language user interface and front panel
- 10.4[inch] colour TFT-LCD touch-screen, SVGA (800x600) with built-in stylus
- Extensive maths and analysis capabilities as standard
- A wide range of advanced and application specific maths and analysis packages available
- SMART triggering and long memory to isolate the signal characteristic you want
- Revolutionary LabNotebook feature
- Mixed-Signal oscilloscope option
- Save waveforms and settings to local hard drive, external USB memory or send over LAN
- 3 years warranty and 7 years support

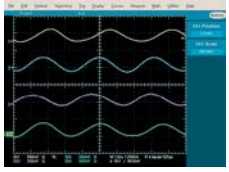




### Waverunner Series

With a true 5 GS/s on each channel, this 300 MHz square wave (checking a timing delay problem between multiple clock signals) is displayed correctly.





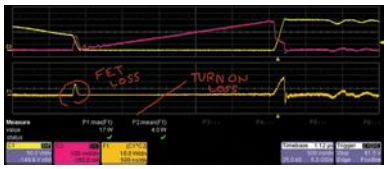
### Other 'scopes

Scopes that are limited to 1.25 GS/s on each channel display the same measurement as a less than informative sinusoidal signal.

### Revolutionary LabNotebook Solution

Create detailed waveform reports directly in the oscilloscope. An all-in-one solution for annotating and sharing information, LabNotebook™ simplifies results recording and report generation. The flashback function allows you to recall the complete setup of the oscilloscope including any saved waveforms, making it easy to make additional measurements.

- Make text or "scribble" notes easily
- Save waveforms and setup data
- Convert reports to PDF, RTF or HTML for sharing
- Annotate your waveforms as you capture them
- Use a default report layout or produce your own template
- Add your company or department logo to the report




### Upgrade Options

### Memory Options

The WaveRunner comes with memory to store 2 MPts (4 channels) / 4MPts (2 channels) of acquired data. For technicians who need to increase capture time, or engineers who design longer records for more advanced debugging, the WaveRunner series has the following additional memory options:

- 8 Mpts / 16 MPts (WRXi-L)
- 12 Mpts / 24 MPts (WRXi-VL)

**WRXi-XWAV: Intermediate Maths Package**

Waveform and histogram analysis functions.

**WRXi-XMATH: Advanced Maths Package**

Provides more than 30 math functions and 40 parameter measurements including: parameter math, tracking measurements, expanded FFT (up to 24 Mpts), expanded histogramming and trending of up to one million events. XMATH has a graphical interface that lets you connect input source, measurement, and display icons forsurprisingly simple advanced analysis.

**WRXi-XDEV: Developer's Customisation Package**

Allows you to create your own scripts for measurement parameters or math functions, using third-party software packages such as Excel, MATLAB, and Mathcad.XDEV seamlessly integrates your custom measurements directly into the oscilloscope's data path, eliminating the need to run separate programs. You can also use XDEV to customize the oscilloscope's interface. This package utilizes the power and efficiency of customization to enable faster analysis and solutions for your specific tasks.

**WRXi-JTA2: Jitter and Timing Analysis**

Find modulation effects and intermittent signal jitter to track timing changes, and to debug in the time, frequency, and statistical domains. Views like Jitter Track and Jitter Histogram let you see system variability in ways that you have never imagined.

**WRXi-XVAP: Value Analysis Package**

A bundled solution of XWAV and JTA2.

**WRXi-XMAP: Master Analysis Package**

A bundled solution of XMATH, XDEV and JTA2

**WRXi-PMA2: Power Measure Analysis**

Automates and enhances your ability to analyse power conversion devices and circuits. Optional accessories, such as differential amplifiers, differentialprobes, current probes, and deskew fixtures complete the solution.

**WRXi-DFP2: Digital Filter Package**

Lets you add any of a set of linear-phase Finite Impulse Response (FIR) filters. It enhances your ability to examine important signal components by filtering out undesired spectral components such as noise. Use the standard filters or create your own.

**WRXi-SDM: Serial Data Mask Package**

Harnesses the WaveRunner's long memory and low jitter to deliver outstanding serial bus characterization. Choose from a comprehensive list of standard eyepattern masks, or create a user-defined mask. Mask violations are clearly marked on the display, so you don't have to guess. SDM also allows a software "GOLDEN"PLL reference to recover an eye diagram from a single long acquisition. The measurement is complete in seconds, and the already low trigger jitter is eliminated, giving you the most precise result possible.

| **Model No.** | **WR 44Xi** |
|---|---|
| **Order Code** | **114-3164** |
| Channels | 4 |
| Bandwidth | 400MHz |
| Sample rate | 5 GS/s |
| RIS* | 200 GS/s |
| Max Memory Std. | 4 MPts/ch |
| Max Memory (Opt.) | 8 / 12 MPts/ch with memory options -L and -VL |
| Display Monitor | 10.4" SVGA colour touchscreen LCD |
| Rise Time | 875 ns |
| Trigger Rate | 1,250,000 waveforms / sec. |
| Vert. resolution | 8 bits, up to 11 bits with enhanced resolution (ERES) |
| Vert. Sensitivity | 50Ω: 2mV/div - 1V/div / (1MΩ): 2mV/div - 10V/div. |
| Vert. accuracy | ±1% of full scale; ± 1.5% of full scale, ≥10mV/div (warranted) |
| Max. Input Voltage | 50Ω: 5V rms; 1MΩ: 250V max. (Peak AC: ≤10kHz + DC) |
| BW Limit | 20 / 200 MHz |
| Input Coupling | 50Ω: DC ; 1MΩ: AC, DC, GND |
| Input Impedance | 1MΩ // 20pF (10MΩ // 3.5pF using PP007 probe) |
| Timebase range/div | Real-time: 200ps - 10s, RIS: to 20ps, Roll mode: to 1000s |
| Timebase accuracy | 5 ppm (at 25°C) |
| Triggering | Edge, State or Edge qualified, Dropout, Pattern, Glitch and Pulse, Width, Signal or Pattern Interval, Timeout (State/Edge Qualified), Exclusion Triggering |

* Random Interleaved Sampling

## Oscilloscopes - continued

### Digital Oscilloscopes - continued

**WaveRunner Xi Series - continued**

*Please contact our customer service department for further information on these options and other accessories.*

425353

| | Mftrs. List No. | Order Code | Price Each 1+ | 2+ |
|---|---|---|---|---|
| **Oscilloscopes** | | | | |
| 400MHz, 4 ch. | WR 44Xi | **114-3164** | 8,030.00 | 7,869.40 |
| **Accessories** | | | | |
| USB GPIB Interface | WS-GPIB | **832-9532** | 425.00 | – – |
| Cherry Mini Keyboard | G84-4100 | **870-6115** | 54.65 | 54.26 |
| **Passive/Active Probes** | | | | |
| Passive, 10:1, 500MHz | PP007-WR-1 | **101-8860** | 270.00 | 264.60 |
| Active, 1GHz | HFP1000 | **582-6780** | 715.00 | 697.13 |
| Active, Hi-Z, 1GHz | ZS1000 | **127-2492** | 520.00 | 509.60 |
| Active, Hi-Z, 1.5GHz | ZS1500 | **127-2493** | 1,220.00 | 1,195.60 |
| Active Differential, 1GHz | AP034 | **582-6792** | 2,575.00 | 2,510.63 |
| Differential HV, 15MHz | AP031 | **582-6810** | 330.00 | 323.40 |
| Current, 150A, 10MHz | CP150 | **582-6834** | 2,830.00 | 2,773.40 |
| Current, 30A, 50MHz | AP015 | **582-6858** | 2,110.00 | 2,067.80 |
| **Upgrade Options** | | | | |
| 4ch 8 Mpts/ch Memory | WR6-L | | | |
| 4ch 12 Mpts/ch Memory | WR6-VL | | | |
| 4ch 8 Mpts/ch Memory | WRXi-L | | | |
| 4ch 12 Mpts/ch Memory | WRXi-VL | | | |
| Intermediate Math Package | WR6-XWAV | | | |
| Advanced Maths Package | WR6-XMATH | | | |
| Advanced Custom Package | WR6-XDEV | | | |
| Master Analysis Package | WR6-XMAP | | | |
| Value Analysis Package | WR6-XVAP | | | |
| Jitter and Timing Analysis | WR6-JTA2 | | | |
| Power Measurement Analysis | WR6-PMA2 | | | |
| Digital Filter Package | WR6-DFP2 | | | |
| Serial Data Measurements | WR6-SDM | | | |

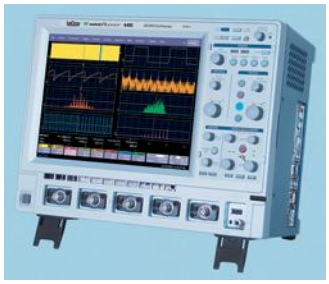
** Please contact our customer service department for further information on these options and other accessories.*

| | | | Price Each |
|---|---|---|---|
| **Standard Calibration Charge** | S | C17 | 73.50 |
| **UKAS Calibration Charge** | N | C17 | 101.20 |
| **Standard Calibration Charge** | S | C18 | 89.27 |
| **UKAS Calibration Charge** | N | C18 | 123.00 |

## 37

### Digital Oscilloscopes

**WaveRunner MXi Series**



With all the features of the XS series but with all these features pre-loaded.

- JTA2 (Jitter and Timing Analysis package)
- XMATH (Enhance Math Option)
- XDEV (Customisation package for integrating MatLab as scope functions)
- HDTVTRIG

- 400 MHz to 2 GHz bandwidths
- 5 GS/s to 10 GS/s sample rate
- 4 channels
- **Wavestream**™ fast viewing mode uses a fast 256 level display to simulate the look of an analogue scope, ideal for viewing waveforms with signal jitter or anomalies
- Local language user interface and front panel
- 10.4" colour TFT-LCD touchscreen, SVGA (800x600) with built-in stylus
- Extensive maths and analysis capabilities as standard
- A wide range of advanced and application specific maths and analysis packages available
- SMART triggering and long memory to isolate the signal characteristic you want
- Revolutionary LabNotebook feature
- Mixed-Signal oscilloscope option
- Save waveforms and settings to local hard drive, external USB memory or send over LAN
- 3 years warranty and 7 years support

510237

| | Order Code | Price Each 1+ |
|---|---|---|
| **Oscilloscopes** | | |
| 400MHz, 4 ch | **160-3953** | 9,300.00 |
| 600MHz, 4 ch | **160-3955** | 10,995.00 |
| 1GHz, 4 ch | **160-3956** | 12,615.00 |
| 2GHz, 4 ch | **160-3957** | 16,000.00 |

| | | | Price Each |
|---|---|---|---|
| **Standard Calibration Charge** | S | C17 | 73.50 |
| **UKAS Calibration Charge** | N | C17 | 101.20 |
| **Standard Calibration Charge** | S | C18 | 89.27 |
| **UKAS Calibration Charge** | N | C18 | 123.00 |

Over 480,000 products online GO

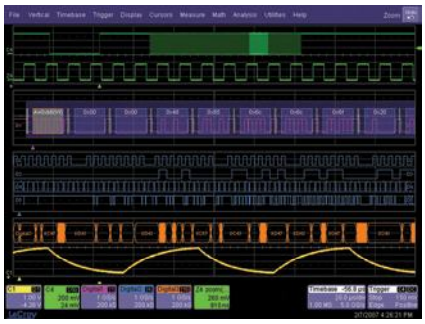
### Mixed Signal Oscilloscope Modules

**MS Series**

LATEST PRICING



W=108 H=38 D=213mm. Weight 775g



Mixed Signal input boxes that allow you to use your WaveRunner Xi or WaveSurfer Xs oscilloscope to see analogue, digital and serial data signals simultaneously as they occur in real time.

- 250MHz and 500MHz bandwidths
- 50 Mpts/Ch memory means that these fast signals can be captured for up to 25 ms at up to 2 GS/s sampling rate
- Up to 36 channels - enough for all the ADDR, DATA, control lines and serial data busses on 16-bit microcontrollers
- Full analogue / digital cross triggering
- Analogue / Digital timebase synchronisation
- Cursors display hexadecimal bus values
- Make timing measurements on a single digital channel, between two digital channels or even between an analogue and a digital channel
- Trigger and decode serial data signals such as $I^2C$, SPI, UART, RS-232, and LIN
- Simple connection to oscilloscope with LeCroy Bus Interface
- Colour coded display makes signal identification easy

**Acquisition System**

| | MSO-500 | MSO-250 |
|---|---|---|
| Bandwidth | 500MHz | 250MHz |
| Max. Sample Rate | 2 GS/s | 1 GS/s |
| Memory Depth | 50 MPts/ch | 10 MPts/ch |
| **Digital Channels** | | |
| Channels | 18 | 18 |
| Threshold Groupings | D0-D8, D9-D17 | D0-D8, D9-D17 |
| Threshold Levels | TTL, ECL, CMOS (2.5V, 3.3V, 5V), PECL, LVDS or User Defined | |
| **Trigger** | | |
| Trigger Types | Edge, Width, Qualified, Pattern, Glitch, Interval, Dropout | |
| Serial Data Triggers | $I^2C$, SPI, UART, RS-232, LIN | |
| Trigger Sources | C1-C4, D0-D17 | C1-C4, D0-D17 |
| **Physical** | | |
| Lead Set Length | 0.4m | |

**Includes:** Mixed Signal Oscilloscope Module, 18 Channel Digital Lead Set (1 with MS-500 and MS-250, 2 with MS-500-36), LeCroy Bus and USB2.0 Cables (1.3 m), Ground Extenders (20 with MS-500 and MS-250, 40 with MS-500-36), Flexible Ground Leads (5 with MS-500 and MS-250, 10 with MS-500-36), Carrying Case, Operator's Manual, Quick Reference Guide.

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

465003

| | Mfrs. List No. | Order Code | Price Each 1+ | 2+ |
|---|---|---|---|---|
| 500MHz, 18ch | MSO-500 | **134-8273** | 3,125.00 | 3,062.50 |
| 250MHz, 18ch | MSO-250 | **134-8276** | 2,330.00 | 2,283.40 |
| **Digital Lead Sets** | | | | |
| 18ch Lead Set D0-D17 | MSO-DLS-18 | **134-8277** | 780.00 | 764.40 |

**FREE global legislation support**

RoHS, REACH, WEEE, EuP, Batteries Directive - we've got it covered at:
**www.global-legislation.com**

# Oscilloscopes - Handheld

## USB Pen Type Oscilloscopes

**PicoScope 2104 and 2105**



The **PicoScope 2105** USB Pen Scope has combined features integral to many high performance bench top oscilloscopes, with a small, lightweight and ergonomic package that fits perfectly in the hand. When used in conjunction with PicoScope software, it converts any laptop or desktop PC with USB support into a powerful oscilloscope without the need for additional probes or power supplies. The **PicoScope 2104** is an entry-level version to accommodate less demanding applications.

- Ergonomically designed to fit in the hand
- Up to 100MS/s real-time sample rate
- Up to 25MHz bandwidth
- Digital ETS enhances repetitive signal sample rate to 2GS/s
- Up to 24k sample buffer
- Connected and powered by USB
- Supplied with PicoScope, PicoLog and 32-bit programming libraries
- Compatible with Windows 98SE, ME, 2000 and XP

| Model | PICOSCOPE 2104 | PICOSCOPE 2105 |
|---|---|---|
| Sampling Rate | 1 GS/s using digital ETS | 2 GS/s using digital ETS |
| Sample Rate (single shot) | 50 MS/s | 100 MS/s |
| Resolution | 8 bits | 8 bits |
| Analogue Bandwidth | 10MHz | 25MHz |
| Voltage Ranges | 50mV to 20V | 50mV to 20V |
| Timebases | 20 ns/div to 50s/div | 10 ns/div to 50s/div |
| Buffer Length | 8000 samples | 24,000 samples |
| Overload Protection | 50V (input to ground) | 50V (input to ground) |
| Accuracy | 3% | 3% |
| Power Supply | From USB Port | From USB Port |
| 32-bit Drivers | C, VB, Delphi, LabVIEW, Agilent VEE | C, VB, Delphi, LabVIEW, Agilent VEE |

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| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| PICOSCOPE 2104 | **107-6329** | 125.00 | 112.50 | 100.00 |
| PICOSCOPE 2105 | **107-6330** | 199.00 | 179.10 | 159.20 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C18 | 89.27 | |
| **UKAS Calibration Charge** | | N C18 | 123.00 | |

## Handheld Scope

**HPS10 Series**





H=220, W=105, D=35 (mm)

A powerful unit combining a 2MHz DSO, autoranging true RMS DMM and a 10MHz frequency counter. Supplied with test probe, rechargeable battery and user manual. The HP10SE is a limited edition version of the personal scope featuring a blue / white backlit LCD display.

- High contrast, wide view angle LCD display (124x64 pixels) with backlight
- Single channel 2MHz oscilloscope with memory function
- 10MHz sampling rate
- 200ns to 1 hour/div horizontal timebase in 32 steps
- 5mV to 20V/div in 12 steps
- Auto set-up
- Recorder function (up to 25hrs)
- Norm, Once, Run and Slope + / - trigger
- X and Y position signal shift
- Frequency readout through markers
- DVM readout with x10 option
- AC and DC measurements in dBm, dBV, dB, DC, RMS
- AC Measurements in RMS, dB (relat.), dBV and dBm
- Peak measurements in Min, Max and pk-pk
- Signal markers for Volts and Time
- Auto power off setting and low battery indication
- Probe calibration
- BNC probe connector (standard oscilloscope probe supplied)
- 5x AA type battery or AC adaptor (not supplied)
- Battery charge circuit
- Integral deskstand
- Optional protective case with a clear PVC window is available

| | | | |
|---|---|---|---|
| Sampling Rate | 10MHz | Vertical | |
| Analogue Bandwidth | 2MHz | Scale (X 1) | 5mV to 20V/div in 12 steps |
| Input Impedance | 1MΩ (20pF standard probe) | Sensitivity | 0.1mV/div |
| Input Voltage | 100V DC, 200V AC max. | Horizontal Scale | 2µsec/div to 1hr/div in 32 steps |
| Coupling | AC, DC, and GND | Voltage Measurement | 0.1mV to 160V pk-pk (±2% Acc.) |
| | | Power | 5x AA batteries or 9V DC 500mA unreg AC adaptor (not supplied) |

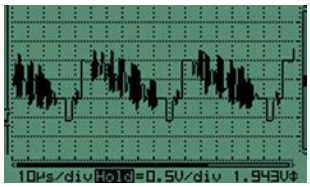
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| Mftrs. List No. | Description | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|---|
| HPS10 | Handheld Oscilloscope | **428-3909** | 111.73 | 101.48 |
| HPS10SE | Handheld Oscilloscope | **105-6460** | 121.98 | 120.19 |
| BAGHPS | Carry Case | **428-3910** | 8.63 | 8.57 |
| HPS10 PSU | UK Power Supply | **121-7075●** | 3.68 | 3.28 |
| HPS10 PSU | EURO Power Supply | **462-6242** | 3.29 | 2.92 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C12 | 60.93 | |
| **UKAS Calibration Charge** | | N C12 | 89.27 | |

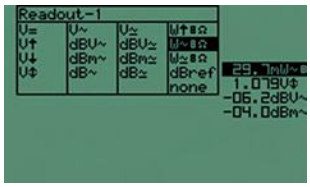
## Hand-held Oscilloscope

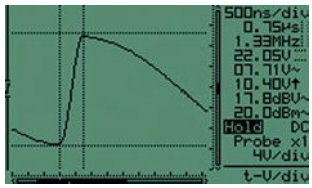
**HPS40**





The HPS40 is designed to be user friendly while offering a range of useful features. Battery powered for complete safety during floating measurements and also portability as a hand-held oscilloscope.





- 40MHz sampling rate
- 12MHz analogue bandwidth
- 0.1mV sensitivity
- 5mV to 20V/div in 12 steps
- 50ns to 1Hour/div timebase in 34 steps
- Full auto setup
- Adjustable trigger level
- Recorder function
- DVM readout
- Signal markers for Volt and Time
- Audio power calculation (rms and peak)
- Signal storage
- High resolution LCD 192x112 pixels
- Optically isolated RS232 output
- Supplied with user manual, rubber holster, insulated probe,rigid carry case, RS232 lead and software
- Complies IEC1010-1, CAT II-600V, UL 94V0

| | | | |
|---|---|---|---|
| Bandwidth | 40MHz | True-rms measurement | 0.1mV to 400Vrms |
| Analogue Bandwidth | 12MHz | Maximum input voltage | 200V |
| Resolution | 192x112 Pixels with LED backlight | Approvals | IEC1010-1, UL, CAT II |
| | | Batteries | 5 x AA Ni-Cd / NiMH Rechargeable |
| Number Of Inputs | 1 | | |
| Timebase | 50ns to 1hour/division | Dimensions (WxHxD) | 105x220x35mm |
| Signal Storage | 256 samples | Weight | 0.45 |

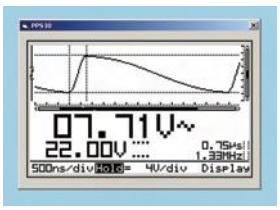
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| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|
| HPS40 | **430-0592** | 244.98 | 233.70 | 227.55 |
| UK Power Supply | **121-7075●** | 3.68 | 3.28 | 2.75 |
| EURO Power Supply | **462-6242** | 3.29 | 2.92 | 2.45 |
| | | | Price Each | |
| **Standard Calibration Charge** | S C12 | | 60.93 | |
| **UKAS Calibration Charge** | N C12 | | 89.27 | |

## Pocket Oscilloscope

**PPS10**





## Oscilloscopes - Handheld - continued

### Pocket Oscilloscope - continued

**PPS10 - continued**

**PPS10**

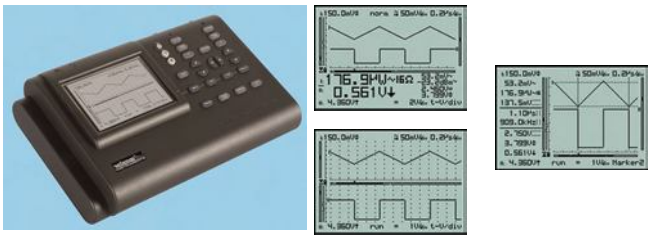
- Joystick control for true hand-held operation
- RS232 interface for PC connectivity
- Measures dBm, dBV, DC, rms ...
- Trigger modes: run, normal, once, roll, slope +/-
- X and Y position signal shift
- Audio power calculation (rms and peak)
- Signal markers for Voltage and Time
- Frequency readout (through markers)
- Recorder function (roll mode)
- Signal storage (2 memories)
- Full auto set up
- 128 x 64 pixel high-contrast LCD screen
- DVM read-out with x10 option
- Time base: 200ns to 1hour/div in 32 steps
- Vertical Sensitivity: 5mV to 20V/div in 12 steps
- 0.1mV sensitivity
- 10MHz sampling rate
- 2MHz analogue bandwidth
- 10 hours operation from 5x AAA battery or NiCd / NiMH (not included)
- Includes battery charging circuit
- Optional 9V dc 500mA PSU available
- Supplied with insulated safety probe, user manual and RS232 cable

446675.436852

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| Pocket Scope | **127-0135** | 134.87 | 121.38 |
| UK Power Adaptor | **462-6205** | 3.23 | 2.88 |
| UK Power Adaptor | **120-5746** ● | 4.21 | – – |
| **Standard Calibration Charge** | S C 12 | Price Each 60.93 | |
| **UKAS Calibration Charge** | N C 12 | 89.27 | |

### 30MHz LCD Oscilloscope - Dual Channel

**APS230**



H=150, W=230, D=150 Weight = 830g

A high quality oscilloscope for handheld or bench use has 240MS/s sampling rate and 2x 30MHz analogue bandwidth, that is ideal for professionals, hobbyists and students alike. The unit comes complete with RS232 cable for connection to a PC, 2 insulated 60MHz (x10) measuring probes, power adaptor and battery pack.

- 2 input channels
- High contrast LCD display (128x192 pixels) with white Backlight
- Full auto set up for volt/div and time/div
- Recorder roll mode, up to 25h per screen
- Trigger mode: run - normal - once - roll.
- Adjustable trigger level and slope
- Peak measurements: Max, Min and Pk to Pk
- Measurements: RMS, dB(rel), dBV and dBm
- Direct Audio power measurements
- x1 and x10 probe calculation option
- Several display modes
- StereoScope mode for audio measurement
- X and Y position shift
- Firmware upgradable through internet

| | |
|---|---|
| Maximum Sampling rate | 240MS/s per channel |
| Analogue Bandwidth | 2 x 30MHz |
| Input Impedance | 1MΩ/20pF |
| Maximum Input Voltage | 100Vpeak (AC + DC), 200Vpeak-peak (AC only) |
| Vertical Resolution | 8 bit |
| Signal Storage | 256 samples per channel, 2047 in roll mode |
| True-RMS Measurement | From 0.03mV to 80V (up to 400Vrms with X10 probe) 2.5% accuracy |
| Sensitivity | Minimum 30µV |
| Input sensitivity in 14 steps | 1mV to 20V/division at X1 - 10mV to 200V/div at X10 |
| Timebase in 35 steps | 25ns to 1hour/division |
| Connection to PC | RS232 (supplied) |

381012.342630

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| APS230 | **498-9739** | 404.51 | 393.86 | 383.76 |
| **Standard Calibration Charge** | S C 17 | Price Each 73.50 | | |
| **UKAS Calibration Charge** | N C 17 | 101.20 | | |

### 10MS/s Panel Scope

**VPS10**



W=165
H=90
D=35mm

A panel mount oscilloscope for monitoring, system analysis, educational purposes, system demonstrations, sensor testing... Or just connect it to your car's audio system and use it as an eye-catcher! Never before has an oscilloscope had so many potential applications.

- Panel mount
- High contrast LCD display (128x64 pixels) with white backlight
- Full auto set up for volt/div and time/div
- Recorder roll mode
- User-friendly set-up menu
- Measurements: RMS, dB(rel), dBV and dBm
- Direct Audio power measurements
- x1 and x10 probe calculation
- 6 display modes
- DVM Readout
- AC or DC input coupling

| | | | |
|---|---|---|---|
| Sampling Rate | 10 MS/s | Vertical Resolution | 8 bit |
| Analogue Bandwidth | 2MHz | Max. Sensitivity | 0.1 mV |
| Input Impedance | 1MΩ/30pF | Power Supply | 9 Vdc or 6 Vac / 300mA |

417154.423172

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| VPS10 | **105-6459** | 101.48 | 97.38 | 94.13 |
| **Standard Calibration Charge** | S C 10 | Price Each 50.45 | | |
| **UKAS Calibration Charge** | N C 10 | 79.41 | | |

### 8MHz Handheld Oscilloscope / DMM

New



A compact, handheld oscilloscope and high performance DMM.

- 60mm mono LCD display (160x160 resolution) with backlight
- 3999 count display
- 10 x screen and setup memories
- AC/DC voltage and current measurement
- Resistance, capacitance and frequency measurement
- Continuity buzzer and diode test
- Sleep mode and low battery warning
- USB interface and PC software
- Supplied with test leads, test clips, 4 x AAA batteries, carry bag, USB lead, software, power adaptor and user manual

| | |
|---|---|
| Bandwidth | DC-8MHz |
| Sampling Rate | 40MS/s (real time)MHz |
| Triggers | Free run, Normal, Single Shot |
| Vertical Sensitivity | 20mV/div to 500V/div |
| Vertical Accuracy | ±(5%+1) |
| Horizontal Accuracy | ±(0.01%+1) |
| Time Base | 100ns/div to 5s/div |
| DC Voltage | 400mV, 4V, 40V, 400V, 1000V<br>4V, 40V, 400V, 750V |
| DC Current | 400µA, 4000µA, 40mA, 400mA, |
| AC Current | 400µA, 4000µA, 40mA, 400mA, |
| Resistance | 400Ω, 4kΩ, 40kΩ, 400kΩ, |
| Capacitance | 40nF, 400nF, 4µF, 100µF |
| Frequency | 10Hz to 10MHz |
| Input Impedance | 10MΩ |
| **General** | |
| Safety | 1000V CAT II, 600V CATIII |
| Dimensions (WxHxD) | 100x200x48mm |
| Weight | 498g |

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| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| Handheld Scope / DMM | **156-3726** | 159.95 | 158.35 |

## Troubleshooting tips

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

## 700 products added online every week

See our pick of the hottest products and latest technologies in '**What's New?**' at **www.farnell.co.uk**

## Handheld Digital Oscilloscopes

digimess®

**HS Series**





New

W=115 H=180 D=40mm.
Weight 645g

- General purpose 20MHz 100MS/s and 60MHz 250MS/s, two channel, colour digital storage oscilloscopes
- Backlit 3.8" display with 320 x 240 resolution and 4096 colours
- Separate isolated inputs for the oscilloscope and built-in 4000 count multimeter
- Storage for up to 4 waveforms
- USB Interface

**Supplied with:**
Lockable aluminium storage case, rechargeable battery, mains adaptor/charger, 2x X1/X10 probes, USB lead, PC software, 20A current shunt, Capacitance adaptor, Multimeter probes and Operating Manual.

| Model | HS20 | HS60 |
|---|---|---|
| **Oscilloscope** | | |
| **Input** | | |
| Coupling | DC, AC | |
| Impedance | 1MΩ ±2%, 20pF ±3pF | |
| Max. Input Voltage | 400V (peak) CAT II | |
| **Horizontal** | | |
| Sampling Range | 10S/s to maximum | |
| Record Length | 6K points per channel | |
| Timebase Range | 5ns/div to 5s/div, 1-2-5 steps | |
| Sample Rate / Delay Time Accuracy | ±100ppm for any time interval | |
| **Vertical** | | |
| A/D Converter | 8-bit resolution, 2 channel | |
| Sensitivity | 5mV/div - 5V/div | |
| Analogue Bandwidth | 20MHz | 60MHz |
| Rise Time | ≤17.5ns | ≤5.83ns |
| DC Gain Accuracy | ±5% | |
| **Data Acquisition** | | |
| Max. Real-time Sampling Rate / Channel | 100MS/s | 250MS/s |
| Max. Equiv. Sampling Rate / Channel | 12.8GS/s | 32GS/s |
| Sampling Modes | Sample, Peak Detection, Average (4, 16, 64, 128) | |
| **Trigger** | | |
| Source | CH1, CH2 | |
| Mode | Auto, Norm, Single, Edge, TV | |
| Coupling | AC, DC, HF Rej, LF Rej | |
| **Measurement** | | |
| Cursor | Voltage Diff. (ΔV), Time Diff. (ΔT) | |
| Auto | Pk-Pk value, Average value, rms value, frequency & period | |
| **Waveform Maths** | | |
| CH1-CH2, CH2-CH1, CH1+CH2, CH1xCH2, CH1/CH2 | | |
| **Multimeter** | | |
| Counts | 4000 | |
| Impedance | 10MΩ | |
| Diode Test | 0 to 1.5V | |
| Continuity Test | <30V | |

| Measurements | Range | Accuracy |
|---|---|---|
| DC Voltage | 400mV, 4V, 40V, 400V | ±(1% + 1d) |
| AC Voltage | 4V, 40V, 400V | ±(1% + 3d) |
| DC Current | 40mA, 400mA, 20A | ±(1% + 1d)* |
| AC Current | 40mA, 400mA, 20A | ±(1.5% + 1d)* |
| Resistance | 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ | ±(1.0% + 1d)* |
| Capacitance | 51.2nF, 512nF, 5.12µF, 51.2µF, 100µF | ±(3% + 3d) |

* best accuracy

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| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| HS20 | **147-0314** | 590.58 | 572.95 | 555.32 |
| HS60 | **147-0315** | 712.98 | 670.42 | 641.68 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C14 | 68.51 | |
| **UKAS Calibration Charge** | | N C14 | 90.30 | |

## Help us to help the environment

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**Please recycle after use.**

## Digital Oscilloscope

FLUKE

**ScopeMeter 123**





H=232, W=115, D=50mm
Weight=1.2kg

The Scopemeter 123 is the rugged solution for industrial troubleshooting and installation applications. It's a truly integrated test tool, with oscilloscope, multimeter and paperless recorder in one affordable east-to-use instrument. Find fast answers to problems in machinery, instrumentation, control and power systems.

- Dual-input 20 MHz digital oscilloscope
- Two 5,000 counts true-RMS digital multimeters
- A dual-input TrendPlot™ recorder
- Connect-and-View™ trigger simplicity for hands-off operation
- Sheilded test leads for oscilloscope, resistance and continuity measurements
- Up to 7 hours battery operation
- 600 V CAT III safety certified
- Optically isolated RS-232 interface
- Rugged, compact case
- All inputs protected to EN61010-1 CAT III 600V

**Included accessories**
PM8907 line adapter/charger, STL120 shielded test leads set, AC120 alligater clips, HC120 hook clips, BB120 shielded BNC adapter, BP120 NiCad battery pack.

**SCC120 Kit Contents (Optional)**
Hard-shell carrying case, optically isolated RS-232 interface cable, and FlukeView ® for Windows® software.

| | | | |
|---|---|---|---|
| Bandwidth | 20MHz | True RMS multimeter | 5000 counts, dual input |
| Sample rate | 25 MS/s | Connect and view triggering | Yes |
| Input sensitivity | 5mV - 500 V/div | Video triggering with line count | Yes |
| Timebase range | 20ns/div to 1 min/div | Dual input trendplot | Yes |
| Inputs and digitisers | 2 | Memory for screens/set ups | 10 |
| Max record length | 512 min/max points per input | Line power | Adapter/battery charger included |
| Glitch capture | 40 ns | Batteries | 5 hours NiCad |
| Scope measurements | 26 automatic | | |

385823

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|---|
| Scopemeter | UK Version | **908-137** | 983.00 | 953.51 | 924.91 |
| Fluke View Software and accessories | SCC120E Kit | **908-149** | 282.00 | 267.90 | 260.85 |
| Carry Case | C101 | **947-9783** | 34.00 | 32.98 | 31.99 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C14 | 68.51 | |
| **UKAS Calibration Charge** | | | N C14 | 90.30 | |

## Digital Oscilloscope

FLUKE

**ScopeMeter 124**



H=232, W=115, D=50mm
Weight=1.2kg

LATEST PRICING

The compact ScopeMeter 124 is the rugged solution for industrial troubleshooting and installation applications. It's a truly integrated test tool, with oscilloscope, multimeter and "paperless" recorder in one offer affordable, easy-to-use instrument. Find fast answers to problems in machinery, instrumentation, control and power systems.

- Dual-input 40 MHz digital oscilloscope
- Two 5,000 counts true-RMS digital multimeters
- A dual-input TrendPlot™ recorder
- Connect-and-View™ trigger simplicity for hands-off operation
- Sheilded test leads for oscilloscope, resistance and continuity measurements
- 10:1 Voltage Probe included for high frequency measurements
- Up to 7 hours battery operation
- 600 V CAT III safety certified
- Optically isolated RS-232 interface
- Rugged, compact case

| | | | |
|---|---|---|---|
| Bandwidth | 40MHz | True RMS multimeter | 5000 counts, dual input |
| Sample rate | 25 MS/s | Connect and view triggering | Yes |
| Input sensitivity | 5 mV - 500 V/div | Video triggering with line count | Yes |
| Timebase range | 10 ns/div to 1 min/div | Dual input trendplot | Yes |
| Inputs and digitisers | 2 | Memory for screens/set ups | 20 |
| Max record length | 512 min/max points per input | Line power | Adapter/battery charger included |
| Glitch capture | 40 ns | Batteries | 7 hours NiMH |
| Scope measurements | 26 automatic | | |

## Oscilloscopes - Handheld - continued

### Digital Oscilloscope - continued

**ScopeMeter 124 - continued**

**Included accessories**
PM8907 line adapter/charger, STL120 shielded test leads set, AC120 alligater clips, HC120 hook clips, BB120 shielded BNC adapter, BP130 NiMH battery pack, VPS40 voltage probe

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

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| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| **UK Power Adaptor** | | | | |
| FLUKE 124 | **438-3450** | 1,136.00 | 1,101.92 | 1,068.86 |
| **European Power Adaptor** | | | | |
| FLUKE 124 | **444-8662** | 1,136.00 | 1,101.92 | 1,068.86 |
| **Accessories** | | | | |
| C101 Carry Case | **947-9783** | 34.00 | 32.98 | 31.99 |
| **Standard Calibration Charge** | | S C14 | Price Each 68.51 | |
| **UKAS Calibration Charge** | | N C14 | 90.30 | |

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| **Accessories** | | | | |
| SCC120E Kit | **908-149** | 282.00 | 267.90 | 260.85 |

### Digital Oscilloscope

**ScopeMeter 125**



H=232, W=115, D=50mm
Weight=1.2kg

Fluke 125 is the ScopeMeter of choice for the maintenance engineer who deals with industrial machinery and the industrial network connecting that machinery.

LATEST PRICING

- Dual-input 40 MHz digital oscilloscope
- Two 5,000 counts true-RMS digital multimeters
- A dual-input TrendPlot™ recorder
- Connect-and-View™ trigger simplicity for hands-off operation
- Sheilded test leads for oscilloscope, resistance and continuity measurements
- 10:1 Voltage Probe included for high frequency measurements
- Vac pwm for use on motor drive outputs, reading the true output voltage experienced by the motor itself.
- Low impedance measurements giving a 0.01 ohms resolution for motor windings and the like.
- Up to 7 hours battery operation
- 600 V CAT III safety certified
- Optically isolated RS-232 interface
- Rugged, compact case

**Bus Health mode** gives a clear Good/Bad indication for the electrical signals on industrial buses and networks, such as CAN-bus, Profi-bus, RS-232 and many more. The Fluke 125 validates the quality of the electrical signals as soon as any electrical signals are passed along the network. It checks the signal levels and speed, transition times and distortion, and compares these to the appropriate standards to help you find errors like improper cable connections and terminators. It helps you find the source of error in case communication comes to a halt.

**Power Measurements** for single phase and balanced 3-phase systems. The Fluke 125 can directly present you the Total Power (Watts), Apparent Power (VA), Reactive Power (VAR) and the Power Factor (PF), over a wide range of applied frequencies, including those seen with motor drives and inverters. As a result, you are able to easily see the effects on the various power measurements during start-up or under changing operational conditions. A current clamp is included as a standard.

**Harmonics mode** graphically displays harmonics up to the 33rd harmonic to assist in fault-finding, e.g. with large non-linear loads. RPM and Hz reading for use with electrical and combustion engines.

| | |
|---|---|
| Bandwidth | 40MHz |
| Sample rate | 25 MS/s |
| Input sensitivity | 5 mV - 500 V/div |
| Timebase range | 10 ns/div to 1 min/div |
| Inputs and digitisers | 2 |
| Max record length | 512 min/max points per input |
| Glitch capture | 40 ns |
| Scope measurements | 26 automatic |
| True RMS multimeter | 5000 counts, dual input |
| Connect and view triggering | Yes |
| Video triggering with line count | Yes |
| Dual input trendplot | Yes |
| Memory for screens/set ups | 20 |
| Line power | Adapter/battery charger included |
| Batteries | 7 hours NiMH |

**Included accessories**
PM8907 line adapter/charger, i400s current clamp, STL120 shielded test leads set, AC120 alligater clips, HC120 hook clips, BB120 shielded BNC adapter, BP130 NiMH battery pack, VPS40 voltage probe

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

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| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 125 Scopemeter | **134-9261** | 1,288.00 | 1,249.36 | 1,211.88 |
| **Accessories** | | | | |
| SCC120E Kit | **908-149** | 282.00 | 267.90 | 260.85 |
| **Standard Calibration Charge** | | S C14 | Price Each 68.51 | |
| **UKAS Calibration Charge** | | N C14 | 90.30 | |

### Colour Scopemeters

**190C Series**





H=256, W=169, D=64mm Weight = 1.95kg



- Up to 200 MHz bandwidth
- Up to 2.5 GS/s real time sampling
- Connect-and-View triggering for an instant stable waveform
- Automatic capture and replay of last 100 screens
- Colour screen for easy identification of individual waveforms
- Full-size, high-resolution screen for revealing more signal detail
- Digital Persistence for analysing complex dynamic waveforms as on an analogue scope
- FFT spectrum analysis
- 3k memory per channel
- Fast display update rate for seeing dynamic behavior instantaneously
- Stop-on-Trigger in ScopeRecord mode for storing and analyzing pre-trigger waveform data
- Waveform reference for visual comparison
- Vpwm function for motor drive and frequency inverter applications
- Isolated Inputs (1,000 V CAT II / 600 V CAT III)
- 4 hours battery operation
- N-cycle+ Dual scope triggering

The ScopeMeter 190C Series with large, high-resolution, colour screen and new Digital Persistence mode give a great view of complex waveforms in the most demanding trouble-shooting applications in the field.

**Included accessories**
Battery charger/Line voltage adapter, voltage probe sets and probe accessories, test leads, user manual, rechargeable NiMH battery (installed), Industrial alligators and 2-mm test probes.

**Optional accessories**
**SW90W FlukeView Software**
FlukeView ScopeMeter software for Documenting: Transfer screens, waveforms, and measurement data from the ScopeMeter to your PC for printing, or to import data to other programs. Archiving: Store and retrieve waveforms with text annotations and create your own library for easy reference and comparison. Analysis: Gather valuable measurement data and enable cursor measurements to reveal relationships and conditions. Extended recording of up to four user-selected measurements help you monitor and analyze slow moving signals and related events. Upload waveforms to the PC and use cursors for detailed measurements. Perform waveform analysis, including analyzing harmonics.

**SCC190 Kit Contents:**
- C190 Hard Carrying Case
- PM9080/101 Optically Isolated RS-232 Adapter/Cable
- SW90W/034EFG FlukeView Software for Windows. English, French and German language

| | Fluke 199C | Fluke 196C | Fluke 192C |
|---|---|---|---|
| Bandwidth | 200MHz | 100MHz | 60MHz |
| Max. Real-time sample rate | 2.5 GS/s | 1 GS/s | 500 MS/s |
| LCD Display | 144mm Monochrome LCD | | |
| Wavefrom Compare | Visual Referance | | |
| Maximum Record Length | in Scope Mode: 3000 points per input channel | | |
| | in Scope Record mode: 27,500 points per input or more (5 ms/div...2min/div.) | | |
| Number of inputs | 2 plus external/DMM input, all isolated from each other and ground | | |
| Number of digitizers | 2 | | |
| Independantly floating isolated inputs | Up to 1000V between inputs, references and ground | | |

| | Fluke 199C | Fluke 196C | Fluke 192C |
|---|---|---|---|
| Input sensitivity | 5 mV/div. ... 100 V/div. | | |
| Glitch capture | Up to 3 ns using pulse Width triggering; 50 ns peak detect at 5 µ/div. to 1 min/div. | | |
| Timebase range in Scope mode | 5 ns/div. to 2 min/div. | | 10 ns/div. to 2 min/div. |
| Trigger types | Connect-and-View™, Free Run, Single shot, Edge, Delay, Video, Selectable pulse width and External | | |
| Scope measurement | 7 Cursor + 30 automatic | | |
| Wavefrom Mathematics | A + B, A - B, A x B, A versus B (X-Y mode, giving Lissajous diagrams) | | |
| Scope-Record trigger modes | Start on Trigger, Stop on Trigger | | |
| Capture last 100 screens | Automatic, with replay capability | | |
| Dual input TrendPlot | Yes, with Cursors and Zoom | | |
| Memory for screens/set-ups | 10 screens and set-ups; 5 more memories are made available upon registration of the scopemeter | | |
| Memory for recordings | Two, each can store 100 scope screens, a ScopeRecord or TrendPlot | | |
| True RMS multimeter | 5000 count, Volts, Amps, Ohms, Continuity, Diode, Temperature | | |
| Safety certified (EN61010-1) | 1000V CAT II / 600V CAT III (instrument and included accessories) | | |
| Battery (installed) | 4 hr Ni-MH BP190 | | |
| Line Power | Adapter/battery-charger included | | |
| PC and Printer interface | Using optional Optically Isolated RS-232 adaptor / cable | | |

385820

| Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| **UK Power Adaptor** | | | | |
| FLUKE 192C | NEW **167-1233** | 2,196.00 | – – | – – |
| FLUKE 196C | **385-7580** | 2,576.00 | 2,498.72 | 2,423.76 |
| FLUKE 199C | **385-7610** | 2,980.00 | 2,890.60 | 2,803.88 |
| **European Power Adaptor** | | | | |
| FLUKE 192C | NEW **167-1234** | 2,196.00 | – – | – – |
| FLUKE 196C | **736-3516** | 2,576.00 | 2,498.72 | 2,423.76 |
| FLUKE 199C | **736-3524** | 2,980.00 | 2,890.60 | 2,803.88 |
| **Accessories** | | | | |
| FlukeView Software SW90W | **431-4566** | 232.00 | 225.04 | 218.29 |
| SCC 190 Kit | **308-4292** | 420.00 | 407.40 | 395.18 |
| C101 Carry Case | **947-9783** | 34.00 | 32.98 | 31.99 |

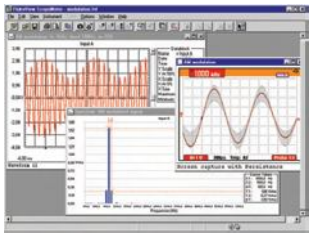
## ScopeMeter™ Accessories

**A range of accessories for FLUKE ScopeMeters™**




LATEST PRICING



**SW90W FlukeView™ Software**

Windows-based software allowing user-friendly interfacing of the ScopeMeter to a PC. Functions available depend on the model used, see the Selection Guide for further details. Minimal functionality comprises the transfer and storage of ScopeMeter images, with optional printout via the PC. Some ScopeMeter models support full remote control from the PC using this software.

**PM9080 Interface Adaptor**

An RS232 interface adaptor for connecting the ScopeMeter (not 93 or 95 models) to either a printer or a PC. Where print-out is supported (see Selection Guide), direct output is possible to Epson FX, LQ or HP ThinkJet compatible printers. This interface cable is required to be used with the FlukeView™ software.

**SCC120 Special Value Kit**

- For Fluke 123/126
- FlukeView Software for Windows. English, French and German language
- PM9080 Optically Isolated RS-232 Adapter/Cable
- ScopeMeter 120 Series Hard Carrying Case (black)
- One BB120 Adapter
- Dimensions case: W x H x D = 40 x 34 x 12 cm

**SCC190 Kit**

- For Fluke 190B/C Scopemeter
- C190 Hard Carrying Case
- PM9080/101 Optically Isolated RS-232 Adapter/Cable
- SW90W/034EFG FlukeView Software for Windows. English, French and German language

**C195 Soft Carry Case**

A zipped vinyl case for the storage and transport of ScopeMeter™ test tools with compartments for accessories. Allows hand or should carrying.

**190 Hard Carry Cases**

Heavy duty carry polypropylene cases, suitable for the storage and transportation of ScopeMeter™ test tools and accessories. Features internal compartments and a carry handle.

**VPS 100 Probe Set**

100Mllz, 10:1 probe set.
600V CHIII/1000V CATII.
Red & Gray

**10:1 Scope Probes and Accessory Sets**

Spare Voltage probes and Accessory sets for the ScopeMeter™ range. Available in red or grey. Length 1.5m.

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

385817

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| FlukeView™ Software | SW90W | **431-4566** | 232.00 | 225.04 |
| Fluke 123/126 accessory kit | SCC 120 | **908-149** | 282.00 | 267.90 |
| Fluke 190B/C accessory kit | SCC 190 | **308-4292** | 420.00 | 407.40 |
| Interface Adaptor | PM9080 | **252-384** | 174.00 | 168.78 |
| Soft Carry case | C195 | **312-3364** | 152.00 | 147.44 |
| Hard Carry case | C190 | **312-3352** | 165.00 | 160.05 |
| Probe Set | VPS100 | **356-4794** | 331.00 | 321.07 |
| Probe - Red | VPS200-R | **312-3376** | 181.00 | 175.57 |
| Probe - Grey | VPS200-G | **312-3388** | 181.00 | 175.57 |
| Probe Accessory Kit - Red | AS200R | **431-4621** | 74.00 | 71.78 |
| Probe Accessory Kit - Grey | AS200G | **431-4633** | 74.00 | 71.78 |

## Colour ScopeMeters with Industrial Bus Health Test

FLUKE

New



225C



215C

The Fluke-225C and 215C add Industrial Bus Health Test to the Fluke 190C-series of Color ScopeMeters (the full functionality of the Fluke 199C and 196C are included).

**Bus Health mode**

Industrial Buses (so called Field Buses) link machinery on the factory floor to each other, to sensors and actuators and to centralized computers or control systems.
The Fluke-225C and 215C now offer extensive capabilities to test the proper functioning of the industrial bus by analyzing the electrical signals on the network.

**Supported Fieldbus types are:**

- AS-i (EN50295, 166 kb/s);
- CAN-bus (ISO-11898, up to 1 Mb/s);
- Modbus (EIA-232 up to 115 kb/s; EIA-485 up to 10 Mb/s);
- Foundation Fieldbus H1 (61158 type 1, 31.25 kb/s) ;
- Profibus DP (EIA-485 up to 10 Mb/s);
- Profibus PA (61158 type 1, 31.25 kb/s);
- Ethernet 10Base2 (coaxial);
- Ethernet 10BaseT (UTP, 10 Mb/s);
- Ethernet 100BaseT (100 Mb/s);
- RS-232 (EIA-232, up to 115 kb/s);
- RS-485 (EIA-485, up to 10 Mb/s).

**New accessory included: BHT190.**

Set of 3 bus system break-out adapters for DB-9, M12 and RJ-45 connection systems. Each contact of the connector is made accessible for hooping up a probe.
One BHT190 (set of 3 adapters) is included with the 225C and 215C, the adapter set is optionally available to support the Fluke 125.
All accessories of the 199C (196C) are also included with the 225C (215C).

The Fluke-225C and 215C now offer extensive capabilities to test the proper functioning of the industrial bus by analyzing automatically the electrical signals on the network against defined bus standards, saving valuable time and eliminating potential human errors

525721

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| **UK Version** | | |
| FLUKE 225C/004 | **167-1229** | 3,520.00 |
| FLUKE 215C/004 | **167-1231** | 3,163.00 |
| **Europe Version** | | |
| FLUKE 225C/001 | **167-1230** | 3,520.00 |
| FLUKE 215C/001 | **167-1232** | 3,163.00 |
| **Accessories** | | |
| FLUKE BHT190 | **167-1235** | 195.00 |

## Oscilloscopes - Handheld - continued

### Handheld Digital Oscilloscopes
**U1600A Series**

Agilent Technologies



W=138, H=241, D=66mm. Weight 1.5kg

A three-in-one solution: Dual channel oscilloscope, True RMS DMM and Real-Time Data Logger. A high performance troubleshooting and quality assurance tool for technical professionals in the installation, maintenance, service and automotive industries.

- Large 4.5" 320x240 pixel colour LCD display
- Full remote control and data transfer via PC Link application software
- USB 1.1 full speed interface connectivity
- Multi-language Quick Help support
- 125 kilobytes/channel of waveform memory depth
- Up to 10 waveforms and configuration setups can be stored and recalled at anytime
- For extra storage, versions with USB flash drive support are available
- Real-time data logging functionality

**Oscilllscope features:**

- Available in 20MHz and 40MHz bandwidth versions
- Autoscaling
- Dual Waveform Math (DWM) and Fast Fourier Transform (FFT)
- 22 automatic measurements and cursor measurements

LATEST PRICING

**Multimeter features:**

- 6000 count auto-ranging TRMS Digital Multimeter
- Voltage, Resistance and Capacitance measurements
- Diode and Continuity tests

**Oscilloscope Specifications**

| | U1602A | U1604A |
|---|---|---|
| Bandwidth | 20MHz | 40MHz |
| Max. Sample Rate | 200 MSamples/sec (interleaved) | |
| Rise Time | 17ns | 8ns |
| Memory Depth | 125 kB / channel | |
| **Vertical System** | | |
| Vertical Range | 5mV/div to 100V/div | |
| Vertical Resolution | 8 bits | 8 bits |
| DC Vertical Gain Accuracy | 3% | 3% |
| **Horizontal System** | | |
| Horizontal Range | 50ns/div to 50s/div | 10ns/div to 50s/div |
| Horizontal Resolution | 2ns | 400ps |
| Horizontal Accuracy | 3% | 3% |
| **Triggering** | | |
| Trigger Source | Channel 1 and Channel 2 | |
| Trigger Modes | Auto, Normal, Single, Roll | |
| Selections | Edge, Pattern, Pulse Width, Video | |
| **Automatic Measurements** | | |
| Voltage | pk-to-pk, max, min, amplitude, top, base, overshoot, preshoot, RMS and mean | |
| Time | frequency, period, width, duty cycle, rise time, fall time, delay and phase shift | |
| Waveform Maths | CH1+CH2, CH1-CH2, CH2-CH1 | |
| FFT (U1604A only) | Rectangular, Hanning, Hamming and Blackman-Harris windows | |

**Multimeter Specifications**

| | Ranges | Best Accuracy |
|---|---|---|
| AC Voltage | 600mV to 600V | ±(0.75% rdg + 0.2% range) |
| DC Voltage | 600mV to 600V | ±(0.3% rdg + 0.08% range) |
| Resistance | 600Ω to 600MΩ | ±(0.5% rdg + 0.2% range) |
| Capacitance | 60nF to 300µF | ±(2% rdg + 0.2% range) |

**Accessories included:** Probe (1:1) CAT III 300 V, Probe (10:1) CAT III 600 V, Ground alligator clip, DMM test lead, Hook Clip, Medium jaw alligator clip, USB cable, Power lead and AC adapter, Ni-MH battery pack, Quick Start Guide, CD-ROM containing Users Guide, Quick Start Guide and PC Link Application Software.

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

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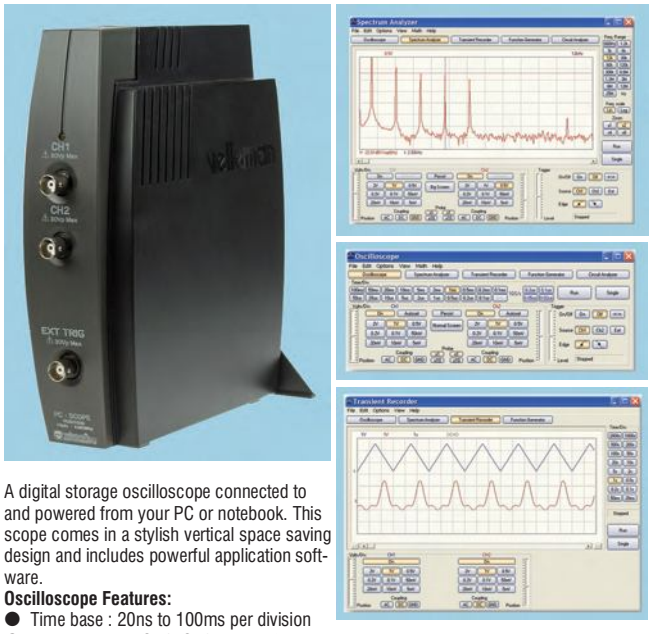
| Description | Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|---|
| 20MHz Scope | U1602A | **126-3223** | 850.00 | 841.50 | 833.09 | 824.75 |
| 20MHz Scope with USB | U1602A-001 | **126-3224** | 944.46 | 934.52 | 925.58 | 915.65 |
| 40 MHz Scope | U1604A | **126-3226** | 1,061.00 | 1,050.39 | 1,039.89 | 1,029.49 |
| 40MHz Scope with USB | U1604A-001 | **126-3227** | 1,155.46 | 1,143.52 | 1,132.58 | 1,120.65 |
| Soft Carry Case | U1590A | **126-3233** | 32.23 | 31.91 | 31.59 | 31.27 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C19 | 89.27 |
| **UKAS Calibration Charge** | N C19 | 141.49 |

## Oscilloscopes - PC Based

### USB PC Oscilloscope
**PCSU1000**

velleman INSTRUMENTS



A digital storage oscilloscope connected to and powered from your PC or notebook. This scope comes in a stylish vertical space saving design and includes powerful application software.

**Oscilloscope Features:**

- Time base : 20ns to 100ms per division
- Trigger source: CH1, CH2, EXT or free run
- Trigger edge : rising or falling
- Trigger level : full-screen adjustable
- Markers for voltage and time/frequency
- Input range : 5mV to 2V/division
- Input sensitivity: 0.15mV display resolution
- Auto set-up function and X10 option
- Pre-trigger function
- Measures True RMS, dBV, dBm, p to p, Duty cycle, Frequency...
- 4K samples / channel record length
- 1.25kHz to 50MHz real time sampling frequency
- 1GHz sampling frequency for Repetitive signals

**Spectrum Analyser Features:**

- 1.2kHz to 25MHz frequency range
- Linear or logarithmic timescale
- Zoom function
- Markers for amplitude and frequency

**Transient Record Features:**

- Timescale: 20ms/Div to 2000s/Div
- 9.4hour/screen max. record time
- Automatic storage of data
- Automatic recording for more than 1 year
- Sampling rates from 100samples/s to 1sample every 20s
- Markers for time and amplitude
- Record and display of screens

**General Specifications:**

- Inputs: 2 channels, 1 external trigger input
- Input impedance : 1 MΩ / 30pF
- Bandwidth: DC to 60 MHz ±3dB
- Maximum input voltage : 30V (AC + DC)
- Input coupling : DC, AC and GND
- Supplied with 2x 60MHz scope probes, USB cable, Software CD, Getting Started manual and a DLL which allows you to create your own applications

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| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| Pocket Scope | **127-0136** | 306.48 | 292.13 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C18 | 89.27 |
| **UKAS Calibration Charge** | N C18 | 123.00 |

**Technical information at your fingertips**

Over **352,000** technical datasheets available online.

Visit **www.farnell.co.uk** and look for the **Tech Info** heading in your search results.

## 50MHz Digital Oscilloscope - 2 Channel

**PCS500**





H = 45, W = 230, D = 165 (mm)

A digital storage oscilloscope, Spectrum Analyser and Transient Recorder that uses a PC to display and store waveforms and measurements. All standard oscilloscope functions are available and the box accepts a standard BNC test probe. The unit has an optically isolated computer interface and printer connection and can be daisy chained with the Velleman PCG10 (Order Code: 4283478) function generator. Supplied with the powerful PC-LAB 2000 Windows software, interface lead and a BNC to croc clip test lead. Requires a 9V 1A power supply.

**Oscilloscope Functions**

- 50MHz measurement range, 50MHz real-time sampling rate
- 2 channels, external trigger
- Auto set up
- DC, AC and GND coupling
- CH1, CH2, EXT or Free Run triggering
- Voltage, Time and Frequency measurement markers
- 20ns to 100ms/div time base
- 5mV to 15V/div input sensitivity
- True RMS readout (AC only)
- Optcally isolated computer interface and printer connection

**Spectrum Analyser**

- 0 to 25MHz frequency range
- Linear or Log scale
- FFT (Fast Fourier Transform) operating principle
- FFT resolution: 2048 lines
- FFT input on CH1 or CH2
- Zoom Function
- Amplitude and Frequency measurement markers

**Transient Recorders**

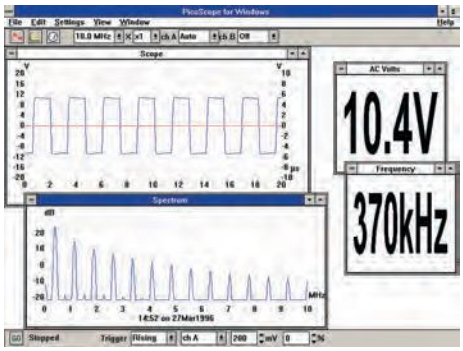
- 20ms to 2000s/div time scale
- 1 sample/20s to 100 samples/s sampling rate
- 9.4 hour/screen recording time
- Automatic data storage and recording for more than 1 year
- Time and Amplitude measurement markers
- ASCII data format

| | | | |
|---|---|---|---|
| Input Voltage | 100V max. AC+DC | Input Impedance | 1MΩ // 30pF |
| Frequency Response (±3dB) | 0 to 50MHz | | |

248916

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| PCS500 | **428-4010** | 263.93 | 262.04 |
| 9V, 1.5A PSU | **117-6292●** | 18.78 | 17.96 |
| | | | **Price Each** |
| **Standard Calibration Charge** | | S C18 | 89.27 |
| **UKAS Calibration Charge** | | N C18 | 123.00 |

## PC Based Oscilloscopes




A range of PC based oscilloscopes that offer all the advantages of conventional scopes, and many features not normally available at this price range.

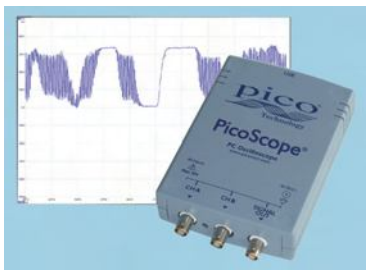
- Multiple views – Simultaneous views of scope, spectrum analyser and meters
- Waveforms can be saved, printed, faxed or E-mailed from your PC
- Use PC monitor – large colour display, ideal for education and training
- Save multiple set-ups for different tests and experiments
- Easy to install and use – up and running in minutes
- Can be used with desktop or laptop PCs

Each unit is also supplied with PicoLog data logging software. Drivers and examples are included for C, Pascal, Delphi, Visual Basic and LabVIEW. A macro is included to collect data directly into an Excel spreadsheet. All units are suitable for use with DOS and Windows.

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## PicoScope 2000 series PC Oscilloscopes

New



The PicoScope 2000 series has been designed to offer excellent performance at a price that represents the ultimate in value.

- 5 MHz to 20 MHz bandwidth available in three models
- Up to 200 MS/s real-time sample rate
- Up to 16 K record length
- Connected and powered via USB 2.0 (480 Mbps)
- Lightweight and compact size ideal for field use
- PicoScope 6 high-end oscilloscope software included
- Compatible with LabVIEW, C/C++, Delphi and VB
- Operates with Windows XP and Vista

**All-in-one instrument**

Each model is an all-in-one full-function oscilloscope, spectrum analyser, signal generator and arbitrary waveform generator (AWG), making it extremely versatile and great value for money. Unbeaten for functionality and price, the PicoScope 2000 series is destined to impress with its compact footprint of 100 x 135 mm, and fits perfectly into a laptop or travel bag. The small, rugged case has three BNC connectors; two dedicated input channels and a dedicated BNC for the signal generator and arbitrary waveform generator.

**Power and speed**

The PicoScope 2000 series takes its power directly from the PC, and uses the full USB 2.0 bandwidth (480 Mbps) allowing a blistering screen update rate without compromising accuracy and detail.

**High-end software**

All PicoScope® PC Oscilloscopes are powered by high-end PicoScope 6 Windows software, with updates, feature extensions and improvements that will remain free for the lifetime of the product. PicoScope 6 is powerful yet easy to operate. Users benefit from the power of the PC, and the familiar Windows interface and controls, making the software easy to learn and easy to use on a daily basis. Data is easily saved in a variety of formats including CSV text, PNG and BMP images and MATLAB binary files.

Drivers and examples are included for LabVIEW, C/C++, Delphi and VB for integration into custom applications.

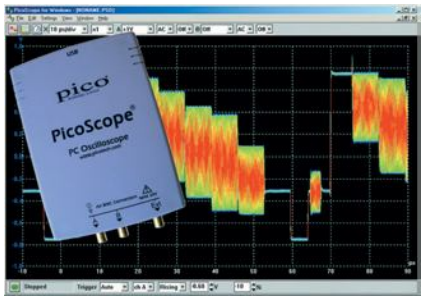
| **Model** | **PicoScope 2203** | **PicoScope 2204** | **PicoScope 2205** |
|---|---|---|---|
| Bandwidth | 5MHz | 10MHz | 25MHz |
| Sample Rate | 40 MS/s | 100 MS/s | 200 MS/s |
| Record Length | 8K | 8K | 16K |
| AWG | Yes | Yes | Yes |

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| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| PicoScope 2203 | 2203 | **147-1475** | 159.00 | 146.77 | 136.29 |
| PicoScope 2204 | 2204 | **147-1476** | 225.00 | 205.00 | 192.86 |
| PicoScope 2205 | 2205 | **147-1477** | 300.00 | 275.00 | 257.14 |

## General Purpose PC Oscilloscopes

**PicoScope 3000 Series**



- Up to 200MS/s real-time sampling rate
- Up to 10GS/s sample rate (repetitive mode)
- Up to 200MHz bandwidth
- Up to 1MB buffer memory
- Advanced display and trigger modes
- Compact and portable
- USB2 powered for high speed data transfer (USB1.1 compatible)
- Supplied with PicoScope (oscilloscope/spectrum analyser) and PicoLog (data acquisition) software

The PicoScope 3000 series offer performance levels that match or exceed conventional instruments. A USB interface connects the instrument to the PC, to turn your PC into an oscilloscope and spectrum analyser. A range of advanced display modes, measurements and automated measurements are available to analyse even the most complex of signals. The unit also provides a spectrum analyser and multimeter operation, and can simultaneously display this information on multiple windows on the PC screen.

# Oscilloscopes - PC Based - continued

## General Purpose PC Oscilloscopes - continued

### PicoScope 3000 Series - continued

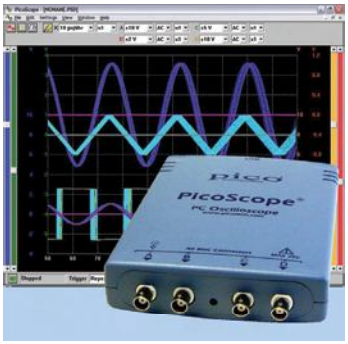
| PicoScope | 3204 | 3205 | 3206 |
|---|---|---|---|
| Bandwidth | 50MHz | 100MHz | 200MHz |
| Sample rate (repetitive) | 2.5GS/s | 5GS/s | 10GS/s |
| Sample rate (single shot) | 50MS/s | 100MS/s | 200MS/s |
| Channels | 2+Ext trigger | 2+Ext trigger/Sig gen | 2+Ext trigger/Sig gen |
| Timebase | 5ns/div to 50s/div | 2ns/div to 50s/div | 1ns/div to 50s/div |
| Timebase accuracy | 50ppm | 50ppm | 50ppm |
| Spectrum ranges | 0 to 25MHz | 0 to 50MHz | 0 to 100MHz |
| Record length | 256K | 512K | 1MB |
| Resolution accuracy | 8 bits/3% | 8 bits/3% | 8 bits/3% |
| Ranges | 10mV to 2V/div | 10mV to 2V/div | 10mV to 2V/div |
| PC Connection | USB2.0 or USB1.1 | USB2.0 or USB1.1 | USB2.0 or USB1.1 |

**Picoscope Case Bundle**
PicoScope PC oscilloscope, Software & Reference CD, Oscilloscope Probes, USB cable, installation guide and hard carry case.

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| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| 3204 - 50MHz | **782-0100** | 399.00 | 359.10 |
| 3205 - 100MHz | **782-0119** | 599.00 | 539.10 |
| 3206 - 200MHz | **782-0127** | 799.00 | 719.10 |
| 3204 CASE BUNDLE | **123-0262** | 407.00 | 366.30 |
| 3205 CASE BUNDLE | **123-0263** | 607.00 | 546.30 |
| 3206 CASE BUNDLE | **123-0264** | 807.00 | 726.30 |
| | | | **Price Each** |
| **Standard Calibration Charge** | | **S** C18 | 89.27 |
| **UKAS Calibration Charge** | | **N** C18 | 123.00 |

## High Precision PC Oscilloscopes
## PicoScope 3000 Series




W=140 H=45 D=190

The PicoScope 3000 Series High-Precision PC Oscilloscopes with USB interface offer large buffer memories, twelve-bit precision and fast data transfer. Using advanced low-power electronics, the oscilloscopes draw their power from the USB port of any modern PC, eliminating the need for an external power supply.

- 2 or 4 channel versions
- 12-bit resolution
- 512kSample memory buffer
- Connected and powered from the PC USB port
- Supplied with PicoScope, PicoLog and 32-bit programming libraries
- Compatible with Windows 98SE, ME, 2000, XP and Vista

| Model | PICOSCOPE 3224 | PICOSCOPE 3424 |
|---|---|---|
| Bandwidth | 10 MHz | |
| Sampling Rate | 20 MS/s | |
| Timebases | 500 ns/div to 20 s/div | |
| Timebase Accuracy | 100ppm | |
| Channels | 2 | 4 |
| Buffer Length | 512,000 samples | |
| Voltage Ranges | ±20mV to ±20V | |
| Voltage Accuracy | ±1% | |
| Resolution | 12 bits | |
| Accuracy | %1 | |
| Dynamic Range | 72 dB | |
| Spectrum Range | DC to 10MHz | |
| Connection to PC | USB 2.0 (USB1.1 compatible) | |
| Power Supply | From USB Port | |

**Picoscope Case Bundle**
PicoScope PC oscilloscope, Software & Reference CD, Oscilloscope Probes, USB cable, installation guide and hard carry case.

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| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| PICOSCOPE 3224 | **107-6327** | 399.00 | 359.10 | 319.20 |
| PICOSCOPE 3424 | **107-6328** | 699.00 | 629.10 | 559.21 |
| 3224 CASE BUNDLE | **123-0260** | 407.00 | 366.30 | 325.60 |
| 3424 CASE BUNDLE | **123-0261** | 717.00 | 645.30 | 573.60 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | **S** C18 | 89.27 | |
| **UKAS Calibration Charge** | | **N** C18 | 123.00 | |

## Oscilloscope, High Resolution
### 2Ch / 4Ch




4224




4424

New

The PicoScope 4000 Series High-Resolution PC Oscilloscopes are designed to meet the requirements of modern electronic engineering servicing, design and debugging. With their high input resolution, they can detect or trigger on voltage changes of less than 50 µV. This makes them ideal for electromechanical applications such as monitoring transducers, and for spectral analysis of audio, noise and vibration. The PicoScope 4000 oscilloscopes are bundled with PicoScope software, scope probes and a tough carry case.
All PicoScope® PC Oscilloscopes are powered by the PicoScope 6 Windows software, which frequently receives free updates, feature extensions and improvements. PicoScope 6 is powerful yet easy to operate. Its 26 automatic measurements, suite of advanced triggers and many other features can be quickly accessed using standard Windows controls.

PicoScope 4000 Series High-Precision PC Oscilloscope

- Accurate 12-bit resolution inputs
- 20 MHz bandwidth
- 2 or 4-channel models available
- 32 Msample memory
- Fast 80 MS/s sample rate
- 1% vertical accuracy
- USB 2.0 connection and power
- PicoScope 6 software for XP SP2 and Vista included
- API compatible with LabVIEW, C/C++, VB, Excel and Delphi

| Model | PicoScope 4224 | PicoScope 4424 |
|---|---|---|
| Number of channels | 2 | 4 |
| Vertical resolution | 12 bits | |
| Analog bandwidth | 20 MHz | |
| Maximum sampling rate (real time) | | |
| One channel in use | 80 MS/s | |
| Two channels in use | 80 MS/s (A+C, A+D, B+C, B+D)<br>20 MS/s (all other combinations) | |
| Three or four channels in use | 20 MS/s | |
| Record length | 32 MS | 32 MS |
| | Buffer shared between enabled channels | |
| Inputs | | |
| Input characteristics | BNC, 1 M ohm " 22 pF | |
| Coupling | Software-selectable AC/DC | |
| Voltage ranges | ±50 mV, ±100 mV, ±200 mV, ±500 mV, ±1 V, ±2 V, ±5 V, ±10 V, ±20 V, ±50 V, ±100 V | |
| Accuracy | 1% | |
| Overload protection | ±200 V | |
| Timebase Ranges | 100 ns/div to 200 s/div | |
| Timebase accuracy | 50 ppm | |
| Operating environment | | |
| Temperature range | 0°C to 45°Cfor normal operation | |
| Humidity | 5% to 80% RH, non-condensing | |
| PC connection | USB 2.0<br>Compatible with USB 1.1 | |
| Power supply | 5 V @ 0.5 A max. (from USB port) | |
| Dimensions | 200 mm x 140 mm x 35 mm | |
| Weight | Less than 0.5kg | |
| Compliance | European EMC and LVD standards<br>FCC Rules Part 15 Class A | |

525452

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| PICOSCOPE 4224 | **166-9212** | 519.00 |
| PICOSCOPE 4424 | **166-9213** | 825.00 |

## High Precision PC Oscilloscopes
### PicoScope 5000 Series




W=170 H=40 D=255mm. Weight 900g



It has all the performance of a full-sized 'benchtop' model, but takes up a fraction of the space. It sends the data to your PC using its high-speed USB interface. Capture fast transients and complete waveforms at the same time, thanks to the huge memory depth of the PicoScope 5000 Series you can use the full 1GS/s sampling rate all the way down to 10ms/div. If even the 128 million sample record length isn't enough, you can record directly to PC memory at up 6MS/s (PC dependent). Now you can inspect long-duration events in minute detail, limited only by your computer's memory.

- 250MHz bandwidth
- 1GS/s real time sample rate
- 128M Sample record length
- Advanced triggers - Pulse width, Window, Dropout, Delay, Logic Level
- Automatic Measurements including RMS, pulse width and rise and fall times
- Arbitrary Waveform Generator - built in 12 bit , 125MS/s arbitrary waveform generator
- Spectrum analyser - allows up to 250MHz signals to be viewed in the frequency domain
- Up to 6MS/s continuous gap-free data acquisition direct to PC memory
- Powerful visual capture and analysis
- Waveform buffer saves the last 127 captures so you can scroll back to view previous measurements
- Software includes Picoscope 6 and 32-bit programming libraries
- Probe Manager allows you to setup up and save custom probe and sensor settings

**Supplied with:**tough plastic carry case, software CD, USB cable, 2x 250MHz x1/x10 probes

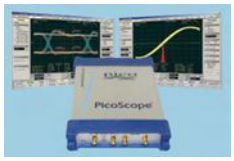
| Model | PICOSCOPE 5203 | PICOSCOPE 5204 |
|---|---|---|
| Channels | 2 | 2 |
| Vertical Resolution | 8 bits | |
| Bandwidth | 250 MHz | |
| Sampling Rate | 1 GS/s (single channel), 500MSa/s (both channels), 20GSa/s (repetitive) | |
| Timebase Accuracy | 50ppm | |
| Buffer Length | 32 MSamples | 128 MSamples |
| Inputs | BNC, 1MΩ '' 16pF, AC or DC coupled | |
| Voltage Ranges | ±100mV to ±20V | |
| Accuracy | %3 | |
| **Triggering** | | |
| Input | BNC, 1MΩ | |
| Trigger Modes | rising/falling edge, dual edge, alternate edges, logic level, window | |
| Advanced Modes | pulse width, dropout, window, logic, state, delay | |
| Threshold | Variable between -20V and +20V | |
| Bandwidth | 150 MHz | |
| **Arbitrary Waveform Generator** | | |
| Waveforms | sine, square, triangle, ramp, sin(x)/x, gaussian, half-sine | |
| Buffer | 8192 samples | |
| Sample Rate | 125MSa/s | |
| Resolution | 12 bits | |
| Amplitude | ±2V | |
| **General** | | |
| Connection to PC | USB 2.0 | |
| Power Supply | 6V dc mains adaptor (supplied) | |

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| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| PICOSCOPE 5203 | **129-6665** | 1,195.00 | 1,075.50 | 956.01 |
| PICOSCOPE 5204 | **129-6666** | 1,795.00 | 1,615.50 | 1,436.02 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C18 | 89.27 | |
| **UKAS Calibration Charge** | | N C18 | 123.00 | |

## Picoscope 9201 & 9211

New






Designed specifically for the complex task of analysing high-speed electrical signals, the PicoScope 9201 & 9211 is ideal for many advanced applications including: signal analysis, timing analysis, testing and design of high-speed digital communication systems, network analysis, semiconductor testing, and research and development.

**Main specifications of the PicoScope 9201 include:**
- 12 GHz bandwidth on 2 channels
- Dual timebase from 10 ps/div
- Up to 10 GHz trigger bandwidth
- 5 TS/s equivalent time sample rate
- High resolution cursor and automatic waveform measurements with statistics
- Waveform processing including FFT
- Time and voltage histograms
- Eye-diagram measurements for NRZ and RZ
- Automated mask test
- USB 2.0 or LAN (optional)
- Familiar Windows graphical user interface
- Lightweight and energy efficient design

**Additional Features for the 9211:**
- Clock data recovery

**Typical applications include:**
- Electrical standards compliance testing
- Semiconductor characterization
- Telecom service and manufacturing
- Timing analysis
- Digital system design and characterization
- Electronic mask drawing and display
- Automatic pass/fail limit testing
- High speed serial bus pulse response

509554

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| PICOSCOPE 9201 | **158-1562** | 5,995.00 | 5,695.00 |
| PICOSCOPE 9211 | **166-9211** | 6,995.00 | – – |

# Oscilloscope Accessories

## BNC to Crocodile Clip Lead



A common test lead for electronics applications. Connects to oscilloscopes, freuency counters, function generators, etc. Manufactured from 50Ω coaxial cable.
IEC1010 rating: 30V AC, 60V DC.

248961

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| JR9021-2M | **428-4227** | 2.25 | 1.91 |

## Oscilloscope Probes



A range of high quality, low cost oscilloscope probes with x1 or x10 attenuation. Supplied with probe accessories.
Length: 1.2m

248924

| Mftrs. List No. | Frequency Rating | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|---|
| PROBE60S | DC to 60MHz | **428-4033** | 12.59 | 11.91 |
| PROBE100 | DC to 100MHz | **428-4045** | 16.67 | 16.52 |
| PROBE150 | DC to 150MHz | **428-4057** | 20.11 | 19.95 |
| PROBE250 | DC to 250MHz | **428-4069** | 23.56 | 23.37 |

## Oscilloscope Probes

TENMA



A range of high quality, low cost replacement probes.
- X1/X10 attenuation (76-107 is X10 only)
- 1Ω (X1) and 10MΩ (X10) input impedance
- 1.2m cable length
- 10-35pF compensation adjustment
- Low noise
- 76-107 includes a readout actuator pin on the BNC connector
- 600V maximum (DC+AC peak)
- **CE** marked, meets **EN-61010-2-031 CAT I (IEC-1010)** requirements
- Includes accessory kit and storage pouch

| Model | Bandwidth (X10 position) | Risetime (X10 position) | Order Code |
|---|---|---|---|
| 76-109 | 60MHz (-3dB) into 18pF | 5.8ns | 342-1582 |
| 76-102 | 100MHz (-3dB) into 16pF | <3.5ns | 342-1594 |
| 76-105 | 200MHz (-3dB) into 14pF | <1.8ns | 342-1600 |
| 76-106 | 250MHz (-3dB) into 14pF | <1.4ns | 342-1612 |
| 76-107 (X10) | 250MHz (-3dB) into 14pF | <1.4ns | 342-1624 |

230669

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-109 | **342-1582** | 16.75 | 16.24 | 15.43 |
| 76-102 | **342-1594** | 17.86 | 17.33 | 16.44 |
| 76-105 | **342-1600** | 27.90 | 27.07 | 25.72 |
| 76-106 | **342-1612** | 33.49 | 32.49 | 30.86 |
| 76-107 | **342-1624** | 31.25 | 30.31 | 28.81 |

## Oscilloscope Probe

**HZ 154**

HAMEG

New




| | |
|---|---|
| Attenuation Ratio | 1:1 / 10:1 |
| Bandwidth | 10 / 150MHz |
| Risetime | <35/2.4ns |
| Input Impedance | 1/10MΩ 82/12pF |
| Max. Input Voltage | (1:1) 400V (DC+peak AC)<br>(10:1) 600V (DC+peak AC) |

347929

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| HZ154 | **120-0916** | 20.79 |

# Oscilloscope Accessories - continued

## Oscilliscope Probes

**6499 and 6500**

Pomona Electronics



- All probes meet IEC1010-2-031, 300V, CAT II

| Model | Attenuation | Bandwidth | Compensation | Voltage max |
|---|---|---|---|---|
| 6499 | x1 / x10 | 20 / 150 | 10 - 60pF | 300 |
| 6500 | x1 / x10 | 30 / 250 | 10 - 50pF | 300 |

382083

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| 20/150MHz Probe | 6499 | **847-1754** | 43.27 | 41.97 | 40.71 |
| 30/250MHz | 6500 | **847-1762** | 46.74 | 45.34 | 43.98 |

## Oscilloscope Probes

**General Purpose**

Pomona Electronics



- One piece (monolithic) design for robust probe life
- Probe bandwidth ratings are specified as a system bandwidth (both probe and oscilloscope). The result is a probe frequency response that can be considered transparent
- All probes meet IEC1010-2-031 300V CAT I

| Model | Probe Ratio | Input Voltage | System Bandwidth MHz | Risetime | Input Res MΩ | Input Cap pF | Compensation range pF | Readout Actuator |
|---|---|---|---|---|---|---|---|---|
| 4550B | 1:1 | 300 | Up to 15[3] | <23.33[3] | 1 | <64 + O-Scope | NA | No |
| | 10:1 | 300 | 100 | <3.50 | 10 | <10.5 | 10 - 60 | |
| 5806A | 1:1 | 300 | Up to 20[3] | <17.5[3] | 1 | <77 + O-Scope | NA | No |
| | 10:1 | 300 | 200 | <1.75 | 10 | <11.5 | 10 - 60 | |
| 5812A | 10:1 | 300 | 300 | <1.17 | 10 | <17 | 10 - 60 | Yes |
| 6069A | 10:1 | 300 | 250 | <1.40 | 10 | <10 | 10 - 30 | No |

382075

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| 100 MHz Probe | 4550B | **847-1614** | 40.68 | 39.46 | 38.28 |
| 200 MHz Probe | 5806A | **847-1690** | 46.74 | 45.34 | 43.98 |
| 300 MHz Probe | 5812A | **847-1703** | 79.62 | 77.23 | 74.91 |
| 250 MHz Probe | 6069A | **847-1738** | 43.27 | 41.97 | 40.71 |

## Passive Modular Probes

**TT-LF-312 and TT-MF-312**

TESTEC



Set comprises: 2 test probes, 2 plug-in spring-hook probe tips, 2 earth leads, a spare probe tip and an alignment tool.

| | TT-LF312 | TT-MF312 |
|---|---|---|
| Bandwidth | 150MHz | 250MHz |
| Max. Input Voltage | 600V | 600V |
| Attenuation | x1 / x10 | x1 / x10 |
| Rise Time | 24ns / 2.3ns | 18ns / 1.4ns |
| Input Capacitance | 47pF / 15.5pF | 47pF / 15pF |
| Input Impedance | 10Mohm | 10Mohm |
| Cable Length | 1.2m | 1.2m |

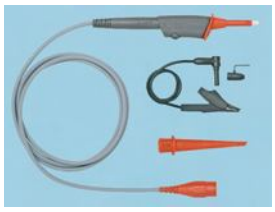
248697

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| TT-LF312-2-6 10020-2-6 | **430-8098** | 21.75 | 21.08 | 20.56 |
| TT-MF312-2-6 10020-2-6 | **430-8104** | 33.30 | 32.19 | 31.47 |

## Insulated Oscilloscope Probes

**72940-2**

Pomona Electronics



72940-2 (Red)

- With CAT II, 600V (CAT III, 300V) rating, these probes are ideal for use with portable oscilloscopes
- 500 MHz bandwidth
- Fully insulated - Meets IEC 61010-031
- Ergonomic design with comfort grip
- Push-on hook and ground contact

Accessories included: Push-on hook clip, push-on reference contact, reference lead with alligator clip for the connection to the 0.2mm socket in the handle

| | | | |
|---|---|---|---|
| Dividing Ratio | 10:1 | Lead Length | 1.2m |
| Input Capacitance | 13pF | Ground Clip Lead Length | 25cm |
| Input Impedance | 10MΩ | Ground Clip Opening | 7mm |
| Compensation Range | 10pF to 30pF | Rated Voltage | CAT II, 600V (CAT III, 300V) |
| Frequency Range | 0 - 500MHz | | Frequency dependant |
| Rise Time | 1ns | | |

489310

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 72940-2 | **142-2700** | 124.77 | 121.03 | 117.40 |

## High Voltage Probes

**HV Series**

TESTEC



| | HV150 | HV250 |
|---|---|---|
| Attenuation | x100 | x100 |
| Loading Input | 100pF | 100pF |
| Bandwidth | 300MHz | 300MHz |
| Rise Time | 1.2ns | 1.2ns |
| Max. Input voltage | 1500Vp | 2500Vp |

Length: 1.2m

347937

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| HV150 | **220-541** | 32.52 |
| HV250 | **354-612** | 35.20 |

## Isoprobe® II Safety Oscilloscope Probes

MC



Fully insulated, high frequency oscilloscope probes. Supplied with plug-in reference lead

- Highly flexible coaxial cable
- Insulated safety BNC plugs
- Ergonomically designed probes with finger guards and stainless steel tips
- Up to 1000V CATII IEC1010 rating

**10:1 250MHz Probe:** A medium frequency divider probe that is a valuable aid to the electric power engineer who wants both reliability and safety. High dielectric strength. Rise Time: 1.2ns. Input Impedance: 10MΩ. Capacitance: 14pF. IEC 1010 rating: 1000V CATII.

**10:1 450MHz Probe:** A high quality probe assembly for the professionally equipped test engineer. Rise Time: 1ns. Input Impedance: 10MΩ. Capacitance: <14pF. IEC1010 rating: 1000V CATII.

**100:1 300MHz Probe:** A high quality oscilloscope probe assembly for the safe measurement of high voltages. The low input capacitance and high input impedance makes the probe particularly suitable for measurements on sensitive circuits. For voltages up to 5kV. Rise Time: <1ns. Input Impedance: 100MΩ. Capacitance: ≤6pF. IEC1010 rating: 1000V CAT II.

339906.267770

| Description | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 10:1 250MHz Safety Probe | **499-1540** | 38.64 | 37.04 | 34.42 |
| 10:1 450MHz Safety Probe | **499-1552** | 38.52 | 36.95 | 34.33 |
| 100:1 300MHz Safety Probe | **499-1564** | 37.15 | 35.62 | 33.08 |

## Power differential probes

**TA041, TA042, TA043, TA057, TA058**

pico Technology Limited

New



TA041



TA042



TA043



TA058

- Ideal for power electronics measurements
- Internal battery option (TA041, TA042, TA043, TA057)
- Optional battery pack and Probus adapter (TA058 only)
- Measurement range covers from millivolts to ±1400V
- 25MHz, 50MHz and 100MHz bandwidth versions available
- BNC connection

| Model | Bandwidth | Common mode | Differential | Battery power |
|---|---|---|---|---|
| TA041 | 25MHz | ±700V | ±70V, ±700V | Internal |
| TA057 | 25MHz | ±1400V | ±140V, ±1400V | Internal |
| TA058 | 50MHz | ±700V | ±70V | Opt. TA047 |
| TA043 | 100MHz | ±700V | ±70V, ±700V | Internal |
| TA042 | 100MHz | ±1400V | ±140V, ±1400V | Internal |

| Model | Attenuation | Input R and C | Safety category rating |
|---|---|---|---|
| TA041 | 1/10, 1/100 | 4MΩ / 5.5pF | CAT III |
| TA057 | 1/20, 1/200 | 4MΩ / 5.5pF | CAT III |
| TA058 | 1/10 | 1.6MΩ / 7pF | CAT I |
| TA043 | 1/10, 1/100 | 4MΩ / 5.5pF | CAT III |
| TA042 | 1/100, 1/1000 | 4MΩ / 7pF | CAT III |

525347

| Mftrs. List No. | Bandwidth MHz | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| TA041 | 25 | **166-7343** | 190.00 | 180.00 |
| TA057 | 25 | **166-7344** | 220.00 | 205.00 |
| TA058 | 50 | **166-7345** | 245.00 | 230.00 |
| TA042 | 100 | **166-7346** | 300.00 | 283.00 |
| TA043 | 100 | **166-7347** | 450.00 | 430.00 |
| **Accessories** | Description | | 1+ | 3+ |
| TA047 | Battery Pack (TA058 only) | **166-7356** | 37.00 | 34.00 |
| PS008 | Power supply, 9V | **166-7353** | 15.00 | 13.00 |
| TA059 | Probus power adapter | **166-7355** | 25.00 | 23.00 |

## High voltage differential probe

pico Technology Limited

New



- Measures up to ±7000V (CAT I)
- Over-range indication
- Internal battery option
- 70MHz bandwidth
- BNC connection

| Model | Bandwidth | Common mode | Differential |
|---|---|---|---|
| TA044 | 70MHz | ±7000V | ±700V, ±7000V |

| Battery power | Attenuation | Input R and C | Safety category rating |
|---|---|---|---|
| Internal | 1/100, 1/1000 | 10MΩ / 7pF | CAT I |

525350

| Mftrs. List No. | Bandwidth MHz | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| TA044 | 70 | **166-7349** | 480.00 | 458.00 |
| **Accessories** | Description | | 1+ | 3+ |
| PS008 | Power supply, 9V | **166-7353** | 15.00 | 13.00 |

## High bandwidth differential probes

pico Technology Limited

New



- Ideal for measuring high speed differential signals
- Fast 800MHz bandwidth
- ±15V differential voltage input
- Low input capacitance - 2 pF
- X1/10 switchable attenuation

| Bandwidth | Common mode | Differential | Battery power | Attenuation | Input R and C |
|---|---|---|---|---|---|
| 800MHz | ±30V | ±15V | 1/10 | ±2% | 100kΩ / 2pF |

525360

| Mftrs. List No. | Bandwidth MHz | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| TA046 | 800 | **166-7352** | 800.00 | 765.00 |
| **Accessories** | Description | | 1+ | 3+ |
| PS009 | Power supply, 12V | **166-7354** | 15.00 | 13.00 |

## Precision differential probe

pico Technology Limited

New



- Designed for higher bandwidth and low-noise applications
- Measurement range up to ±20V
- Optional battery pack and Probus adapter
- 200MHz bandwidth
- BNC connection

| Bandwidth | Common mode | Differential | Battery power | Attenuation | Input R and C |
|---|---|---|---|---|---|
| 200MHz | ±60V | ±20V | Opt. TA047 | 1/10 | 500kΩ / 7pF |

525359

| Mftrs. List No. | Bandwidth MHz | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| TA045 | 200 | **166-7351** | 600.00 | 570.00 |
| **Accessories** | Description | | 1+ | 3+ |
| PS008 | Power supply, 9V | **166-7353** | 15.00 | 13.00 |
| TA059 | Probus power adapter | **166-7355** | 25.00 | 23.00 |
| TA047 | Battery Pack (TA058 only) | **166-7356** | 37.00 | 34.00 |

## AC Current Clamp

**i200s**

FLUKE



A dual range 20A and 200A ac current clamp with voltage output via a safety insulated BNC connector. A dual banana to BNC adapter is supplied to allow the i200s to be connected to multimeters with banana inputs.

- Two ranges: 20 A & 200A, 10 or 100 mV/ Amp output
- Take accurate current readings without breaking the circuit
- Max. conductor ∅ 20 mm
- CAT III 600V safety rating

**FLUKE Compatibility:**

27, 43B, 77 IV, 83V, 87V, 88V, 114, 115, 117, 120 Series, 190 Series, 175, 177, 179, 187, 189, 430 Series , 741B, 743B, 744, 787, 789, 1577, 1587, 8845A, 8846A,

| | |
|---|---|
| Nominal Current Range(s) | 20A, 200A |
| Continuous AC Current Range | 0.1 - 24A, 0.5 - 200A |
| Highest Current | 240A |
| Lowest Measurable Current | 0.5A |
| Basic Accuracy (48-65Hz) | 1.5% +0.5A |
| Useable Frequency | 40Hz - 10kHz |
| Max. Working Voltage | 600V AC |
| Max. Conductor Dia. | 20mm |
| Output Levels | 100mV/A, 10mV/A |
| Output Cable (m) | 2m |
| BNC Adaptor | ✓ |
| Safety | CAT III 600V |

489307

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| I200S | **142-2694** | 157.00 | 152.29 | 147.72 |
| | | | Price Each | |
| **Standard Calibration Charge** | | | S C5 | 39.11 |
| **UKAS Calibration Charge** | | | N C5 | 61.97 |

## AC Current Clamp

**i400s**

FLUKE



- CAT IV 600 V / CAT III 1000 V safety rating.
- Soft non-slippery overmold handle.
- Two ranges: 40 A & 400 A, 10 & 1 mV/Amp output.
- Max. conductor ∅ 32 mm.

**FLUKE Compatibility:**

43B, 120 Series, 190 Series, 430 Series (No adaptor needed)

To work with the models shown below a dual banana plug 4mm male to female BNC adaptor is required

27, 77 IV, 83V, 87V, 88V, 114, 115, 117, 175, 177, 179, 187, 189, 741B, 743B, 744, 787, 789, 1577, 1587, 8845A, 8846A

| | |
|---|---|
| Nominal Current Range(s) | 40A, 400A |
| Continuous AC Current Range | 0.5 - 40A, 5 - 400A |
| Highest Current | 1000A |
| Lowest Measurable Current | 0.5A |
| Basic Accuracy (48-65Hz) | 2% +0.15A |
| Useable Frequency | 45Hz - 3kHz |
| Max. Working Voltage | 1000V |
| Max. Conductor Dia. | 32mm |
| Output Level(s) | 10mV/A, 1mV/A |
| Output Cable (m) | 2.5m |
| BNC Adaptor | ✓ |
| Safety | CAT IV 600V, CAT III 1000V |

489308.503195

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| I400S | **142-2695** | 155.00 | 150.35 | 145.84 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

Over 480,000 products online QGO

## Oscilloscope Accessories - continued

### Current Probe
**i310s**



The i310s current probe is based on Hall Effect technology for use in measurement of both DC and AC current. The i310s may be used in conjunction with oscilloscopes and other suitable recording instruments for accurate non-intrusive current measurement.

- i310s connects to oscilloscopes via safety BNC, to multimeters via BNC-4mm adaptor supplied
- Dual range 30/300 A
- Wide bandwidth - 20kHz (-3dB)
- Output sensitivity of 10/1 mV / A
- 10 kΩ Load Impedance
- Accuracy of +/- 1% of reading ±50/300 mA
- Maximum jaw conductor 19mm (0.75 in)
- Battery life - 30 hours with low battery indicator
- Superior noise rejection for power electronics applications
- Typical applications include inverters, switch mode power supplies, industrial controllers requiring current measurement and/or waveform analysis, automobile diagnostics.

**Safety Standards**
- BS EN 61010-1: 2001, BS EN 61010-2-032: 2002, BS EN 61010-031: 2002
- 300 $V_{RMS}$, Category III, Pollution Degree 2
- Use of the probe on uninsulated conductors is limited to 300 V $AC_{RMS}$ or DC and frequencies below 1kHz

**EMC Standards**
- BS EN 61326 : 1998 +A1, A2, & A3

488176.502130

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| I310S | **144-1502** | 191.00 | 185.27 | 179.71 |
| **Standard Calibration Charge** | S C 8 | | 45.13 | |
| **UKAS Calibration Charge** | N C 8 | | 73.70 | |

### Flex AC Current Probes
**i6000s Series**



The i6000sflex is an AC current probe utilising the Rogowski principle. It can be used to measure currents up to 6000A when used in conjunction with oscilloscopes, multimeters, recorders or data loggers. The flexible and lightweight measuring head allows quick and easy installation in hard to reach areas. Two versions are available to accommodate conductor diameters up to 170mm or 275mm.

- Connects to scopes via BNC connector and DMM's via adaptor (supplied)
- Measures multiple ranges: 60A, 600A or 6000A AC
- Output sensitivity of 50mV, 5mV, 0.5mV per A
- 100kΩ load impedance
- Permanent data logging (via external power supply)
- Accuracy of ± 1% of range
- Low battery indication
- Available in 24" or 36" head cable length

| | |
|---|---|
| Phase Error | ± 1° (45 to 65 Hz), ± 10° (at 5 kHz) |
| Linearity | ± 0.2% of reading from 10% to 100% of range |
| Position Sensitivity | ± 2% of range, cable >25mm from coupling |
| External Field | ± 1% with cable > 200mm from head |
| Noise Level | 0.1mV rms (0.03% of range) |
| Operating Temperature | -20°C to 85°C |
| Gain Variation | ± 0.08%/°C |
| Common Mode | Voltage between the Output and Earth must not exceed 30V |
| Power Supply | 2 x AA MN1500 (1.5V) LR6 batteries |
| External Power | Battery eliminator, via 2.1mm connector, 3V DC |
| Socket Type | A16M500 |
| Safety | BS EN 61010-1: 1993, 600V CAT III Pol. Deg 2EMC EN61326: 1998 |
| Enclosure | IP5X, Flame retardant UL94 -V0 rated |
| Output Connections | Hypotronics connector type D01EEB306FST |
| Weight | 0.19 kg |

488181

| Head Cable Length | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| 24" | I6000S FLEX-24 | **144-1506** | 336.00 | 325.92 | 316.14 |
| 36" | I6000S FLEX-36 | **144-1507** | 385.00 | 373.45 | 362.25 |

### AC Current Clamp
**i1000s**



A clamp-on ac current probe designed to expand oscilloscope applications in industrial and power environments.
- Ideal for measuring distorted current waveforms and harmonics.
- Allows accurate measurement of currents from 100 mA to 1000 A rms, 5 Hz to 100 kHz without breaking into the circuit
- A passive filter eliminates noise and ring on rapidly rising di/dt waveform, ensuring accurate screen displays
- Connects directly to an oscilloscope through a reinforced coaxial cable and an insulated BNC connector

**FLUKE Compatibility:**
43B, 120 Series, 190 Series, 430 Series (No adaptor needed)
To work with the models shown below a dual banana plug 4mm male to female BNC adaptor is required
27, 77 IV, 83V, 87V, 88V, 114, 115, 117, 175, 177, 179, 187, 189, 741B, 743B, 744, 787, 789, 1577, 1587, 8845A, 8846A

| | |
|---|---|
| Nominal Current Range(s) | 10A, 100A, 1000A |
| Continuous AC Current Range | 0.1 - 10A, 0.1 - 100A, 1 - 1000A |
| Highest Current | 2000A |
| Lowest Measurable Current | 0.1A |
| Basic Accuracy (48-65Hz) | 1% +1A |
| Useable Frequency | 5Hz - 100kHz |
| Max. Working Voltage | 600V AC |
| Max. Conductor Dia. | 54mm |
| Output Level(s) | 100mV/A, 10mV/A, 1mV/A |
| Output Cable (m) | 1.6m |
| BNC Adaptor | ✓ |
| Safety | CAT III 600V |

489309.503194

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| I1000S | **142-2696** | 363.00 | 352.11 | 341.55 |
| **Standard Calibration Charge** | S C 8 | | 45.13 | |
| **UKAS Calibration Charge** | N C 8 | | 73.70 | |

### AC Scope Current Probe 50MHz
**i50s**



Designed for use with all types of oscilloscopes, the i50s current probe offers an ergonomic, robust and high performing solution for the measurement of DC and AC currents up to 50 MHz. With a permanent nominal current of 30A RMS and a measuring capacity of 50A for 10s. The i50s considerably widens the possibilities of accurate measurement of commutation currents

- Connects to oscilloscopes via safety BNC, to multimeters via BNC-4mm adaptor supplied
- Dual range 3/50 A
- Exceptional immunity to high common mode voltages (dv/dt = 5kV/_s,) amplitude = 1,5kV, error <0,05 % of IPN
- Auto Zero Function and Auto Degauss functions for optimal performance
- 30A continuous, 50A for 10 seconds
- Wide Bandwidth - 50MHz (-3dB)
- Output Sensitivity of 1 V/A (3A range) 100 mV/A (50A range)
- Rise Time < 7 ns
- Rejection Rate of fast dv/dt (5kV/µs) < 15 mA t
- External magnetic field rejection rate AC and DC 60 dB
- Typical Accuracy of +/- 0.5% of range
- Maximum jaw conductor 5mm
- Typical applications include inverters, switch mode power supplies, industrial controllers requiring current measurement and/or waveform analysis, automobile diagnostics

**Safety Standards**
- BS EN 61010-1: 2001, BS EN 61010-2-032: 2002, BS EN 61010-031: 2002- 300 $V_{RMS}$, Category I, Pollution Degree 1

**EMC Standards**
- BS EN 61326 : 1998 +A1, A2, & A3

488178

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Current Probe | I50S | **144-1503** | 1,858.00 | 1,802.26 | 1,748.19 |
| Power Supply | PSI50S | **144-1505** | 441.00 | 427.77 | 414.94 |

## I.R. Remote Control Test Plug

TENMA

**72-7507**



Compact plug simply fits onto the BNC socket of an oscilloscope. When an infrared source, e.g. remote control, is pointed at the unit, the signal waveform can be displayed on the oscilloscope screen. it is ideal for identifying problems with remote controls and assisting in complex home automation remote programming.

336715.343918

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 72-7507 | **490-8478** | 14.38 | 13.28 | 12.32 |

## Oscilloscope/Test Equipment Trolley

TENMA



A test trolley with slanted top to view equipment a a convinient angle. Features a lower shelf for storage, heavy duty castors, and an adjustable back support with bumpers to prvent damage to equipment.

**Maximum load 45 kg.**

H=851, W=406, D=483 (mm)

248925

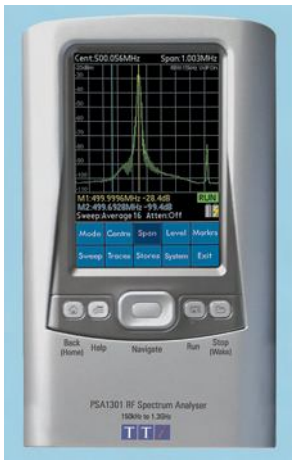
| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| 21-1925 | **428-4495** | 69.94 | 69.43 |

# Spectrum Analysers

## 1.3GHz & 2.7GHz Handheld Spectrum Analysers

TTi

**PSA1301T & PSA2701T**





W=97 H=169 D=47mm. Weight 480g

The PSA1301T and PSA2701T utilise the power of a handheld computer to provide a level of performance that was previously impossible for an instrument of this small size and low cost. The result is an RF spectrum analyser of high functionality in a compact and lightweight format. Ideal for field applications, their low cost will also make them attractive for many bench top applications.A Palm Tungsten TX handheld computer is incorporated within the housing to create single integrated instrument. Access to the USB port is provided within the body of the instrument, and all of the functionality of the handheld computer is retained, however it can be removed from the instrument if required.

- Frequency range: 150kHz to 1300MHz (1301T), 1MHz to 2700MHz (2701T)
- Full colour TFT screen, 480 x 320 pixels
- Handheld format weighing under 500g
- 4 hour battery life per charge or AC power
- Integrated tilt stand for bench top use
- Zero span mode with AM/FM demodulation
- Continuous, single, peak hold, average sweep
- 80dB dynamic range. -93dbm noise floor
- RBW of 1MHz, 280kHz or 15kHz
- Twin markers with absolute/difference
- Smart marker movement with peak finding
- Unlimited storage for waveforms, set-ups and fully annotated screens
- Data transfer to PC for analysis and printing
- Integrated handheld computer providing word processing, spreadsheets, etc.

**Display**

| | |
|---|---|
| Display Type | 3.7" (9.4 cm) backlit colour TFT, 480 x 320 pixels (half VGA) |
| Waveform Area | 300x320 pixels (320 samples), 8 x 10 division graticule |
| Waveform Traces | Live trace and reference trace (selectable) in different colours |
| Default Annotations | Centre freq., Span (or Start & Stop), Ref. level, RBW, Marker frequencies, Marker amplitudes, Sweep type, Attenuator setting |

**Control**

| | |
|---|---|
| Modes | Choice of Hard Key or Touch Screen control for all functions |
| Numeric Entry | By numeric keypad or by jog and scroll |

**Frequency**

| | |
|---|---|
| Frequency Range | 150 kHz to 1300 MHz (PSA1301T)<br>1MHz to 2700MHz (PSA2701T) |
| Setting Modes | Centre + Span, or Start + Stop, or Zero span with demodulation |
| Setting Resolution | 1 kHz (7 digits max.) |
| Span | 320 kHz to 1299.85 MHz or zero span (PSA1301T)<br>320 kHz to 2799.85 MHz or zero span (PSA2701T) |
| Frequency Stability | ±10ppm ±3ppm/year |
| Markers | Single or dual markers, differentiated by colour |
| Marker Modes | Manual scroll or automatic peak finding/tracking |
| Marker Accuracy | 0.3% of span ±0.1 kHz |
| Demodulation | AM/FM selectable (zero span mode), variable level output |

**Amplitude**

| | |
|---|---|
| Displayed Ampliture Range | 80dB (10dB/div) or 40dB (5dB/div with vertical panning) |
| Marker Resolution | 0.1dB |
| Reference Level | Selectable as -20dBm or 0dBm |
| Linearity and Accuracy | Linearity <±1dB, Reference level accuracy <±2dB |
| Noise Floor | Average displayed noise floor typically < -93dBm<br>(ref. level -20dBm, RBW 15kHz) |

**Sweep**

| | |
|---|---|
| Sweep Modes | Continuous, Single, Peak Hold, or Average (2 to 256 sweeps) |
| Resolution Bandwidth (RBW) | 280 kHz or 15 kHz (PSA1301T)<br>1MHz, 280kHz or 15 kHz (PSA2701T) |

**Storage Capability**

| | |
|---|---|
| Trace Storage | Storage for unlimited number of traces with user filenames |
| Setup Storage | Storage for unlimited number of setups with user filenames |
| Screen Storage | The whole screen can be stored as a bitmap for printing or viewing. |

**Connectors**

| | |
|---|---|
| RF Input | SMA connector, 50R impedance; VSWR <1.5:1 typical |
| Audio Out | 3.5mm phones jack for demodulated audio |
| USB Through | Mini USB socket - direct access to USB of handheld computer |
| Power Input | 1.3mm power jack for external power and recharging |

**Handheld Computer Type**

Palm Tungsten, Intel Xscale processor, Flash Memory, 480x320 portrait/landscape screen, Bluetooth, SD/SDIO or MMC card expansion, compatibility with Word, Excel, Outlook etc.

**Power Sources**

| | |
|---|---|
| Battery Operation | Internal NiMh batteries giving typically 4 hours operation |
| External Power | External Power Supply / Charger, 100V to 240V universal input |

464593.501822

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Handheld Spectrum Analyser | PSA1301T | **107-6496** | 795.00 | 771.15 | 748.02 |
| Handheld Spectrum Analyser | PSA2701T | **134-7345** | 1,050.00 | 1,018.50 | 987.95 |
| | | | **Price Each** | | |
| **Standard Calibration** | | **S** C 20 | 108.78 | | |
| **UKAS Calibration** | | **N** C 20 | 128.40 | | |


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## 3GHz Spectrum Analyser

GW INSTEK



New

**Model:** GSP-830

A great value Spectrum Analyser with an outstanding noise floor level that presents extreme sensitivity for picking up weak signals. Further advanced features such as Auto Set, Split Windows, Power measurements and Pass/Fail settings make the GSP-830 an ideal solution for frequency spectrum analysis.

- 6.4" (640 x 480) high resolution colour TFT LCD screen
- 10 markers for peak functions, 5 markers for delta functions
- Split windows allows separate settings
- Users can define their own macros in 10 sequence steps
- Pause, Repeat or Single run modes
- ACPR, OCBW, Channel Power, N -dB, Phase jitter measurement
- Pass/Fail test with limit line editing
- USB and RS232 interface
- Direct VGA output

# Spectrum Analysers - continued

## 3GHz Spectrum Analyser - continued

| | |
|---|---|
| Frequency Range | 9kHz to 3GHz |
| Sweep Time | 50ms to 25.6s |
| RBW Range | 3kHz, 30kHz, 300kHz, 4MHz |
| Amplitude Measurement | -114dBm to +20dBm |
| Noise Floor | -117dB @1GHz |
| Connections | Input: N type 50Ω, Ext Ref: BNC (female) |
| Dimensions (WxHxD) | 330x170x340mm |
| Weight | 6kg |

510024.509894

| Description | Order Code | Price Each 1+ | Price Each 3+ |
|---|---|---|---|
| Spectrum Analyser | 156-3802 | 2,550.00 | 2,524.50 |

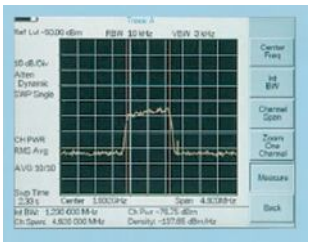
## 3GHz Spectrum Analyser

**SpectrumMaster MS2711D**



LATEST PRICING

W=254 H=178 D=61mm Weight = 2.14kg



This Handheld Spectrum Analyser covers the 100 kHz to 3.0 GHz frequency band and features a pre-amplifier. The battery-operated, field-proven design is powerful, yet so small that it fits into your backpack. Its exceptional performance combined with ease-of-use and broad functionality makes it an ideal solution for field environments and applications that require mobility such as site surveys and on-site system test.

The MS2711D also features several dedicated one-button measurements that make testing cellular, DCS/PCS and WLAN systems easier than ever before. Measurements include channel power, adjacent channel power ratio, and occupied bandwidth measurements that can confirm the distortion level or channel power level of an AMPS, TDMA, CDMA or GSM transmitter. Additionally, the MS2711D can conduct a series of spurious measurements when analysing a wireless base station transmitter, while the field strength mode allows users to measure propagation and coverage, or to pinpoint electromagnetic (EM) leakage in broadcast systems. Measurement of carrier to interference has been added; This measurement is targeted for measurements of 802.11 a, b, and g access points.

**Supplied with:** data analysis software, soft carrying case, rechargeable/field-replaceable battery, AC/DC power supply, and 12.5V car cigarette lighter adapter and users guide.

- Handheld, lightweight, battery-operated design
- Built in pre-amplifier (standard)
- Noise Level < -135 dBm typical
- Quick Zoom-in, Zoom-out display in 1-2-5 sequence
- RBWs: 100 Hz to 1 MHz in 1-3 sequence
- VBWs: 3 Hz to 1 MHz in 1-3 sequence
- Automatic, manual, and dynamic attenuator control
- Amplitude Accuracy ±0.5 dB typical
- Dedicated One-button measurements
- Trace Averaging and Trace Overlay
- Reference Level Offset
- Multilingual User Interface
- Alphanumeric labeling of saved measurements
- Automatic time and date stamp of saved data
- Rechargeable/field-replaceable battery
- 6 Markers, limit lines and segmented limit lines
- RS232 Interface
- Built in AM, FM and SSB demodulation

**Frequency**

| | |
|---|---|
| Frequency Range | 100kHz to 3GHz (tunable to 9kHz) |
| Accuracy | ±2ppm. Ageing: ±1ppm/year |
| Resolution Bandwidth (-3dB) | 100Hz to 1MHz, ±5% typical |
| Video Bandwidth (-3dB) | 3Hz to 1MHz, ±5% typical |

**Amplitude**

| | |
|---|---|
| Total Level Accuracy | ±1dB typical (±1.5dB max) |
| Measurement Range | +20dBm to -135dBm |
| Input Attenuator Range | 0 to 51 dB |
| Dynamic Range | >65dB |
| Display Range | 1 to 15dB/div, in dB steps, 10 divisions displayed |
| Scale Units | dBm, dBV, dBmV, dBμV, V, W |

**General Specifications**

| | |
|---|---|
| Display | VGA monochrome with adjustable backlight |
| Setup Storage | 10 test setups |
| Trace Storage | 300 traces maximum |
| Inputs / Outputs | RF In, RF Out (both 50Ω, Type N, Female) |
| Communications | RS232 |

**All models include:** mains lead, 1x 1.5m sensor lead per channel, Operation Manual, Certificate of Calibration.

**Option 10A - Variable Bias Tee**

| Voltage | Power |
|---|---|
| 12 to 24 Vdc | 6W max. steady state |

**Option 25 - Interference Analysis Software**

- Audible Tone - identify interference type
- Strength of the interferer
- RSSI
- Spectrogram

**Option 27 - Channel Scanner Software**

| Frequency Range | Accuracy | Measurement Range | Channel Power | Adjacent Channel Power Accuracy |
|---|---|---|---|---|
| 100MHz - 3GHz | ±10Hz + Timebase error | +20dBm to -110dBm | ±1dB typ. (1.5dB max) | ±0.75dBc |

**Option 29 - Power Meter**

| Frequency Range | Measurement Range | Display Range | Offset Range | Accuracy | VSWR | Maximum Power |
|---|---|---|---|---|---|---|
| 3MHz - 3GHz | -80 to +20dBm | -80 to +80dBm | 0 to +60dB | ±1dB typ. (1.5dB max.) | 1.5:1 typ. | +20dBm (0.1W) |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

450277

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| MS2711D | Spectrum Analyser | 129-8839 | 3,250.000 | – – | – – |
| Option 10A | Variable Bias Tee | | 278.00 | | |
| Option 25 | Interference Analysis S/W | | 1077.00 | | |
| Option 27 | Channel Scanner S/W | | 1106.00 | | |
| Option 29 | Power Meter | | 737.00 | | |
| **Accessories** | | | | | |
| 800-441 | Serial Cable | 129-8840 | 267.733 | 261.648 | 255.833 |
| 760-235 | Carry Case | 129-8841 | 170.200 | 165.950 | 161.690 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | S C20 | 108.780 | | |
| **UKAS Calibration Charge** | | N C20 | 128.400 | | |

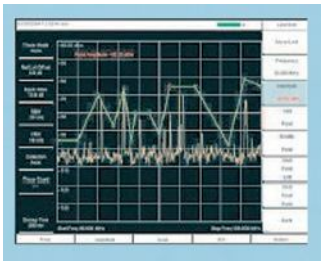
## High Performance Handheld Spectrum Analysers

**Spectrum Master MS272xB Range**









W=313 H=211 D=77mm

The sensitivity of the Spectrum Master family delivers the ability to measure very low level signals. Coupled with a wide range of resolution bandwidth choices, you can configure the Spectrum Master to meet your most challenging measurement needs. As the spectrum becomes more and more congested, the ability to measure low level signals becomes more and more important not only for interference detection but also for wireless system planning.

Continuous frequency coverage from 9 kHz to 20 GHz (MS2724B) gives the wireless professional the performance needed for the most demanding measurements. Whether your need is for spectrum monitoring, WiFi and WiFi5 installation and testing, RF and microwave signal measurements or cellular signal measurements, the Spectrum Master family gives you the tools you need to make the job easier and more productive. The built-in AM/FM/SSB demodulator simplifies the job of identifying interfering signals.

LATEST PRICING

**Field Use**

The input attenuation value can be tied to the reference level, reducing the number of parameters a field technician may have to set. The RBW/VBW and the span/RBW ratios can be set tovalues that are best for the measurements being made, further easing the technician's burden and reducing the chances of errors. Over 1000 traces with names up to 40 characters long may besaved in the 256 MB non-volatile compact flash memory. These traces can later be copied into a PC using the built-in USB 2.0 connector or the 10/100 Mbit Ethernet connection. Measurements may also be saved directly to Compact Flash or USB Flash Drive. Commonly needed measurements are built in. These include:

- Field strength
- Occupied bandwidth
- Channel power
- Adjacent channel power ratio
- AM/FM/SSB demodulation
- Carrier to interference (C/I) ratio measurements

**Lab Use**

Resolution bandwidth and video bandwidth can be independently set to meet a user's measurement needs. In addition the input attenuator value can be set by the user and the preamplifier canbe turned on or off as needed. For maximum flexibility, sweep triggering can

be set to free run, or to do a single sweep. In zero span, the sweep can be set to trigger when a signal meets or exceeds a certain power level or it can be externally triggered. The span can be set anywhere from 10 Hz to 7.1, 13, or 20 GHz (depending on the model) in addition to zero span. Using battery-powered equipment to measure powerline related sidebands on a signal source removes any question as to the source of the sidebands.

- Handheld, lightweight, battery-operated design
- Large daylight viewable transflective color display
- Built in pre-amplifier (standard) up to 4 GHz
- Displayed Average Noise Level <-159 dBm typical in a 1 Hz resolution bandwidth at 1 GHz
- Quick Zoom-in, Zoom-out display in 1-2-5 sequence
- RBWs: 1 Hz to 3 MHz in 1-3 sequence
- VBWs: 1 Hz to 3 MHz in 1-3 sequence
- Automatic or manual input attenuator control
- Dedicated smart measurements
- Trace Averaging
- Normal, Max hold, Min hold, user settable averaging (more than 65,000 traces can be averaged!)
- Reference Level Offset
- Three traces
- Multilingual User Interface (English, Chinese, French, German, Japanese, Spanish, Korean, Italian)
- Capability to create two custom languages using Master Software Tools and download the languages into the MS2724B
- Store over 1000 test set-ups internally
- Save over 1000 measurement traces internally
- Save directly to compact flash memory
- Alphanumeric labeling of saved measurements
- Automatic time and date stamp of saved data
- Rechargeable/field-replaceable Li-Ion battery
- 6 Markers plus 6 delta markers or choose one marker with 6 delta markers
- Multi-segmented upper and lower limit lines
- 50Ω Interface standard (75Ω interface capability - instrument internally corrects for adapter loss)
- RJ45 Ethernet 10/100 Base T and USB 2.0 Interfaces
- AM, FM and SSB demodulation with built-in speaker and headset jack.

**Supplied with:** User's Guide, a soft carrying case, an AC/DC Adapter, a Car Cigarette Lighter/12Vdc Adapter, a CD ROM containing Master Software Toolsr, an Ethernet cable, a crossover Ethernet Cable, a rechargeable Li-ion battery pack, a type-N male to SMA female adapter, a type-N male to BNC female adapter, a tilt stand, 256MB USB flash drive, USB Type A to mini-B cable.

**Master Software Tools (MST)**

- Transfer saved measurements, along with markers and limit lines, to a PC for further analysis
- Modify display parameters, overlay multiple traces, upload and download traces, print traces and data on local or networked printers
- Quickly modify and add limit lines and markers
- Compare multiple traces using drag, drop, and trace overlay features
- Create or modify language files and convert .dat files to the new .vna file format
- Save and manipulate test data for production or laboratory reports
- Export or save measurement data as text or graphic files for use in spreadsheets, reports or other presentation formats
- Capture live traces and view them on the PC.
- Add two custom languages
- Automatic updates with the latest firmware available via the Anritsu website
- Handle long file names for easy, descriptive data labeling

| Model | MS2721B | MS2723B | MS2724B |
|---|---|---|---|
| **Frequency** | | | |
| Frequency Range | 9kHz to 7.1GHz | 9kHz to 13GHz | 9kHz to 20GHz |
| Tuning Resolution | 1Hz | | |
| Accuracy | ±0.3ppm + aging. Ageing: ±1ppm per 10years | | |
| Resolution Bandwidth (-3dB) | 10Hz to 3MHz, ±10% typical | | |
| Video Bandwidth (-3dB) | 1Hz to 3MHz | | |
| **Amplitude** | | | |
| Measurement Range | DANL to +30dBm | | |
| Total Level Accuracy | ±1.75dB max | | |
| Input Attenuator Range | 0 to 65 dB, 5dB steps | | |
| Display Range | 1 to 15dB/div, in dB steps, 10 divisions displayed | | |
| Scale Units | dBm, dBV, dBmV, dBµV, nV, µV, mV, V, kV, nW, µW, mW, W, kW | | |
| **General Specifications** | | | |
| Display | Bright colour transmissive LCD, Full SVGA, 8" | | |
| Data Points | 551 points (normal), 661 points (full screen) | | |
| Markers | Six markers | | |
| Marker Modes | standard, delta, to peak, to centre, to ref. level, next peak left, next peak right, all markers off, noise marker, freq. counter marker | | |
| Sweeps | Full span, zero span, span up/span down | | |
| Detection | Peak, RMS , Negative, Simple | | |
| Setup & Trace Storage | Limited only by the size of the attached CompactFlash card. | | |
| Inputs / Outputs | RF In (N), Ext. Freq. Ref (BNC), Ext. Trigger (BNC), Headset (2.5mm, 3 wire) | | |
| Communications | USB2.0 (Mini-B), Ethernet'LAN (RJ45) | | |
| Weight | 3.1kg | 3.4kg | 3.4kg |

The functionality of the spectrum analysers can be extended by adding a number of options. The options include:

Option 09 IQ Demodulation Hardware; Option 19 High Accuracy Power Meter (PSN50 sensor not included); Option 20 Tracking Generator; Option 25 Interference Analysis - provides a spectrogram display, signal strengh with audible tone and RSSI (received signal strength indication); Option 27 Channel Scanner - adds the capability to select up to 20 channels or signals to monitor (Great for interference mitigation); Option 31 GPS (includes GPS antenna); Option 33 cdmaOne and CDMA2000 1xRTT Over The Air (OTA) Measurements; Option 34 EVDO Over The Air (OTA) Measurements; Option 35 W-CDMA/HSDPA OTA (requires Opt. 09); Option 37 Mobile WiMAX Over the Air (OTA) Measurements (requires Option 09); Option 40 GSM/GPRS/EDGE RF Meas; Option 41 GSM/GPRS/EDGE Demod (requires Opt. 09); Option 42 CDMA RF Measurements; Option 43 cdmaOne and CDMA2000 1xRTT Demodulator; Option 44 W-CDMA/HSDPA RF Mea; Option 45 W-CDMA Demod (requires Opt. 09); Option 46 Fixed WiMAX RF Meas; Option 47 Fixed WiMAX Demod; Option 62 EVDO RF Measurements (requires Option 09); Option 63 EVDO Demodulator (requires Option 09); Option 64 DVB-T/H Digital Video Measurements; Option 65 W-CDMA/HSDPA Demod (requires Opt. 09); Option 66 Mobile WiMAX RF Measurements (requires Option 09); Option 67 Mobile WiMAX Demodulator (requires Option 09); Option 89 IF Output (MS2723B and MS2724B only)

**For further details and pricing please contact your local Farnell Sales Office.**

**Adaptors**

| Model | Frequency Range | Connectors |
|---|---|---|
| 12N50-75B | dc - 3GHz | 50Ω N(m) to 75Ω N(f) |

**Antenna Kit**

Consists of the following antennae and a carrying pouch:

- Portable Antenna, 1.71 to 1.88 GHz, SMA (m), 50Ω
- Portable Antenna, 1.85 to 1.99 GHz, SMA (m), 50Ω
- Portable Antenna, 2.4 to 2.5 GHz, SMA (m), 50Ω
- Portable Antenna, 806-866 MHz, SMA (m), 50Ω
- Portable Antenna, 896-941 MHz, SMA (m), 50Ω
- Antenna, 5725 to 5825 MHz, SMA male connector

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

493745

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| MS2721B | 7.1GHz Analyser | **151-2736** | 8,678.00 | | |
| MS2723B | 13GHz Analyser | **151-2737** | 10,999.00 | | |
| MS2724B | 20GHz Analyser | **151-2738** | 12,741.00 | | |

**Quantity discounts available. Please contact your local Farnell Office.**

| Accessories | | | 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| 12N50-75B | Matching Pad, DC to 3GHz | **129-8843** | 313.58 | 305.74 | 297.90 |
| 61532 | Antenna Kit | **129-8844** | 159.10 | 155.12 | 151.15 |
| 760-235 | Carry Case | **129-8841** | 170.20 | 165.95 | 161.69 |

| | | | Price Each |
|---|---|---|---|
| **Standard Calibration Charge** | S | C 20 | 108.78 |
| **UKAS Calibration Charge** | N | C 20 | 128.40 |

## 1GHz Spectrum Analyser

TENMA

**72-6696**



H = 150, W = 310 D = 455 (mm)

An easy to use, digital synthesised, spectrum analyser with a frequency range of over 1GHz. The unit uses a phase locked loop RF system that combines measurement accuracy with an affordable price. The analyser is supplied with Windows compatible RS232 software to allow a PC to display spectrums, save to file and also print.

- 6" screen with two markers
- Backlit LCD setting and measurement displays
- Digital cursor readout
- Span, RBW, frequency (relative and abolute) and amplitude (relative and absolute)
- Hold, Max Hold, Average, Numeric Entry and Set-up Memory functions
- Search for Peak and Peak to Centre
- High frequency staility to ensure drift free frequency display
- 1kHz frequency resolution
- -100dBm noise floor enables the unit to catch low level signals
- Wide inout power range: -100dBm to 20dBm
- Input overload protection

| | | | |
|---|---|---|---|
| **Frequency** | | Reference Level | -30dBm to 20dBm ±1dB |
| Range | 150kHz to 1GHz | Noise Floor | -100dBm typical |
| Resolution | 1kHz | Display Range | 75dB with ± 1.5dB Acc. |
| Display | 6½ digit | **Input** | |
| Stability | ±2ppm/year ageing | Impedance | 50Ω |
| Spans | Zero, 2kHz to 100MHz/div | Input Attenuation | 50dB to 0dB |
| **Bandwidth** | | Functions | |
| Resolution Bandwidths | 3kHz, 30kHz, 220kHz, 4MHz | Return Loss | <16dBRL (VSWR <1.35) |
| Video | 1.6kHz/90kHz couple with RBW | **Marker** | |
| **Amplitude** | | Resolution | 0.1dB |
| Input Voltage | 25V max. | Accuracy | 0.1dB ± Amplitude Acc. |
| Input Range | -100dBm to +20dBm | | |

248946

| Mftrs List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| 72-6696 | **433-8698** | 1,275.00 | 1,198.50 |

## Spectrum Analyser - 1GHz

HAMEG Instruments

**HM5014-2**



A processor controlled spectrum analyser with a real-time, 200 point, digital signal display. The screen will also display all selected frequency settings and the marker results. The built in calibrator allows a quick readout accuracy check, based on a stable voltage and frequency reference source. Fitted with an RS-232 interface for PC communication and print-out via PC.

Supplied with Software, documentation, remote control, operating manual and mains power lead.

- Continuous frequency range from 150kHz to 1050MHz
- Amplitude range from -100dBm to +13dBm (7dBµV to 120dBµV) 80dB on-screen
- Phase-locked Direct Digital Synthesis
- Keypad entry for precise and repeatable frequency setting
- TCXO High Stability Reference Oscillator
- Resolution bandwidths of 9kHz, 120kHz, 1MHz
- Fully Remote controlled via RS-232 Interface
- EMC compilance measurement
- Tracking generator that can be used to evaluate the frequency characteristics of 4-terminal devices, such as filters

# Spectrum Analysers - continued

## Spectrum Analyser - 1GHz - continued

### HM5014-2 - continued

**Frequency, Marker**

| | |
|---|---|
| Range | 0.15 to 1050MHz |
| Resolution | 1kHz (6½ Digit max) |
| Center Range | 0.15 to 1050MHz |
| Accuracy | ±5% of selected span |
| Marker Resolution (frequency) | 1kHz, 6½ Digit, ±1 kHz |
| Marker Resolution Accuracy (level) | 3½ Digit, 0.4dB |
| Marker Readout Accuracy | ±(0.1% span + 20kHz) |
| Resolution Bandwidth RBW (3dB) | 1MHz, 120kHz and 1000kHz |
| Video Bandwidth | 4 kHz |
| Sweep Time (span/dependent) | 40ms, 320ms, 1s |

**Amplitude**

| | |
|---|---|
| Measument Range | -100dBm to +13dBm |
| Display Range | 8 division, 40dB/80dB (5dBdiv/10dBdiv) |
| Scale Units | dBm |
| Freq. Response (Relative to 500MHz) | ±2dBm |
| Reference Level Variation | -99.8dBm to +13dBm |
| Reference Level Resolution | 0.4dBm |
| Reference Level Accuracy (ATTN 10dB) | ±2.5dBm |
| Input Attenuator Range | 0-40dB, 10dB steps |
| Accuracy (ref. level) | ±1dB |
| Max Safe Input Level | |
| Atten. setting 40dB | +20dBm (0.1W) |
| Atten. setting 0dB | +10dBm |
| DC | ±25V |
| Displayed Average Noise Level | -100dBm (9kHz RBW, ATTN 0dB) |
| Intermodulation (3rd order) | >-75dBc |
| Harmonic Distortion | 2nd at input level -27dBm, ATTN 0dB, Freq. distance <3MHz |
| Resolution Bandwidth Switching Uncertainty | ±1dB |

**Tracking Generator**

| | |
|---|---|
| Output Frequency Range | 150kHz to 1050MHz |
| Output Power Level | -50dBm to ±1dBm |
| Output Flatness (at 500MHz) | ±dB |
| Spurious Outputs | >20dBc |

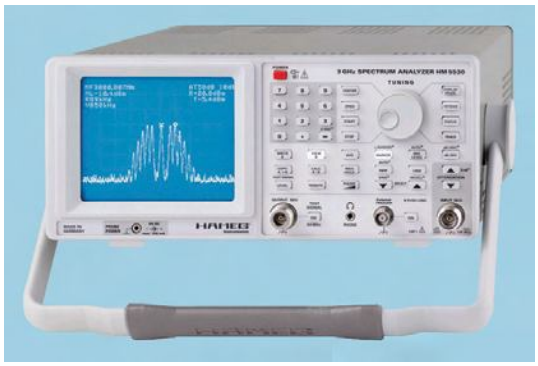
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| Description | Order Code | Price Each |
|---|---|---|
| **EURO Version** | | |
| HM5014-2 Spectrum Analyser + Digital Display | **327-7458** | 2,024.20 |
| **Accessories** | | |
| Nearfield Probe | **463-2047** | 544.81 |
| Transient Limiter | **463-2059** | 118.72 |

## 3GHz Spectrum Analyser

HAMEG Instruments

### HM5530



L=285 H=125 B=380mm; 6,5kg

- Frequency range from 150kHz to 3GHz
- ±5ppm Frequency stability
- Amplitude measurement range -110 to +20dBm
- Phase synchronous, direct digital frequency synthesis (DDS)
- Resolution bandwidths: 9kHz, 120kHz and 1MHz
- YIG oscillator
- Storage and recall of up to 10 instrument settings
- Pre-compliance EMI measurements
- Serial interface for documentation and remote control
- Supplied with power lead, manual, CD-ROM, N male to BNC female adaptor

**Frequency Characteristics**

| | |
|---|---|
| Frequency Range | 100kHz to 3GHz |
| Stability | ±5ppm |
| Ageing | ±1ppm/year |
| Frequency Resolution | 1kHz |
| Resolution Bandwidths (RBW) @ -6dB | 1MHz, 120kHz and 9kHz |

**Amplitude Characteristics**

| | |
|---|---|
| Measurement Range | -110dBm to +20dBm |
| Scaling | 10dB/div or 5dB/div |
| Display Range | 80dB or 40dB (5dB/div) |
| Input Attenuator Range | 0 - 50dB (10dB increments) |
| Max. DC Voltage | ±25V |

**Inputs / Outputs**

| | |
|---|---|
| Measurement Input | N-Type Socket |
| Input Impedance | 50Ω |
| Audio Output | 3.5mm Jack Socket |
| Test Signal Output | N-Type Socket, 50Ω output impedance, 50MHz, -10dB to 0dBm |
| RS232 Interface | 9-pin sub-D |
| External Trigger Input | BNC, signal numérique, 0 - 0.8V faible, 2.5 - 5V élevé |

**Functions**

Centre frequency, Span, Start frequency, Stop frequency, Marker, Deltamarker, Reference level, Test signal level, Focus, Trace rotation, Volume. Peak hold, Averaging, Reference spectrum, Save & Recall (10 settings), AM demodulation

**General**

| | |
|---|---|
| Display | 8 x 10cm CRT |
| Power | 105 - 254V, 50/60Hz, approx. 37W |
| Operating Temperature | 10°C - 40°C |

441552

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| HM5530 | **124-2201** | 2,532.98 |

## Microwave Spectrum Analysers

Anritsu

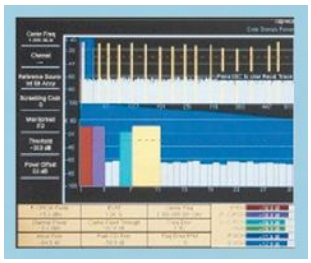
### MS271xB Family

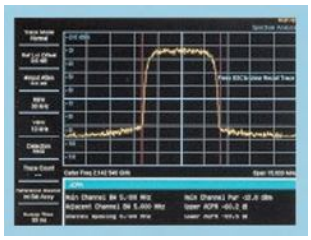


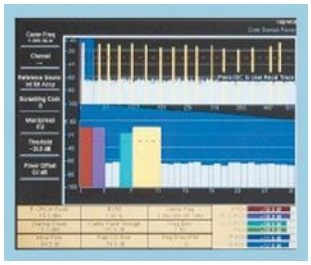
W=372 H=242 D=339mm Weight = 5.6kg











Affordable spectrum analysis with exceptional performance, advanced capabilities and modern W-CDMA and WiMAX signal analysis.

LATEST PRICING

**Typical Performance of the MS271xB family**:

- 9 kHz to 7.1, 13 and 20 GHz
- Standard Built-in Preamplifier
- Dynamic Range of 100 dB
- Third Order Intercept of +12 dBm
- DANL (No Preamp) of -126 dBm (RBW = 10 Hz)
- DANL (With Preamp) of -150 dBm (RBW = 10 Hz)
- Phase Noise (800 MHz) of -114 dBc/Hz at 10 kHz Offset
- Amplitude Accuracy of ±1.0 dB to 20 GHz
- Sweep Speed of 200 ms in 10 MHz Span (RBW = 30 kHz, VBW = 10 kHz)
- Demodulation Bandwidth of 10 MHz
- Residual ACLR of -60 dB
- Residual EVM of 1.75%
- True RMS Detection
- 65 dB Attenuation Range, 5 dB Steps
- 20 Watt (+43 dBm) Input Protection

**Standard Measurements:**

- ACPR: Measures power levels in the channels immediately above and below the center channel.
- Occupied Bandwidth: Measures 99% to 1% power channel of a spectrum.
- Channel Power: Measures the total power in a specified bandwidth.
- C/I: Measures carrier to interference ratio.

**Features:**

- Easy-to-Learn Operation
- 8.4 inch Color TFT Display (SVGA)
- Eight Built-in Languages (plus Two Custom)
- 256 MB Storage for 4,000 Traces and 4,000 Setups
- Six Markers, Nine Marker Modes
- Built-in AM/FM/SSB Demodulator
- Output Displays in JPEG Formats
- Connectivity: Ethernet, USB 2.0, Compact Flash
- USB 2.0 Host connector for PSN50 High Accuracy Power Meter and USB Flash Drives
- Remote Programming: Ethernet Only

**Supplied with:** User's Guide, a CD ROM containing Master Software Tools, a USB A-mini B cable, RJ45 Ethernet Cable, 256MB Compact Flash module, 256MB USB Flash Drive, Type-N male to SMA female adaptor, Type-N male to BNC female adaptor

**Master Software Tools (MST)**

- Transfer saved measurements, along with markers and limit lines, to a PC for further analysis
- Modify display parameters, overlay multiple traces, upload and download traces, print traces and data on local or networked printers
- Quickly modify and add limit lines and markers
- Compare multiple traces using drag, drop, and trace overlay features
- Create or modify language files and convert .dat files to the new .vna file format
- Save and manipulate test data for production or laboratory reports
- Export or save measurement data as text or graphic files for use in spreadsheets, reports or other presentation formats
- Capture live traces and view them on the PC.
- Add two custom languages
- Automatic updates with the latest firmware available via the Anritsu website
- Handle long file names for easy, descriptive data labeling

| Model | MS2717B | MS2718B | MS2719B |
|---|---|---|---|
| **Frequency** | | | |
| Frequency Range | 9kHz to 7.1GHz | 9kHz to 13GHz | 9kHz to 20GHz |
| Tuning Resolution | 1Hz | | |
| Resolution Bandwidth (-3dB) | 10Hz to 3MHz, ±10% typical | | |
| Video Bandwidth (-3dB) | 1Hz to 3MHz | | |
| **Amplitude** | | | |
| Amplitude Accuracy | ±0.7dB @50MHz | | |
| Measurement Range | DANL to +30dBm | | |
| Input Attenuator Range | 0 to 65 dB, in 5dB steps | | |
| Display Range | 1 to 15dB/div, in 1dB steps, 10 divisions displayed | | |
| Scale Units | dBm, dBV, dBmV, dBµV, nV, µV, mV, V, kV, nW, µW, mW, W, kW | | |
| **General Specifications** | | | |
| Max. Continuous Input | 10dB attenuation, +30dBm, ±50Vdc | | |
| RF Input VSWR | 2.0:1 max., 1.5:1 typ. (≥10dB attenuation) | | |
| Inputs / Outputs | RF In (N), Ext. Freq. Ref (BNC), Ext. Trigger (BNC), Headset (2.5mm, 3 wire) | | |
| Communications | USB2.0 (Mini-B), Ethernet'LAN (RJ45) | | |

### Adaptors

| Model | Frequency Range | Connectors |
|---|---|---|
| **12N50-75B** | dc - 3GHz | 50Ω N(m) to 75Ω N(f) |

### Antenna Kit

Consists of the following antennae and a carrying pouch:

- Portable Antenna, 1.71 to 1.88 GHz, SMA (m), 50Ω
- Portable Antenna, 1.85 to 1.99 GHz, SMA (m), 50Ω
- Portable Antenna, 2.4 to 2.5 GHz, SMA (m), 50Ω
- Portable Antenna, 806-866 MHz, SMA (m), 50Ω
- Portable Antenna, 896-941 MHz, SMA (m), 50Ω
- Antenna, 5725 to 5825 MHz, SMA male connector

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

493746

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| MS2717B | Spectrum Analyser, 7.1GHz | **151-2739** | 8,097.00 | ⇵ | ⇵ |
| MS2718B | Spectrum Analyser, 13GHz | **151-2740** | 10,419.00 | ⇵ | ⇵ |
| MS2719B | Spectrum Analyser, 20GHz | **151-2743** | 12,160.00 | ⇵ | ⇵ |
| **Quantity discounts available. Please contact your local Farnell Office.** | | | | | |
| **Rack Mount Kits** | | | | | |
| MS2717 Rack Mount Kit | | **129-8846** | 61.00 | – – | – – |
| MS2718 Rack Mount Kit | | **151-2741** | 58.00 | – – | – – |
| MS2719 Rack Mount Kit | | **151-2745** | 58.00 | – – | – – |
| **Accessories** | | | | | |
| 12N50-75B | Matching Pad, DC to 3GHz | **129-8843** | 313.58 | 305.74 | 297.90 |
| 61532 | Antenna Kit | **129-8844** | 159.10 | 155.12 | 151.15 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | | S C 20 | 108.78 |
| **UKAS Calibration Charge** | | | | N C 20 | 128.40 |

## Swivel Base BNC Antenna

TENMA™

**72-6601**



Great for non-contact test of RF transmitting products. Connects to frequency counter, spectrum analyzer or other RF test equipment with BNC input.

- Swivel base telescopic antenna with BNC connector
- 610mm maximum length
- 1.8MHz to 1800MHz frequency range

336713

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 72-6601 | **490-8480** | 3.91 | 3.61 |

# Signal Strength & Detection

## RF Signal Strength Meter



A pocket RF signal strength meter, which can be used to show the presence and strength of a radio signal. Briefly press the power switch and the LED bargraph will show the RF activity within the local environment. The peak signal is held for one second.

This meter can be invaluable when installing a radio system to determine if other RF signals are present (interference) and to validate the signal strength of the radio transmitter to be installed (range expectation).

**Applications**

- Detects interference
- Range testing
- Radio installation performance check
- Transmitter check

- Handheld meter
- Detects 433MHz RF carrier
- 10 digit LED display with peak hold
- Single 9V PP3 battery operation
- Battery low indication
- Auto shut-off after 1 minute
- No radio licence required

| | | | |
|---|---|---|---|
| Supply Voltage | | IF bandwidth | 600kHz |
| Supply current | 20mA (PP3 battery supplied) | Initial frequency accuracy | ±50kHz |
| Frequency | | Max. RF input | -20dBm |
| Operating temperature | to + | 3dB bandwidth | ±400kHz |
| RF sensitivity | -110dBm typical | Dimensions | 110x65x24mm |

248241

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| RF Level Meter, 433MHz | 006-433R2 | **431-7750** | 52.37 | 49.65 | 47.95 |

## Broadband EMF Meter

LAPLACE

**TriField**



**Gauss Meter**

| | |
|---|---|
| 0-3 Range | 0.2 - 3 milligauss |
| 0-100 Range | 0.3 - 100 milligauss |
| Frequency Range | 50 - 500Hz flat |
| Accuracy | ±20% to 50MHz |

**Electric Field**

| | |
|---|---|
| Range | 10V/m - 100KV/m |
| Frequency Range | 40 - 100KHz |
| Accuracy | ±25 % |

**RF Field Strength**

| | |
|---|---|
| Range | 0.01 - 1KV/m |
| Frequency Range | 100KHz - 2.5GHz flat |
| Indication | Analogue meter with rotary range change switch |

**General**

| | |
|---|---|
| Power | 9V (PP3) internal battery. Battery test reading on meter |
| Dimensions | 150x90x30mm |

The Broadband meter was designed as a general purpose electromagnetic measurement tool. It detects electric and magnetic fields from power line frequencies up to several GHz. It it unique in its combination of a magnetic AC gaussmeter, electric field meter and RF field strength meter, all in one package.

339184.343926

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| BM-100 | **502-0463** | 281.07 | 272.67 | 260.99 |

## Digital RF Power Meter

LAPLACE

**TDM-200**



The Power Density Meter measures the field strength over the range 0.001 to 200µW/cm. This extremely sensitive meter can accurately measure the RF background level even in rural areas. The meter reads true power density directly on the display with 3 ranges, 20, 200 and 2000µW/cm. For comparison, a typical cordless phone will produce 0.01µW/cm at a distance of 50 feet.

| | |
|---|---|
| Frequency Range | 3MHz - 2.5GHz (±25%)<br>0.5MHz - 3GHz (-3dB) |
| Max Sensitivity | 0.001µW/cm at 1GHz |
| Sensitivity | 25% at 5GHz, 10% at 10GHz |
| Max Reading | 2000µW/cm |
| Readout | LCD, 4½ digit |
| Bandwidth | Wide: 0.05MHz - 3GHz<br>Narrow: 100MHz - 3GHz |
| Antenna | Internal |
| Averaging | Fast / Slow selector switch |
| Power | 9V (PP3) internal battery |
| Battery Life | 60 hours (1000mAH battery) |
| Dimensions | 150x90x30mm |

339185.343927

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| TDM-200 | **502-0475** | 391.24 | 379.57 | 363.31 |

## Portable RF Power Meter

KEITHLEY

**3500**



New

The **Model 3500** Portable RF Power Meter is a compact, handheld instrument that makes lab quality RF power measurements in both field and R&D laboratory environments. With an absolute accuracy as good as ±0.21dB, a wide frequency range of 10MHz to 6GHz, and a measurement range of -63dBM to +20dBM, it is suitable for a wide variety of RF measurement applications. Its built-in power sensor eliminates the need for users to carry both an instrument and a separate sensor module, and the same sensor is used when duplicating tests or measurements for better repeatability. Truly portable, it fits easily into your hand or a toolkit; an optional belt loop holster or carrying case with shoulder strap is also available. To optimize flexibility, it's capable of drawing operating power from batteries, an AC-DC converter module, or a computer via the USB interface.

W=79 H=134 D=49mm Weight = 500g

- Broad 10MHz to 6GHz frequency range enables use in a wide variety of applications, including test of mobile phones and infrastructures, WLAN devices, RFID readers, and WiMax devices
- Large dynamic range of +20dBm to -63dBm measures a wide variety of signals, either directly from the device-under-test or through layers of cabling and fixtures
- Integrated power sensor eliminates the need to carry a separate sensor and makes it

## Signal Strength & Detection - continued

### Portable RF Power Meter - continued

**3500 - continued**

the most compact and truly portable RF power measurement instrument
- Internal power reference enables self-calibration and eliminates the need for the user to perform an independent calibration before the instrument can be used
- Absolute accuracy as good as ±0.21dB enables more precise characterization of devices, tighter test limits, and more accurate fixture calibration.

| | |
|---|---|
| Frequency Range | 10MHz to 6GHz |
| Power Range | +20dBm to -63dBm |
| Power Accuracy | Best Case: ±0.16dB. Worst Case: ±0.4dB |
| Linearity | ±0.10dB, +6dBm to -40dBm |
| Noise Floor | -63dBm |
| Units | dBm, mW |
| Display | 4-digit, backlight, auto-shutoff, hold |
| Power | 2x 1.5V AA batteries (not included), from USB or from optional DC power supply |
| Speed | Normal: 2 rdgs/sec / High-Speed: 34 rdgs/sec |
| Averaging | 1, 2, 4, 8, 16 and 32 averages |

**Supplied with:** 1.0m USB A to Mini-B cable and software CD

494114

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| **Power Meters** | | | | |
| 3500 | **151-7380** | 913.92 | 892.50 | 867.00 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | **S** C 20 | 108.78 | |
| **UKAS Calibration Charge** | | **N** C 20 | 128.40 | |

### RF MilliVoltmeter

digimess®

**RF 2000**




W=280 H=140 D=200mm. Weight 5kg

A broadband RF millvolt meter ideal for use in the broadcasting, television and radio communications fields.

- 4½ digit LED display
- Supplied with measuring probe set, T insertion adapter, 50Ω terminator, power lead and operating instructions

| | |
|---|---|
| Frequency Range | 20kHz - 1GHz |
| Voltage Range | 800µV - 10V (5 ranges) |
| Voltage Accuracy (@100kHz) | ±1% rng (>100mV), ±2% rng (<100mV), ±3% rng (<10mV), |
| Input Capacitance | ≤2.5pF |
| SWR of T Adaptor | ≤1.35 (at ≤1 GHz) |

450201.460916

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| RF2000 | **129-3269** | 479.20 | 431.28 | 420.00 |

### USB Power Sensor

Anritsu

LATEST PRICING

**MA24106A**




W=56 H=85 D=30mm Weight = 180g

The **MA24106A** power sensor is a USB power sensor that eliminates the need of a traditional power meter. It is a highly accurate, standalone instrument that communicates with a PC via USB. The power measurement capability is intended to mimic that of a traditional thermal (thermo-electric) power sensor with a wider dynamic range. Therefore, it is ideal for measuring average power of CW, modulated RF waveforms such as 3G, 4G, OFDM, and multi-tone signals. In other words, it measures true RMS power regardless of the type of the input signal. The presence of a micro-controller along with signal conditioning circuitry, ADC, and power supply in the sensor makes it a complete miniature power meter. The data display, acquisition and post processing occurs in the PC. The included Anritsu Power Meter software for Windows can be used to control and operate the sensor.

- True RMS measurements over 63dB dynamic range enables accurate CW and modulated power measurements.
- Ready for use in a wide variety of applications, including installation and maintenance of base stations, testing of 3G and 4G devices, cell phones and general purpose RF devices.
- High damage power levels and ESD protection circuitry showcases ruggedness and reliability
- Low power consumption (100 mA typ) extends Laptop battery life
- Presence of signal channel/analogue signal acquisition HW and on-board (frequency as well as temperature) corrections eliminates the need for a reference calibration, simplifying the measurement process and reduction of test time in production
- Light weight, low cost easy to use with a PC or Laptop

**Sensor**

| | |
|---|---|
| Frequency Range | 50MHz to 6GHz |
| Dynamic Range | -40dBm to +23dBm |
| Input Return Loss | >26dB (50MHz to 2GHz); >20dB (2GHz to 6GHz) |
| Measurement Ranges | Range 1: -40dBm to -5dBm; Range 2: -5dBm to +23dBm |
| Signal Channel Bandwidth | 100Hz, typical |

**Measurement Uncertainty**

| | |
|---|---|
| Linearity | ±0.13dB (power level <+18dBm); ±0.18dB (power level >+18dBm); |
| Calibration Factor | ±0.6dB |
| Noise | <2.5nW (-40dBm to -5dBm); <0.4µW (-5dBm to +23dBm); |
| Zero Set | <10nW (-40dBm to -5dBm); <1.7µW (-5dBm to +23dBm); |
| Zero Drift | <3.0nW (-40dBm to -5dBm); <0.5µW (-5dBm to +23dBm); |
| Temp. Compensation (0 to 50°C) | ±0.6dB |
| Effect of digital modulation | ±0.02dB (power level <+18dBm); ±0.10dB (power level >+18dBm); |

**System**

| | |
|---|---|
| Measurand | True-RMS / Average Power |
| Measurement Resolution | 0.01dB |
| Offset Range | ±100dB |
| Averaging Range | 1 to 256 |
| Measurement Speed | 10 measurements per second, typical |
| Range | Auto-ranging between Range 1 and Range 2 |

**General**

| | |
|---|---|
| Current (via host USB) | 100mA typical at 5V |
| Maximum DC Voltage at RF port | ±25V |
| Maximum CW power | +33dBm |

**Supplied with:** 1.8m USB A to Mini-B cable and software CD

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

494040

| Mftrs. List No. | Order Code | 1+ | Price Each + | + |
|---|---|---|---|---|
| **Power Meters** | | | | |
| MA24106A | **151-2746** | 1,393.00 | – – | – – |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | | **S** C 20 | 108.78 |
| **UKAS Calibration Charge** | | | **N** C 20 | 128.40 |

### USB Power Sensors 12.4, 18.5 & 26.5GHz

TTi

New

**Satori ST Series**




TTi Satori ST series power sensors are complete miniature power meters. The sensors contain a CPU that controls the sensor, processes the measurement results and operates the interface. All measurement data and settings can be transmitted via a USB interface to and from a Windows PC. Multiple sensors can be connected to the PC and operated simultaneously.

The concept of using a PC as the user interface in classic microwave power measurements is both highly cost effective and flexible, particularly if a PC is already used for data acquisition and evaluation.

The supplied software provides an easy-to-use virtual power meter under Windows with calculation and graphing functions. In addition a software toolkit includes a DLL for individualized use of the entire sensor functionality.

- Performs precision power measurement without a separate power meter by using direct USB connection to a PC
- CW power measurements over 70dB dynamic range from 10MHz to 12.4GHz, 18.5GHz or 26.5GHz depending upon model
- Internal zeroing capability and built-in temperature and frequency compensation removes the need for a reference calibrator
- Low power consumption of 50mA from USB port minimises laptop battery drain
- Uses standard USB cable enabling easy choice of cables up to 5 metre length
- Virtual power meter software for Windows, and developers software toolkit supplied
- Duty cycle based calculation allows measurement of gated signals such as GSM

**Model Specific Specifications**

| Model | ST124SMA | ST185SMA | ST265SMA |
|---|---|---|---|
| Frequency Range | 10MHz to 12.4GHz | 10MHz to 18.5GHz | 10MHz to 26.5GHz |
| Dynamic Range | -50dBm to +20dBm | -50dBm to +20dBm | -50dBm to +20dBm |
| Input SWR | < 1.2:1 | < 1.2:1 | < 1.25:1 to 18GHz, <1.35:1 to 26.5GHz |
| Linearity (>50MHz) | ±0.26dB -40 to +10dBm | ±0.26dB -40 to +10dBm | ±0.25dB -35 to +20dBm |
| (please request data sheet for full specifications of linearity versus level, frequency and temperature) | | | |
| Cal. Factor Error | 0.17dB | 0.17dB | 0.2dB |
| Noise | 0.15nW RMS | 0.15nW RMS | 0.14nW standard deviation |
| Zero Set | ±1.7nW | ±1.7nW | ±1.6nW |
| Connector type | SMA (male) | SMA (male) | K type (male) |

**Common Specifications**

| | |
|---|---|
| Measurement Speed | -50 to -35dBm - 8/sec, -35 to -20dBm - 33/sec, -20 to +20dBm - 50/sec |
| Max. Input Power | 200mW CW (+23dBm) |
| Temperature Range | 0 to 50 °C |
| Shock and Vibration | Shock - 25G, 11 ms; Vibration - 15G, 100 to 2000Hz |
| USB Supply Current | 50mA typical |
| Supplied USB Cable | 193 cm standard A to standard B (cables up to 5m can be used) |

**Virtual Power Meter**

| | |
|---|---|
| Operating System | Operates under Windows 2000, XP or Vista |
| Multi-channel Measurements | Any number of meters can be opened for multi-channel power measurement |
| Measurement | Average carrier wave power |
| Meter Type | Digital meter or analogue bar graph |
| Resolution | Selectable up to 0.001dB |
| Measurement Control | Relative offset, Duty cycle compensation, Limits Comparison |
| Graphing | Trace mode offers graphical display of power against time |

**Supplied with**: USB cable, Users Manual and CD with virtual power meter software and developers toolkit.

525618

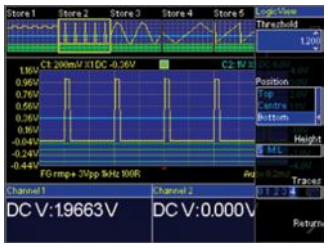
| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| ST124 | **167-0771** | 950.00 | 899.00 |
| ST185 | **167-0772** | 1,150.00 | 1,099.00 |
| ST265 | **167-0774** | 1,450.00 | 1,395.00 |

## Multi-Instruments

### Precision Active Oscilloscope

**CircuitMaster 4000M**







A complete instrument station, combining power on and power off tests, for full diagnostics and measurement on all electronics and electrical applications. Unique test functions, such as active mode which injects and measures signals simultaneously, allow for the detection of electrical conditions which cannot be determined with conventional equipment. Combining measurement techniques, for instance oscilloscope and DC voltmeter, removes the need for multiple probing and multiple instruments, therefore reducing testing time and equipment expenditure. Additional features for faster data acquisition, analysis and comparison make the CircuitMaster 4000M a comfortable and powerful instrument for all testing requirements.

**Summary:**

- VI tester for analogue signature analysis (with pulse outputs)
- 2 Channel Digital Storage Oscilloscope with accurate Digital DC Voltmeter
- Active mode for dynamic testing
- AC and DC function generator
- FirmFlex tester for node strength evaluation
- LogicView for logic signals analysis
- 40 Channel MultiWay connection for multiple signal acquisition
- Footswitch for hands-free signal acquisition
- WaveStack for signal acquisition memory
- Automatic measurements and comparison features
- USB interface for PC connectivity

**Supplied with**: UK & EU power leads, 2x oscilloscopes probes X10/X1, 2x red & black 4mm probes with BNC adapters, MultiWay cable, 40 way 0.6" DIL test clip, 16 way 0.3" DIL test clip, USB cable, Footswitch, Operator's manual, CD with CircuitLink software and drivers.

**Oscilloscope Specifications**

| | |
|---|---|
| Bandwidth | 100MHz |
| Sample Rate | 50MSa/s (single shot), to 25GSa/s in ERS mode |
| Resolution | 10-bits (max), 8-bits on 10mV/div and 20mV/div ranges |
| Timebase | 1ns/div to 2s/div |
| Sensitivity | 10mV/div to 10V/div |
| AC Accuracy | 1% of full scale (5% on 10mV and 20mV ranges) |
| Trigger Modes | Auto, Normal, Single Shot |
| Trigger Coupling | DC, AC, LF reject, HF reject. From CH1, CH2, EXT. or internal FG. |

**DVM specifications**

| | |
|---|---|
| Resolution | 24-bits (approx. 0.1µV on 10mV/div, 162µV on 100V/div |
| Accuracy | ±(0.1% range + 1digit) |

**Inputs**

| | |
|---|---|
| Channels | 2 analogue, 4 digital plus external trigger |
| Maximum Input | ±200V DC or pk AC, ±25V (VI of FirmFlex), ±12V (LogicView) |
| Input Impedance | 1MΩ " 50pF |
| Input Coupling | DC, AC, GND |

**Outputs**

| | |
|---|---|
| Stimulus Output | ±0.5V to ±25V bipolar/unipolar (for VI, FirmFlex, SignalTrack) |
| Stimulus Frequency | 10Hz to 100kHz |
| Stimulus Waveforms | Sine, Triangle, Ramp, Square and Pulse |
| Stimulus Source Resistance | 100R to 1MR in decade sequence |
| Pulse Output | -10V to +10V in 0.1V steps |
| LogicView Threshold | -4V to +4V in 0.1V steps |

**General Specifications**

| | |
|---|---|
| Power Supply | 110V/230V 50Hz/60Hz |
| Interfaces | USB, Footswitch, BNC, Multiway, 4mm |
| Display | 320x240 pixel colour LCD |

450212

| Description | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| CircuitMaster 4000M | **102-0919** | 2,050.00 | 1,988.00 | 1,928.00 |

### 3-in-1 Lab Unit

**LAB1**



A space saving lab solution featuring a multimeter, a power supply and a soldering iron. Covers 99% of your home lab needs and is the perfect solution for starters or schools.

**Digital Multimeter**
- 3 1/2 backlit LCD
- Automatic polarity indication
- Diode, transistor and continuity test
- data-hold function and buzzer

**Regulated Power Supply**
- LED overload indication
- Output on/off switch
- Very low ripple
- LED power indication

**Soldering Station**
- Low-voltage iron: 24V
- Ceramic 48W heating element with temperature sensor
- Temperature range: OFF - 150 - 450°C
- Lead-free soldering possible

**Includes:** DMM test leads, user manual, sponge, spare soldering bit, 9V battery and mains cable.

**Digital Multimeter**

| | |
|---|---|
| DC Voltage | 200mV to 600V in 5 steps |
| AC Voltage | 200V and 600V |
| DC Current | 200µA to 10A in 5 steps |
| Resistance | 200R to 2MR |
| Safety Category | 600V CATI 300V CATII |

**Regulated Power Supply**

| | |
|---|---|
| Selectable Output Voltages | 3 - 4.5 - 6 - 7.5 - 9 - 12 V dc |
| Max. Current | 1.5A (2A peak) |

417173.423173

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| LAB1 | **105-6461** | 87.13 | 83.25 | 79.06 |

### Multi-Instrument

**MI200**



- 2MHz Sweep Function Generator
- 1GHz Frequency Counter
- Quad Output Power Supply
- Autoranging Digital Multimeter

W=375 H=160 D=340mm

**Function Generator**

| | |
|---|---|
| Frequency | 0.02Hz to 2MHz |
| Waveforms | Sine, square, triangle, skewed sine, pulse, TTL level |
| Sweep Modes | Linear and Log |
| Output Level | 0.1$V_{pp}$ to 20$V_{pp}$ DC |
| Output Impedance | 50Ω / 600Ω selectable |

**Frequency Counter**

| | |
|---|---|
| Measuring range | 1Hz - 100MHz, 70MHz - 1GHz |
| Sensitivity | 1Hz to 100MHz 15$mV_{rms}$, 70MHz to 1GHz 25$mV_{rms}$ |
| Resolution | 0.1Hz, 1Hz, 10Hz, 100Hz, 1kHz |
| Gate Time | 10s, 1s, 100ms, 10ms / 12.8s, 1.28s, 128ms, 12.8ms |
| Accuracy | ±(1Hz + 1d + timebase error) |
| Display | 8-digit LED with annunciators |

**DC Power Supply**

| | Output 1 | Output 2 | Output 3 | Output 4 |
|---|---|---|---|---|
| Output voltage | 0-30V | 0-30V | +5V fixed | +5V fixed |
| Output current | 0-3A | 0-3A | 2A fixed | 2A fixed |
| Ripple | 2mV max | 2mV max | 2mV max | 2mV max |
| Load regulation | 0.01%+5mV | 0.01%+5mV | <35mV | <35mV |
| Display | 3.5 digit LCD display of voltage and current | | | |

**Digital Multimeter**

| | |
|---|---|
| Display | 3.5 digit LCD |
| Input Impedance | 10MΩ |
| Ranging | Auto and Manual |
| Functions | DCV, ACV, DCA, ACA, Ω |
| Basic Accuracy | ±(0.5%+2d) |

# Multi-Instruments - continued

## Multi-Instrument - continued

### MI200 - continued

**Supplied with:** multimeter test leads, power supply leads, BNC-BNC lead, power lead and operating manual.

492805.502116

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| MI200 | **150-3498** | 508.98 | 459.00 | 428.40 |

## Modular System 8000

HAMEG Instruments

The HAMEG Modular System 8000 is a suite of instruments that consists of the HM8001-2 mainframe and a group of modular inserts. The mainframe holds two modules at a time and provides a source of regulated power and on/off control for the modules and acts as a stackable rack/enclosure station for groups of two modules.

Significant space savings and a high degree of flexibility are achieved through the use of the System 8000. An assortment of varied measurement instruments are available within the series. An outstanding benefit is its ability to adapt to changing test station requirements through the use of plug-in instruments. Since the plug-ins do not contain any power supplies, they are small, lightweight and convenient to store when not being used. For special applications, blank modules are available for customer designed plug-ins.

A typical example of a compact arrangement for the Modular System would utilise an HM8001-2 mainframe with an HM8040-2 Triple Power Supply and an HM8030-5 Function Generator stacked with an HM407 Digital Oscilloscope. The stacked combination would be able to supply power to all circuits under test, generate an input stimulus waveform and the circuit could be observed with the oscilloscope. All the test equipment would only take up a small amount of lab bench space.

339636

| Mftrs. List No. | Description | Order Code | Price Each 1+ |
|---|---|---|---|
| HM8001 | Mainframe Unit (power supply) for 2 modules | **824-872** | 143.10 |
| HM8012.. | Programmable DMM, 4¾ digit | **825-426** | 267.49 |
| HM8018... | LC Meter, 200ΩH to 200H, 200pF to 200µF | **825-580** | 251.11 |
| HM8021-4 | Universal Counter, DC-1.6GHz | **825-529** | 228.19 |
| HM8030-5 | Function Generator 0.05Hz to 5MHz | **825-517** | 207.44 |
| HM8040-3 | Power Supply, 2x0 to 20V/0.5A, 5V/1A | **825-463** | 158.31 |
| HM800 | Blank Module | **825-578** | 27.30 |

## Programmable Multimeter

HAMEG Instruments

### HM8012



W=135, H=68, D=228mm

The HM8012 is a highly integrated digital multimeter with 42 measurement ranges. Auto ranging provides optimum resolution for AC+DC, dB and temperature measuring functions. The 4¾ digit readout will display a measured magnitude of up to 50,000 points. The maximum resolution obtained, dependent on measurement function is 10µV, 10nA, 10mΩ or 0.1°C.

Input resistance exceeds 1GΩ/90pF in the lowest VDC modes. True RMS measurements of AC voltage/current are possible with a Crest factor of 7. Analysis of audio signals is easy thanks to direct reading in dB. Resolution is 0.01dB. Offset compensation is employed to eliminate the effects of any line resistance influencing resistor measurements. A software controlled calibration routine allows a complete instrument adjustment without any manual adjustments.

All instrument functions can be controlled via a RS-232 standard interface. Easy Software makes PC based set up under Windows a simple task. All measurement functions can be controlled on a virtual instrument shown on the PC monitor. A data logging capability including a time based curve tracer runs under Excel.

- 50000 counts, 4¾ Digits
- 42 Measurement Ranges
- Automatic and Manual Range Selection
- Between 3 to 6 Measurements/sec
- True RMS Measurement of AC and AC + DC
- Basic Accuracy 0.05%
- Resolution 10µV,10nA, 10mΩ, 0,01dBm and 0,1°C
- Input Resistance >1GΩ (0.5V and 5V)
- Communication by RS-232 Link

**DC Voltages**

| | |
|---|---|
| Ranges | 500mV, 5V, 50V, 500V, 1000V |
| Resolution | 10uV, 100uV, 1mV, 10mV, 100mV |
| Accuracy | 5V - 1000V: ±(0.05%rdg+0.002%fs)<br>5V - 1000V: ±(0.05%rdg+0.002%fs) |
| 200mV: | ±(0,05% v.M.+0,01 %v.E.) |
| Max Input Voltage | 1000Vc for 50V, 1000V ranges<br>300Vrms for 500mV and 5V ranges |
| Input Impedance | 100MΩ//90pF for 50V, 1000V ranges<br>>1GΩ//90pF for the 500mV, 5V ranges |
| Input Current | max. 20pA (23°C) |

**DC Current**

| | |
|---|---|
| Ranges | 500µA, 5mA, 50mA, 500mA, 10A |
| Resolution | 10nA, 100nA, 1µA, 10µ, 1mA |
| Accuracy | 0.5-500mA: ±(0.2%rdg+0.004%fs)<br>10A: ±(0.3%rdg+0.004%fs) |

**AC Voltage**

| | |
|---|---|
| Range | 500mV, 5V, 50V, 500V, 750V |
| Resolution | 10µV, 100mV, 1mV, 10mV, 100mV |
| Accuracy 0.5-50V | 10Hz-40Hz: ±(0.4%rdg + 0.07%fs)<br>20Hz-20kHz: ±(1%rdg + 0.07%fs) |
| Accuracy 500V and 750V | 40Hz-1kHz: ±(0.4%rdg + 0.07%fs)<br>20Hz-1kHz: ±(1%rdg + 0.07%fs) |
| Max. Input Voltage | 1000Vc for 50V, 500v and 1000V ranges<br>300Vrms for 500mV and 5V ranges |
| Input Impedance | 1MΩ // 90pF AC + DC: 10MΩ |

**AC Current**

| | |
|---|---|
| Range | 500µA, 5mA, 50mA, 500mA, 10A |
| Resolution | 10nA, 100nA, 1µA, 10µA, 1mA |
| Accuracy | (40Hz-5kHz) 0.5-500mA: ±(0.7%rdg + 0.07%fs)<br>10A: ±(1%rdg + 0.07%fs) |

**Resistance**

| | |
|---|---|
| Range | 500Ω, 5kΩ, 50kΩ, 500kΩ, 5MΩ, 50MΩ |
| Resolution | 10mΩ, 100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ |
| Accuracy | ±(0.05%rdg + 0.004%fs+50mΩ) 500Ω to 500kΩ<br>50MΩ: ±0.3%rdg + 0.004%fs) |
| Input Protection | max 300Vrms |

347932

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| HM8012.. | **825-426** | 267.49 |

## LC Meter

HAMEG Instruments

### HM8018



W=135, H=68, D=228mm Weight=650g

- 24 Measurement Ranges
- Max. Resolution: 0.1pF / 0.1µH / 0.01W / 0.01µS
- 3 Test Frequencies (160Hz, 1.6kHz, 16kHz)
- 4 Wire Measurement Technique
- Basic Accuracy 0.5%
- Internal Bias for Electrolytic Capacitors
- Measures both Series and Parallel Components

Measured values are displayed on a 3½ digit LED with a basic accuracy of 0.5%. Measurements are performed at a 2 per second rate. Through the 3 used oscillator frequencies, which automatically switch upon range selection, the instrument always operates at the optimum test frequency.

Measures L, C, series and parallel components of inductances and capacitances can be determined with the HM8018, providing easy evaluation of the quality or dissipation factors of the components under test.

A special measurement technique allows separation of real and imaginary components up to a phase angle of 45° with an accuracy of ≤1%. The high degree of resolution, 10mW/ 0.01µS ensures precise and reliable test results.

The accuracy and operability of the HM8018 make it ideal for use in virtually every area of electronic technology, including quality control and laboratory applications. The low number of operating controls ensures a maximum of measurement functions.

**Ranges**

| | |
|---|---|
| Inductance | 200µH to 200H (7 decades) |
| Series Resistance | 20W to 200kΩ (5 decades) |
| Shunt Capacitance | 200pF to 200µF (7 decades) |
| Shunt Conductance | 20µS to 200mS (5 decades) |
| Max. Resolution | 0.1pF; 0.1µH; 0.01Ω; 0.01µS |
| Measuring Frequencies(Sine wave signal) | approx. 160Hz, 1.6kHz, 16kHz |
| Measuring Voltage | max. 1Vpp |
| Measuring Current | max. 36mA (rms) |
| Power Dissipation during measurement | max. 3.2mW |
| Accuracy | ±0.5% of value +(3 Digit+0.5pF/0.5µH/10mΩ/0.01µS) |

**Display**

| | |
|---|---|
| Display | 3½ digit LED-display |
| Measuring Rate | 2 measurements/second |
| Principle of Measurement | 2 or 4 Wire Measurement |

**General Information**

| | |
|---|---|
| Polarisation voltage for C measurement | 2V |
| Operating Conditions | +10°C to +40°C |
| Max. relative humidity | 80% |

339561

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| HM8018... | **825-580** | 251.11 |

## Universal Counter

HAMEG Instruments

### HM8021-4



W=135, H=68, D=228mm Weight = 650g

- Frequency Range: DC to 1.6GHz
- Sensitivity: 20mVRMS
- 7 Measuring Functions
- 3 Selectable Gate Times; External Gate (HO801)
- 8 Digit LED Display
- Crystal Time Base (TCXO) 5x10-7
- Selectable Auto Trigger

This microprocessor based instrument has built-in self test as well as two high sensitivity inputs, with an extended frequency range to 1.6GHz for one of them. The reciprocal frequency measurement technique provides high resolution of low frequency signals with 7 significant digits for a 1s measurement duration. The HM8021-3 is equipped with an extremely stable

temperature compensated crystal oscillator (TCXO) with a stability of 0.5 ppm over the entire operating temperature range.

Readings of frequency, period, time interval and totalized count, up to 99,999,999, combined with the Display Hold function and a full range offset makes this instrument ideally suited for a broad range of applications. The Auto Trigger function allows accurate measurements to be made, even on noisy waveforms and those with extremely short duty cycles. The HM8021 provides variable trigger control, offers selectable 20dB attenuation and AC or DC coupling to simplify measurements on complex signals.

**Input A Characteristics**

| | |
|---|---|
| Frequency Range | 0 to 150MHz (DC coupled); 10Hz to 150MHz (AC coupled) |
| Sensitivity(normal triggering) | 20mVrms (sine wave) DC to 80MHz, 80mV (pulse)<br>60mVrms (sine wave) 80MHz to 150MHz<br>50mVrms (sine wave) 20Hz to 80MHz, (auto trigger) |
| Min. Pulse Duration | 5ns |
| Input Noise | <100µV, typical |
| Coupling | AC or DC (switch selectable) |
| Input Impedance | 1MΩ‖40pF |
| Attenuator | x1, x20 (switch selectable) |
| Max. Input Voltage | 250V (DC+ACpeak) from 0 to 440Hz down to 8Vrms at 1MHz |

**Input C Characteristics**

| | |
|---|---|
| Frequency Range | 100MHz to 1.6GHz |
| Sensitivity | 30mV to 1.3GHz (typically 20mV);<br>100mV to 1.6GHz (typically 80mV) |
| Input Impedance | 50Ω nominal |
| Coupling | AC |
| Max. Input Voltage | 5V (DC+ACpeak) |

**Frequency A**

| | |
|---|---|
| LSD | ($2.5x10^{-7}$s x Freq.) / measuring time |
| Resolution | ±1 or 2 LSD |

**Period A**

| | |
|---|---|
| Range | 10000sec to 66.6ns |
| LSD | ($2.5x10^{-7}$s x period / measuring time) |
| Resolution | ±1 or 2 LSD |

**Totalize A (manually / gated by external signal)**

| | |
|---|---|
| Range | DC to 20MHz |
| Min. Pulse Duration | 25ns |
| LSD | ±1 Count |
| Resolution | LSD |
| Ext. Gate Error (in manual mode only) | 100ns |

**Time Interval (averaged)**

| | |
|---|---|
| LSD | 100ns to 10ps (averaged) |
| Resolution | 1 or 2 LSD |

**Gate Time**

| | |
|---|---|
| Range | 100ms to 10s in 3 steps (cannot be shorter than 1 period) |
| External Gate Time | min. 150µs |

**Time base**

| | |
|---|---|
| Frequency | 10MHz clock rate; 10MHz crystal (TCXO) |
| Accuracy | $\pm5x10^{-7}$ between 10°C and 40°C |
| Aging | <2.5ppm / year |

**General Information**

| | |
|---|---|
| Display | 8 digit 7 segment LED 7.65mm height; Sign and Exponent |
| Power Requirements | 7W, nominal |
| Ambient Temperature | +10°C to +40°C (operation) |
| Humidity | 10%-90%, no condensation, 5%-95% RH |

339562

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| HM8021-4 | **825-529** | 228.19 |

## Function Generator

HAMEG Instruments

**HM8030-6**



W=135, H=68, D=228mm Weight=800g

- Frequency Range: 0.05Hz to 5MHz
- Digital Frequency Readout (4 digit)
- Waveforms: Sine, Square and Triangle
- DC Offset Adjustment, Trigger Output
- Internal Sweep and External FM Modulation Input
- Fast Square Wave Rise Time (typical 15ns)
- Distortion Factor <0.5% (up to 100kHz)

The HM8030-5 Function Generator is a versatile signal source useful for many stimulus and test applications. Key features are high signal purity and constant amplitude flatness throughout the entire frequency range. This instrument is ideal for a broad range of test bench use including precision audio measurements.

The generator produces 3 waveforms: sine, square and triangle. The square wave output has a fast rise time <15ns, exceptional for function generators with 5MHz. The output frequency can be swept internally and externally. This is ideal for examining transmission curves of a circuit under test using an oscilloscope as a measurement indicator. All outputs are electrically protected against short circuits and accidentally applied voltages of up to ±45V.

Frequencies are indicated on a 4 digit LED display, making accurate and precise frequency setting possible with a maximum resolution 1mHz in the 5Hz range. The measurement time is a constant quarter second over the entire frequency range. The HM8030-5 Function Generator offers precision and multifunctional qualities. This makes the instrument ideally suited for laboratory and educational use.

**Frequency Range**

| | |
|---|---|
| Total Range | 0.05Hz to 5MHz (8 Decade Steps) |
| Variable Frequency Adjustment | x0.09 to x1.1 (12:1) |
| Frequency Stability | <0.5%/h or 0.8%/day at constant ambient temperature |

**Waveform Characteristics**

| | |
|---|---|
| Sine Wave Distortion | 0.05 Hz to 100kHz: max. 0.5%, 0.1 MHz to 0.5MHz: max. 1.5%<br>0.5 MHz to 5MHz: max. 3% |
| Square Wave Rise Time | typ. 15ns |
| Overshoot | <5% (when output is terminated with 50Ω) |
| Triangle Non linearity | <1% (up to 100 kHz) |

**Display**

| | |
|---|---|
| Frequency | 4 digit LED display; 8x5mm each |
| Accuracy | up to 5 Hz; ±(1% + 3 digit), 5Hz to 5MHz: $\pm(5x10^{-5}$ + 1 digit) |
| LED | Indicator for mHz, Hz and kHz |

**Outputs**

| | |
|---|---|
| Signal Output (short circuit proof) | Impedance: 50Ω; protected against ±45Vdc max. |
| Output Voltage | 10Vpp into 50W; 20Vpp open circuit |
| Attenuation | max. 60dB |
| 2 steps | 20dB ±0.2dB each |
| variable | 0 to 20dB |
| Amplitude Flatness (sine/triangle) | 0.5Hz to 0.5MHz: max. 0.2dB, 0.5MHz to 5MHz: max. 0.5dB |
| DC-Offset | variable (switchable) |
| Offset range | max. ±2.5V into 50Ω; max. ±5V open circuit |
| Trigger Output | +5V / TTL compatible square wave synchronous to signal outputs |

**General Information**

| | |
|---|---|
| Operating Conditions | +10°C to +40°C |
| max. relative humidity | 80% (no condensation) |

339563

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| HAMEG HM 8030-6 | **825-517** | 207.44 |

## Blank Module

HAMEG Instruments

**HM800**



The HM800 blank module is avaible to make building of custom designed instruments based on the HM8000 system easy. It can take up to 4 separate PCBs in different positions. The module is supplied with a blank front panel and the necessary connector to correctly adapt to the power supply of the HM8001-2 mainframe.

339422

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| HM800 | **825-578** | 27.30 |

## Modular Test and Measurement System

HAMEG Instruments

**HM8001**



W=285, H=75, D=365mm Weight=4kg

The HM8001 mainframe and its internal power supplies are the basis for the HAMEG Modular System 8000. It can accommodate any two System 8000 modules. All 8000 series module types can be individually powered from the mainframe's 8 independent, floating output voltages. The maximum total power output for each mainframe is 36Watts. The mechanical strength of the mainframe allows stacking of a maximum of 5 units, allowing for minimal lab bench footprint space a maximum of measurement applications. Stacking is facilitated by removable footrests on top of each unit that prevents sliding when stacked. The mainframe of the Modular System 8000 can also bestacked with any other HAMEG instrument, such as oscilloscopes and System 8100 series instruments.

**Module Supply Voltages**

| | |
|---|---|
| 2x8VAC | capable of sourcing 0.5A each |
| 2x5VDC | capable of sourcing 1A each |
| 4x20VDC | capable of sourcing 0.5A each |

**Power Source Specifications**

| | |
|---|---|
| Total Power (2 modules) | 36W max |
| DC Voltages | electronically regulated,<br>floating, short circuit proof |
| Isolation (Test Voltage to Ground) | 500V |

**General**

| | |
|---|---|
| Power ON/Off control | Center of front panel |
| Power Input | 115 / 230VAC ± 10% @ 50 / 60Hz |
| Power Consumption | 110W, maximum |
| Overload Protection | Thermal |
| Safety | Class I (IEC 348) |

347931

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| HM8001 | **824-872** | 143.10 |

## Modular Instruments

### USB Three Channel Source Measure Unit

**4 Quadrant Operation**

LATEST PRICING

Agilent Technologies

New



H = 66, W = 120, D = 183mm.

- Four-quadrant operation
- 3 Channels
- 16 bits resolution across all current and voltage range
- 100pA resolution @ 1 uA range
- Hi-Speed USB 2.0 TMC488.2 compliance
- Connect via USB 2.0 - High speed (480Mbps)

The U2722A SMU is a versatile device that allows sweep and measurement from different operating regions with just a single device without extra configurations. The 4 quadrant-operation (±20 V) makes the device well suited for a wide range of test applications including leakage measurement, solar cell management. forward/reverse voltage curve tracer and many others. Thee U2722A offers high measurement sensitivity with 16-bit resolution and accuracy that enables accurate analysis and measurement results.
The USB 2.0 interface provides connectivity and setup that allows automatic detection of the device. With quick and easy USB connectivity the U2722A is simple enough for R & D applications but robust and versatile enough for electronic functional test applications. The USBTMC 488.2 standard makes the U2722A compatible with any system that is provided with USB ports.
The SMU is compatible with:

- Agilent VEE and Agilent T & M Toolkit
- Microsoft Visual Studio, NET, C/C++ and Visual Basic 6
- LabVIEW
- MATLAB®

508684

| Mftrs. List No. | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| Source Measure Unit (SMU) | U2722A | **157-7811** | 1,156.00 |
| **Accessories** | | | |
| Case | U2781A | **129-7812** | 633.00 |
| Cable, Secure USB, 2m | U2921A-101 | **157-9662** | 11.11 |

### Multimeter, USB Module

Agilent Technologies

New



The Agilent U2741A is a 5.5 digits digital multimeter (DMM), which is the latest addition to the Agilent's USB modular family. It can operate as standalone or as a modular unit when used with the U2781A USB modular instrument chassis. It comes with various features and functions to meet your needs today.
The U2741A DMM gives you an accurate 5.5 digits resolution. It offers a wide range of measurement functions and features despite its value price. The U2741A is capable of performing DC voltage, AC voltage, DC current, AC current, 2-wire resistance, 4-wire resistance, continuity, diode, frequency, and temperature measurement to meet the industrial needs.

**Features**:

- Makes fast measurements with up to 100 readings per second
- Measures up to 300 VDC with 5.5 digits resolution
- Frequency and temperature measurement capability
- Wide voltage measurement range
  - DC: 1 µVDC to 300 VDC
  - AC: 1 µVrms to 250 Vrms
- Wide current measurement range
  - DC: 1 µADC to 2 ADC
  - AC: 1 µArms to 2 Arms
- Compatibility with Hi-Speed USB 2.0, USBTMC 488.2 standards
- Dual-play - standalone and modular capability
- Bundled software - Agilent Measurement Manager (AMM)
- Wide range of compatible Agilent Development Environments (ADEs)

**Shipped Accessories:**

- 12 V, 2 A AC/DC adapter
- Power cord
- Standard test lead
- USB Standard-A to Mini-B interface cable
- L-Mount kit (used with the modular instrument chassis)
- Agilent Automation-Ready CD (contains the Agilent IO Libraries Suite)
- Agilent USB Modular Products Quick Start Guide
- Agilent USB Modular Products Reference CD-ROM
- Agilent Measurement Manager Quick Reference Card
- Certifi cate of Calibration

525268

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| U2741A | **166-5153** | 555.00 |

### USB Oscilloscope

**Modular**

LATEST PRICING

Agilent Technologies

New



H = 41, W = 117, D = 180mm.

- 2 channels ( simultaneous sampling )
- 100MHz and 200MHz models
- Bundled software includes basic spectrum analysis ( FFT, peak search, next peak )
- Up to 1GSa/s maximum sample rate
- Up to 32Mpts memory depth
- Advance triggering including edge, pulse width and TV
- Hi-Speed USB 2.0 TMC 488.2 standards
- Four maths functions, including FFT's standard
- DUAL-PLAY - Standalone and modular capability

The U2701A and U2702A Oscilloscopes are bundled with the user-friendly Agilent Modular Instrument Measurement Manager software which offers a simple interface for quick setup, configuration and measurement control.
These ocsilloscopes are compatible with:

- Agilent VEE and Agilent T & M Toolkit
- Microsoft Visual Studio, NET, C/C++ and Visual Basic 6
- LabVIEW
- MATLAB®

508697

| Bandwidth | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| 100MHz | U2701A | **157-7812** | 710.00 |
| 200MHz | U2702A | **157-7813** | 875.00 |
| **Accessories** | | | |
| Case | U2781A | **129-7812** | 633.00 |
| Cable, BNC | U2921A-100 | **157-9661** | 11.11 |
| Cable, Secure USB, 2m | U2921A-101 | **157-9662** | 11.11 |
| Probe, Passive 1:1 20MHz | 10070C | **157-9663** | 96.70 |
| Probe, Passive 10:1 150MHz (U2701A) | N2862A | **157-9664** | 56.99 |
| Probe, Passive 10:1 300MHz (U2702A) | N2863A | **157-9665** | 74.83 |

### USB Switch Matrix

**Modular**

LATEST PRICING

Agilent Technologies

New



H = 41, W = 117, D = 180mm.

- 32 two-wire cross points in 4x8 configuration
- Bandwidth of 45MHz
- Minimal cross talk up to 45MHz
- Relay cycle counter
- Flexible connection configurations - Multiple closed channels simultaneously
- Command logger function
- Connect via high speed USB2.0 (480 Mbps)
- Standalone and modular
- SCPI and IVI-COM supported
- USBTMC 488.2 standards

The U2751A USB modular switch matrix offers a high-quality switching solution for automated testing. It has 32 two-wire cross points organized in a four row by eight column configuration. This enables connection with any combination of rows and columns, including multiple channels at the same time.
The switch matrix offers flexible connection paths between the Device Under Test (DUT) and the test equipment, allowing different instruments to be connected to multiple points on the DUT at the same time. The unit is bundled with the Agilent Measurement Manager (AMM) software.
The U2922A Terminal Block has screw-type terminals which offer a convenient and simple way of making connection to the Switch Matrix for prototyping applications or system deployment.
The Switch Matrix is compatible with:

- Agilent VEE and Agilent T & M Toolkit
- Microsoft Visual Studio, NET, C/C++ and Visual Basic 6
- LabVIEW
- MATLAB®

508708

| Bandwidth | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| USB Switch Matrix | U2751A | **157-7814** | 500.00 |
| **Accessories** | | | |
| Case | U2781A | **129-7812** | 633.00 |
| Terminal Block - 32 Channel | U2922A | **157-7816** | 27.77 |
| Cable, Secure USB, 2m | U2921A-101 | **157-9662** | 11.11 |

### USB Function Generator

**Modular**

Agilent Technologies

LATEST PRICING

New



H = 41, W = 117, D = 180mm.

- Sine, Square, Pulse, Ramp, Triangle, DC and Arbitrary Waveform Generation
- AM, FM, PM, ASK, FSK, PSK, sweep
- 20 MHz Sine and Square waveforms
- Pulse, Ramp, Triangle and DC waveforms
- 14-bit, 50 MSa/s, 64 K-point Arbitrary waveforms
- Linear & logarithmic sweeps
- 40 mVpp to 5 Vpp amplitude range (into 50W)

- Hi-Speed USB 2.0 TMC 488.2 standards
- Arbitrary waveform editor
- Command logger function
- Includes software bundle

The U2761A adopts the latest Direct Digital Synthesis (DDS) technology that digitally creates arbitrary waveforms and frequencies from a single and fixed frequency source. DDS offers the precision of digitally controlled logic, thus reducing the complexity of the generator while increasing the stability. This strategy produces a stable, accurate output signal for clean, low distortion sine waves with fast rise and fall time up to 20 MHz and linear ramp waves up to 200kHz.

The U2761A is compatible with:

- Agilent VEE and Agilent T & M Toolkit
- Microsoft Visual Studio, NET, C/C++ and Visual Basic 6
- LabVIEW
- MATLAB®

508722

| Bandwidth | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| Function Generator | U2761A | **157-7817** | 881.00 |
| **Accessories** | | | |
| Case | U2781A | **129-7812** | 633.00 |
| Cable, BNC | U2921A-100 | **157-9661** | 11.11 |
| Cable, Secure USB, 2m | U2921A-101 | **157-9662** | 11.11 |

## Data Acquisition Systems

### USB Voltage Data Logger

**EL-USB-3**



L=112, W=27, D=27mm

EL-USB-3 measures and stores voltage readings from power supplies, sensors or other sources. User settable logging rate, start-time and alarms and the downloads are stored via a PCs USB port. Software requires Win 98/2000 or XP and allows voltage data to be graphed and printed.

- 32 000 readings
- Screw terminal connection
- 2 user programmable alarm thresholds
- Status indicated by flashing red and green LED
- User selectable measurment unit and scaling factor
- Supplied with battery and software

| | | | |
|---|---|---|---|
| Measurement range | 0 to 30V d.c. | Accuracy | ±1% |
| Internal resolution | 100mV d.c. | Logging rate | 1 sec to 12 hours |

381903.381933

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| EL-USB-3 | **852-2901** | 39.00 | 34.95 | 33.00 | 31.20 |

### 4-20mA Current Loop USB Data Logger

**EL-USB-4**



Length = 112mm ∅27mm

Measures and stores up to 32,000 current loop readings over a 4-20mA d.c. measurement range. The user can easily set up the logging rate and start time, and download the stored data by plugging the module into a PC's USB port and running the supplied software. The data can then be graphed, printed and exported to other applications. Correct functioning of the unit is indicated by a flashing red and green LED. The data logger features a pair of screw terminals and is is supplied complete with a set of measurement leads terminating in crocodile clips.

- 4-20mA d.c. Current Loop Measurement Range
- Stores 32,000 readings
- Supplied software supports Windows 98SE/2000/XP
- USB Interface for Set-up and Data Download
- User-Programmable Alarm Thresholds
- Red and Green LED Status Indication
- At least one years continuous operation from supplied lithium battery

| | | | |
|---|---|---|---|
| Measurement Range | 4 - 20mA dc | Logging Rate | min: every 1s<br>max: every 12h |
| Accuracy (overall error) | ±1% | Operating Temperature Range | -35 to 80°C |

415819.428946

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| EL-USB-4 | **100-6158** | 39.75 | 38.96 | 38.18 | 37.41 |

Over 480,000 products online QGO

### USB to InfraRed Converter

**USB-LINK-IR**



Converts USB data into InfraRed format. This allows a PC to communicate with other devices without the need for a wire link. To operate, simply plug USB-LINK-IR into a free USB port, install the device driver and point the USB-LINK-IR at the device you wish to communicate with. USB-LINK-IR appears as a COM port to PC applications and requires no special software to operate. It requires no batteries and no power adaptor, as it is powered from the host's USB port. The module is designed to work in existing COM port applications and is ideal for modern PCs which often have no RS232 port.

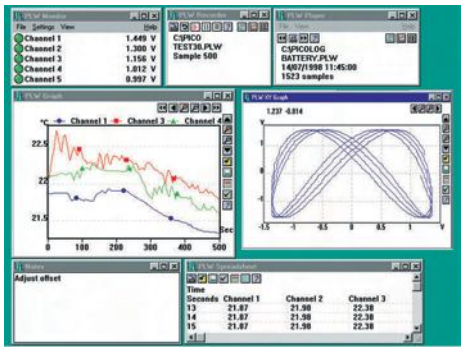
- Converts USB data into InfraRed format
- Transmit distance up to 1.0m
- Support for Windows 98SE/2000/XP, MAC OS-X, Linux 2.40 and above
- Virtual COM port device driver
- Fully compatible with IrDA 1.4 and USB 1.1/2.0 specifications
- IrDA Data rate of 9600 Baud
- Designed to work with existing COM port applications

| | | | |
|---|---|---|---|
| Baud Rate | 9600 bps | Communication Cone | ±15° |
| Max. Communication Distance | 1m | Operating Temperature Range | -10 to 50°C |

415805.428944

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| USB-LINK-IR | **100-6156** | 35.85 | 33.00 | 30.89 | 28.68 |

### PC Based Data Acquisition Systems



A range of easy to use PC based data acquisition products. The units simply plug into a PC (desktop or laptop) and require no power supply. Replacing costly chart recorders and complicated 'plug-in' data acquisition boards, these PC based instruments allow your computer to display and record voltages. By connecting suitable sensors they can be used to measure temperature, pressure, humidity, light, resistance, current, power, speed, vibration and other signals.

**General features of the range include:**

- Easy to install and use – up and running in minutes
- Supplied with PicoLog data logging software and PicoScope software which works as an oscilloscope, spectrum analyser and multimeter
- Data can be displayed in both graphical or spreadsheet format both during and after data collection
- Programmable alarm limits can be set for each channel
- PicoLog can collect data from multiple converters at the same time. This not only allows a mix of these voltage input units to be used on the same PC but also allows other PC based instruments such as the ADC-200 range of PC based oscilloscopes(Farnell parts 768-870/725-432/605-578) to be used at the same time.
- Drivers and examples are provided for C, Delphi and Visual Basic, Labview, Agilent VEE6.1 and Excel
- Runs under all current Windows versions (98SE/ME/2000/XP)

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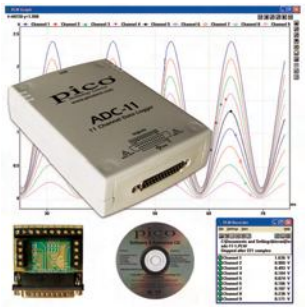
**Premium service without a premium price**

With thousands of prices already reduced, go online to see our most up-to-date pricing:
**www.farnell.co.uk**

# Data Acquisition Systems - continued

## PC Data Acquisition Systems

### USB ADC-11 Series



Used with any laptop or PC with a USB port, the USB ADC-11 is a low cost solution for converting voltage signals into digital samples for up to 11 voltages at a time. In addition, the unit has 2 digital outputs which may be used to control devices such as alarms. The USB ADC-11 can be used in conjunction with PicoScope and PicoLog software which enables users to monitor, store and analyse acquired data. In addition, drivers for C, Delphi, Visual Basic, LabVIEW and Agilent VEE are provided for custom programming.
The optional terminal board enables larger voltages to be measured and connection of external sensors including temperature (sensors not included).

- Measure up to 11 voltages
- 2 digital outputs for control
- Interface to PC and power via USB
- Detachable screw terminal block
- 10 bit and 12 bit versions available
- Connect up to 4 units to one PC giving 44 sampling channels

| Model | USB ADC-11/10 | USB ADC-11/12 |
|---|---|---|
| Channels | 11 | 11 |
| Resolution and Accuracy | 10 bit at 1% accuracy | 12 bit at 0.5% accuracy |
| Input Range | 0 to 2.5V (unipolar, single ended) | |
| Sample Rate | 20 kS/s | |
| Digital Outputs | 2 channels at 3.3V | |
| PC Connection | USB 1.1 (USB 2.0 compatible) | |
| Power Supply | from USB (100mA max.) | |
| Input Connector | DB25 Female | |

417421.428883

| Description | Order Code Part No. | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| USB ADC-11/10 | **107-6335** | 95.00 | 94.05 | 93.11 |
| USB ADC-11/12 | **107-6336** | 149.00 | 147.51 | 146.04 |
| ADC-11 Screw Terminal Board | **413-5726** | 15.00 | 14.85 | 14.70 |

## High Resolution Data Loggers

### ADC-20 and ADC-24



The ADC-24 and ADC-20 high resolution data loggers offer the ultimate in precise and accurate readings. Features such as true differential inputs, galvanic isolation, and software selectable sample rates all contribute to a superior noise free resolution.The ADC-24 PC Data Logger is equipped with a 24 bit A/D converter, and can maintain an accuracy of 0.1%. The 8 true differential inputs may be configured as 16 single-ended inputs or any combination in between, e.g. 4 differential and 8 single ended.Power and connection to a PC or laptop is via a USB 1.1 or USB 2.0 port. Using the supplied PicoLog software, users can record, monitor and analyse collected data, even exporting to 3rd party applications such as MS Excel.

- Available with 20 or 24 bit resolution, ideal for detecting small signal changes
- Ultra-high accuracy, up to 0.1% of reading
- True differential inputs for excellent noise rejection, also configurable as single-ended
- Up to 7 programmable gain ranges allow compatibility with wide range of sensors and signals
- Galvanic isolation from PC eliminates noise pickup
- 4 bidirectional digital I/O channels
- USB connection and power from PC
- Supplied with PicoLog data logging software and 32-bit programming libraries
- Compatible with Windows 98SE, ME, 2000 and XP

| Model | ADC-20 | ADC-24 |
|---|---|---|
| Resolution | 20 bits | 24 bits |
| Channels | 8 single ended / 4 differential | 16 single ended / 8 differential |
| Conversion Time per Channel | 660ms, 340ms, 180ms, 100ms, 60ms | |
| Accuracy | 0.2% | 0.1% (0.2% using 2.5V input range) |
| Overload Protection | ±30V | |
| Input Ranges | 2: ±2.5V and ±1.25V | 7: ±2.5V to ±39mV |
| Digital I/O | None | 4 bi-directional (3.3V CMOS) |
| Reference Voltage | +2.5V | |
| PC Connection | USB 1.1 (USB 2.0 compatible) | |
| Power Supply | from USB | |
| Input Connector | D25 Female | |

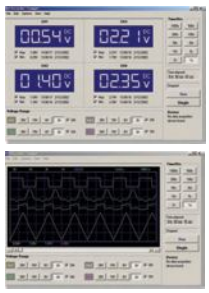
417434.428884

| Description Part No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| ADC-20 | **107-6338** | 199.00 | 197.01 | 195.04 |
| ADC-24 | **107-6339** | 399.00 | 395.01 | 391.06 |
| ADC-20 TERMINAL BOARD | **107-6340** | 25.00 | 24.75 | 24.50 |

## 4 Channel Recorder / Logger

### PCS10



- Record DC signals or slow-moving signals over very long periods
- Measurements are automatically stored on your hard disk for further processing
- Thanks to the USB connection no power supply is necessary and installation is easy and straightforward
- Signals are instantly displayed on the PC screen using an analogue or DVM display
- Power and recording diagnostic LED
- USB cable included
- PC-LAB2000 Software included

**Software Features:**

- Analogue trace or DVM readout
- 4 channels record simultaneously
- Minimum / maximum sample hold function for DVM
- From 1 sec to 1000 sec per division
- Storage and recall of screens (full colour) or data
- Automatic recording option for long recordings
- On screen markers for time and voltage
- DLL included for your own developments

| | | | |
|---|---|---|---|
| Inputs | 4 DC-coupled input channels | Sensitivity | 10 mV |
| Input Resistance | 1MΩ | Accuracy | ±3% of full scale |
| Max. Sample Rate | 100 Samples/sec | Maximum Input | 30 Vdc |
| Input Ranges | 3 - 6 - 15 - 30V | | |

417174.423174

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| PCS10 | **105-6462** | 43.68 | 39.33 | 36.32 |

## USB Modular Data Acquisition

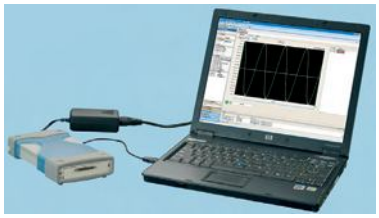
### U2300A Series

LATEST PRICING






W=120 H=44 D=182mm. Weight 565g



- Up to 3 MSa/s sampling rate for a single channel
- Standalone or modular use
- Easy to use - plug-and-play and hot-swappable with high speed USB 2.0
- Up to 384 channels when incorporated into the Agilent Modular Instrument chassis (129-7812)
- Easy to use bundled software for quick set up and data logging
- 12-bit or 16-bit A/D resolution
- 24-bit programmable digital input/output
- Self-calibration capability
- Compatible with a wide range of Application Development Environments
- USB connectivity to USBTMC 488.2 standard. SCPI commands supported

Multifunction data acquisition (DAQ) is a high performance plug-and-play solution suitable for a wide range of applications in both industrial and scientific environments. Supplied with Agilent IO Libraries and IVI-COM driver which provides robust instrument control from whichever software development environment you choose.

Modules provide flexible system stimulus and control.
**Operating Modes:** Polling or continuous modes.
**Trigger sources:** None (intermediate trigger), analogue/external digital trigger, SSI/Star trigger and master/slavetrigger sources. You can configure all these trigger sources for A/D and D/A operations.
**Predefined function generator:** Sinewave, square-wave, triangle wave, sawtooth and noise waveforms.
**Burst mode:** Incorporated to simulate simultaneous analogue input.
**Arbitary waveform:** - Arbitary waveform generation through user's input.
**Remote access and control:** The built-in user interface provides remote access and control via the AgilentMeasurement Manager software and SCPI commands. Using the software, you can:

- View and modify instrument setup
- Send trigger signals to instrument
- Open, close, or monitor I/O channels

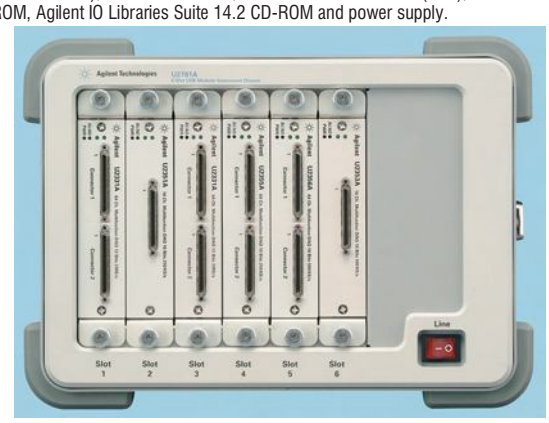
- Send SCPI commands via Agilent IO

The modules can be programmed directly with SCPI, or use the IVI-COM software driver that provide compatibility with themost popular development environments and tools:

- Agilent VEE, Agilent T&M Toolkit
- Microsoft Visual Studio.NET, C/C++ and Visual Basic 6
- LabVIEW
- MATLAB

| Model: | U2351A | U2352A | U2353A | U2354A | U2356A | U2331A |
|---|---|---|---|---|---|---|
| **Analogue Inputs** | | | | | | |
| **Resolution** | 16-bits (no missing codes) | | | | | 12-bits |
| **Channels** | 16 single ended or 8 differential inputs | | 64 SE / 32 DI | | 64 simples / 32 entrées différentielles | 64 SE / 32 DI |
| **Max. Sampling Rate** | 250 KSa/s | | 500 KSa/s | | 500 KSa/s | 3MSa/s |
| **Analogue Outputs** | | | | | | |
| **Resolution** | 16-bits | -- | 16-bits | -- | 12-bits | 12-bits |
| **Channels** | 2 | -- | 2 | -- | 2 | 2 |
| **Max. Update Rate** | 1 MSa/s | -- | 1 MSa/s | -- | 500 KSa/s | 3MSa/s |
| **Digital I/O** | | | | | | |
| **Channels** | 24-bits programmable as inputs or outputs | | | | | |
| **Compatibility** | TTL: $V_{IL}$<0.7V. $V_{IH}$>2.0V. $V_{OL}$<0.45V. $V_{OH}$>2.4V. | | | | | |

**DAQ modules are supplied with:** USB Interface Cable, L-Mount Kit (used with modular instrument chasis), Quick Start Guide, Certificate of Calibration (CoC), Product Reference CD-ROM, Agilent IO Libraries Suite 14.2 CD-ROM and power supply.



W=270 H=197 D=271mm. Weight 3.7kg

**U2781A USB Modular Instrument Chassis**

A portable 4U height chassis with 6 USB module slots. The chassis has a star trigger bus which offers precise synchronization between USB modules and the external trigger signal. The chassis also provides external 10MHz reference clock, external trigger in and trigger out functions via BNC connectors at the rear panel.

- 6 USB module slots
- Simultaneous Synchronization (SSI)
- Star Trigger
- Internal and external 10 MHz reference clock
- Trigger in and trigger out signals
- USB 2.0 high speed interface

**USB Chassis supplied with:** USB Interface Cable, Quick Start Guide, Functional Test Certificate, Product Reference CD-ROM, Agilent IO Libraries Suite 14.2 CD-ROM.

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

449856

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|---|
| **Basic Multifunction DAQ Modules** | | | | | | |
| U2351A | Analogue I/O DAQ | **129-7804** | 981.000 | 971.190 | 961.480 | 951.860 |
| U2352A | Analogue Input DAQ | **129-7805** | 566.000 | 560.340 | 554.740 | 549.190 |
| U2353A | Analogue I/O DAQ | **129-7807** | 842.000 | 833.580 | 825.240 | 816.990 |
| U2354A | Analogue Input DAQ | **129-7808** | 659.621 | 644.281 | 629.638 | 615.646 |
| **High Density Multifunction DAQ Modules** | | | | | | |
| U2356A | 16-bit DAQ | **129-7810** | 955.000 | 945.450 | 936.000 | 926.640 |
| U2331A | High Speed DAQ | **129-7811** | 1,122.000 | 1,110.780 | 1,099.670 | 1,088.680 |
| **Accessories** | | | | | | |
| U2781A | 6-Slot Chassis | **129-7812** | 633.000 | – – | – – | – – |
| U2901A | Terminal Board - 1m Cable | **129-7813** | 67.820 | 67.140 | 66.470 | 65.810 |
| U2902A | Terminal Board -2m Cable | **129-7814** | 79.030 | 78.240 | 77.460 | 76.680 |

## Logic Testers & Analysers

### Logic Probe with Memory

**72-190**



A rugged, soft carry case ideal for hand held oscilloscopes and graphical multimeters.

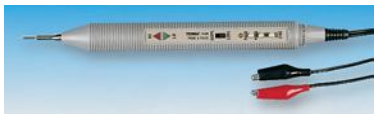
This compact and lightweight probe recognises high, intermediate and low level pulses in DTL, TTL, HTL and CMOS logic circuits.

- Pulse detector (pulse-LED): High speed pulse train or single events (+ or - transitions) activate ⅛ second pulse stretcher
- Memory function indicates first transition and latches LED
- Detectable pulse width 50 nsec minimum
- Input impedance 100K ohm
- Input signal frequency 10MHz
- Input overload protection 100V continuous, 117 VAC for less than 30 seconds
- Probe power DC 5 - 15V / 25mA - 40mA
- Probe power protection: 36V maximum with power lead reversal protection
- Dimensions: 200mm x 16mm∅

337094

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 72-190 | **490-8340** | 13.20 | 12.56 |

### 50MHz Logic Probe and Pulser



A hand-held logic probe and pulser designed to aid and simplify trouble-shooting on digital circuits.

L=210, Dia=28

- Tests TTL and CMOS
- Displays DC to 50MHz
- Detects 10ns pulse width

| | | | |
|---|---|---|---|
| Operating voltage | 4VDC to 18VDC | CMOS | Logic "1" 60% VCC 5% |
| Max. input signal frequency | 50MHz | | Logic "0" 15% VCC 5% |
| Input impedance | 120KΩ | Pulse rate | 5pps or 400pps(switchable) |
| TTL | Logic "1" 3.0V +0.25V | Pulse width | 10ns |
| | Logic "0" 0.75V +0.25V | | |

231042

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 72-500 | **356-2505** | 27.54 | 24.87 | 24.23 |

### Logic Probe

**LP10B**



- Pen size logic probe
- Evaluates most common circuits (TTL, CMOS)
- Dual LEDs indicate hi/lo state
- Detects pulses >30ns up to 17MHz

490249.503089

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| LP10B | **146-6480** | 28.00 | 27.16 | 26.35 |

### 32 Channel Logic Analyser

**TA320S**



The TA320S is a high performance logic analyser capable of synchronous data capture at up to 25MHz on 32 channels. Sophisticated triggering and multiple clocks give precise data capture. Non-volatile storage ensures that reference data and commonly used configurations are retained for future use. For connection to the target system, the AP01 combination data pod provides 38 high impedance TTL threshold inputs (32 data plus 6 clock/qualifiers) and is terminated with colour coded ribbon cabled sockets. Logic grabber probes are available in packs of ten.

- 32 data channels from DC up to 25MHz
- 2K word data acquisition memory
- 4 step trigger sequencer with delay and restart
- Multiple clock inputs with qualifiers
- Non-volatile data and set-up memories
- LCD display for timing diagrams and state listings
- RS232 interface for hard-copy printing

| | |
|---|---|
| **Memory organisation** | |
| Data memory size | 32 bits x 2K words |
| Reference memory | 32 bits x 2K words |
| Non-volatile memory | Non-volatile storage for 10 acquisitions and 10 set-ups. Data retention typically 5 years by lithium cell. |
| **External clock** | |
| Frequency range | DC to 25MHz |
| Clock pulse width | 20ns minimum |
| Organisation | 3 clocks, individually qualified and ORed together |
| Set-up & hold times | 18ns set-up, 0ns hold for both data and clock qualifiers |
| **Internal clock** | |
| Clock rate | Selectable 40ns to 100ms (25MHz to 10Hz) in a 1:2:4 sequence with all pods. Additionally 10ns (100MHz) in high speed mode with high speed pod. |
| **Triggering** | |
| Sequencer words | 4 words of up to 32 bits |
| Sequencer terms | The actual trigger term searched for in a sequencer step. Each consists of up to 4 trigger sequencer words ORed together. |
| Sequencer steps | Each of up to 4 sequencer steps consists of a search for the trigger term specified in that step. Each step has an event count of 1 to 128 occurrences of the trigger term |

## Logic Testers & Analysers - continued

### 32 Channel Logic Analyser - continued

**TA320S - continued**

| | |
|---|---|
| Trigger position | Selectable to be from 0 to 5K clocks before the start, centre or end of store, settable in 1K steps |
| Trigger output | TTL level signal at rear panel BNC |
| **Timing display** | |
| Number of channels | Any 6 channels may be displayed; channels may be repeated. |
| Channel labelling | A user-defined name can be given for each group of channels and each channel will be uniquely numbered within the group |
| Number of samples | The store can be displayed with expansions of x1, x2, x4, x8, x16. Window indicator shows position of window within the store and shows expansion. Expansion window scrolled throughout store. |
| Cursors | Movable cursor and marker, with readout of store positions and data values. Marker moves to the trigger location following each acquistion. |
| **List Display** | |
| Channel groups | Up to 32 channels can be grouped together under a single character label for which a name can be defined. Up to 16 groups can be specified. |
| Display format | Binary, Octal, Hex, Decimal or ASCII individually selectable for each channel group. Each group is listed underneath its label or name. |
| Cursors | A movable cursor and a fixed marker are provided. |
| Search & compare | Differences between data and reference can be shown, and a search made for any word and any difference. Automatic comparisons can be performed on a user specified area of the data, and acquisitions stopped on an equality or inequality. |

**Hard copy output**

State listings may be printed over any specified memory range via the RS-232 interface.

**General**

| | |
|---|---|
| Display | 240 x 64 pixel supertwist graphic LCD providing 8 lines of text or timing diagram. |
| Power | 230V or 115V nominal 50/60Hz, 25VA max. Installation Category II |
| Safety and EMS | Complies with **EN61010-1, EN55081-1** and **EN55082-1**. |

230697

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| TA320S | **351-0920** | 607.00 | 562.37 | 531.13 |
| AP01 Pod | **351-0931** | 102.00 | 94.50 | 89.25 |
| Logic Grabbers (10) | **351-0943** | 31.00 | 28.72 | 27.13 |

## Power Supplies - Laboratory/Test

37

### Desktop PSU




W=86 H=75 D=135mm.

A 1.2A regulated desktop PSU with selectable 3V, 6V, 9V, 12VDC output. Output power 14.4VA (max).

| | | | |
|---|---|---|---|
| Input Voltage | 230V 50Hz 36.1W | Output Power (max) | 14.4 VA |
| Output Voltage (selectable) | 3.0, 6.0, 9.0, 12.0VDC | Output Plug | 6xC detachable plugs |

414837.405831

| Description | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| Desktop PSU | **100-3067▲** | 9.24 | 8.00 | 7.42 |

### Bench PSUs - 13.8V




A series of bench power supplies with a fixed 13.8Vdc output. They are ideally suited for use with auto equipment, CB radios, communications transceivers and any device that requires 13.8V supply. Rated for 90 minutes continuous use.

| Connectors | Binding Post | Outputs | 13.8V Power AC | 230Vac @ 50Hz |
|---|---|---|---|---|
| | **1003064** | **1003065** | **1003066** | |
| Current Rating | 5A | 10A | 20A | |
| Dimensions (mm) | 140x100x230 | 200x120x260mm | 150x100x280mm | |
| Weight | 3.1kg | 5kg | 5kg | |

414784.405805

| Current Rating | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| 5A | **100-3064▲** | 21.89 | 21.02 | 20.22 |
| 10A | **100-3065** | 34.02 | 30.67 | 28.70 |
| 20A | **100-3066** | 47.34 | 44.80 | 41.47 |

### Triple Output Bench Top Power Supply

**BPS4000**




The BPS 4000 provides three fully stabilised and smoothed, variable DC power sources. The voltages can be adjusted by rotating graduated controls on the front panel. All three outputs are short circuit and reverse connection protected. Additional protection is provided by current limiting and an internal thermal shutdown mechanism. A 20mm x 5mm mains fuse, accessible from the rear panel, provides further protection.

| | |
|---|---|
| Mains input | 240V ac (±7.5%) 50Hz via 1 metre 3-core cable, on/off switch and 20mm x 5mm mains fuse rated 0.5A |
| Power-on indication | LED on front panel |
| DC output 1 | 4 to 6V, adjustable by front panel control. maximum current 0.5A. On this output, the indicated area on the front panel is for T.T.L. applications and provides a reminder of the voltage range (4.75 to 5.25) |
| DC outputs 2 and 3 | +12 to 15V and -12 to 15V. The two outputs share a common OV, are adjusted simultaneously by a single front panel control, and are isolated from output 1. Maximum current 0.5A |
| Protection | All 3 outputs have an internal current limit of approximately 1A for overload protection |
| Load regulation | Typically 0.5% (all outputs) |
| Ripple and noise | Typically 5mV rms (all outputs) |
| Termination | For use with 4mm wander plugs or as a winding post for wire connection |
| Dimensions (H x W x D) | 76x160x138mm |
| Weight | 1.5kg |

227638

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| BPS4000 | **332-8983** | 124.14 | 118.26 | 117.09 | 101.42 |
| | | | Price Each | | |
| **Standard Calibration Charge** | | **S** C4 | 34.10 | | |
| **UKAS Calibration Charge** | | **N** C4 | 58.75 | | |

### 1.5 - 30V/1A Laboratory Power Supply




- Digital indication of Volts and Amps (Backlit)
- Over-voltage/Over-current and short-circuit protection
- Standard test lead connections
- Lightweight: 400g (Approx.)
- Compact - External Dimensions: 140x140x51mm (WxDxH)
- Mains powered
- Stackable

| Output Voltage | Output Current | Display Resolution - Volts | Display Resolution - Amps |
|---|---|---|---|
| 1.5 to 30V dc | 0 to 1A dc | 100mV | 10mA |

338604.344022

| Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| **UK & Euro Version** PSU 130-UK/EU | **491-3425** | 56.99 | 51.38 | 48.49 | 46.78 |
| | | | Price Each | | |
| **Standard Calibration Charge** | | **S** C4 | 34.10 | | |
| **UKAS Calibration Charge** | | **N** C4 | 58.75 | | |

## Help us to help the environment

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**Please recycle after use.**

## Laboratory Power Supplies - Single Channel

**PSA30 and PSD30**





W=130 H=165 D=310mm. Weight 5.6kg

- 0-30V linearly adjustable output
- Low noise and ripple (<-.3mV rms)
- Voltage and current presets
- Constant voltage and constant current modes
- Current output protection
- Backlit analogue or digital displays for voltage and current
- Provides 8 hours full load stability
- Rugged metal case
- Supplied with instruction manual, power lead, spare fuse and connection leads

| | PSA30/3B | PSD30/3B |
|---|---|---|
| **Channel 1** | | |
| Voltage | 0 - 30 V | 0 - 30 V |
| Current | 3A | 3A |

446906.434532

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| PSA30/3B | **127-0467** | 65.40 | 62.28 |
| PSD30/3B | **127-0468** | 70.33 | 66.98 |
| | | **Price Each** | |
| **Standard Calibration Charge** | **S** C8 | 45.13 | |
| **UKAS Calibration Charge** | **N** C8 | 73.70 | |

## 0-30V/2.5A Variable, Regulated Output



A compact, high quality bench-top power supply for laboratories, workshops or education establishments. The unit offers variable voltage and current outputs. Also features a dual LCD display.

H = 145, W = 150, D = 220 (mm)

- 0-30C DC adjustable output control
- 5V/500mA and 12V/500mA fixed outputs with spring loaded terminals
- Adjustable current control (0-2.5A)
- Overload and short circuit protection
- LCD Voltmeter and Ammeter
- 4mm shrouded output terminals

| | | | |
|---|---|---|---|
| Power Supply | 240V AC | Load Regulation | 0.05% +10mV |
| Line Regulation | 0.05% +10mV | | |

248530

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| EP-613-040 | **428-3170** | 93.02 | 92.37 |
| | | | **Price Each** |
| **Standard Calibration Charge** | | **S** C4 | 34.10 |
| **UKAS Calibration Charge** | | **N** C4 | 58.75 |

## Bench Power Supply

**Variable Voltage**



A bench type power supply with variable output voltage and bright, digital AV meters

- Digital Voltage and Current meters
- Variable regulated output with coarse/fine adjustments
- Coarse/Fine current limiting adjustments
- Short circuit and overload protected
- Ground connection facility
- Robust Case with Feet
- On/Off switch and mains connection
- Excellent Value

H = 285, W = 155, D = 133 (mm)

| | | | | | |
|---|---|---|---|---|---|
| Output Voltage | 0 to 40V DC | Output Current | 0 to 3A | Voltage Supply | 240V AC |

248546

| Description | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| UK Version | **428-3193** | 100.30 | 90.80 |
| | | **Price Each** | |
| **Standard Calibration Charge** | | **S** C8 | 45.13 |
| **UKAS Calibration Charge** | | **N** C8 | 73.70 |

## Bench Power Supply – Variable Voltage



- 3 digit LED display
- Voltage and current meter
- Coarse and fine rotary controls
- Short circuit and foldback overload protection
- Housed in a robust case
- Ground, red(+) and black(-) connections
- On/off switch and mains connection

H=260, W=355, D=160mm Weight = 12kg

A high quality bench type regulated power supply with variable output voltage up to 30V and bright, digital AV meters.

| | | | |
|---|---|---|---|
| Input voltage | 230Vac 50Hz | Output Current | 0 to 10A |
| Output Voltage | 0 to 30V | | |

381013.345372

| Description | Order Code | Price Each 1+ | 5+ | 10+ | 20+ |
|---|---|---|---|---|---|
| UK Version | **428-3200** | 146.75 | 137.25 | 133.03 | 126.69 |
| | | | | **Price Each** | |
| **Standard Calib. Charge** | | **S** C8 | | 45.13 | |
| **UKAS Calib. Charge** | | **N** C8 | | 73.70 | |

## Laboratory Power Supplies - Multi-channel

**PSM2 and PSM3**





W=255 H=150 D=305mm. Weight 7.5kg

- 2x 0-30V linearly adjustable outputs
- 4x 3 digit LEDs for voltage and current display
- Low noise and ripple (<1mV)
- Voltage and current presets
- Constant voltage and constant current modes
- Series or parallel operation
- Provides 16 hours full load stability
- Rugged metal case
- Supplied with instruction manual, power lead, spare fuse and connection leads

| | PSM2/2A | PSM2/5A | PSM3/2A |
|---|---|---|---|
| **Channel 1** | | | |
| Voltage | 0 - 30 V | 0 - 30 V | 0 - 30 V |
| Current | 2A | 5A | 2A |
| **Channel 2** | | | |
| Voltage | 0 - 30 V | 0 - 30 V | 0 - 30 V |
| Current | 2A | 5A | 2A |
| **Channel 3** | | | |
| Voltage | — | — | 5V |
| Current | — | — | 1, 2, 3A |

446907.434522

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| PSM2/2A | **127-0464** | 101.80 | 96.94 |
| PSM2/5A | **127-0465** | 117.83 | 112.22 |
| PSM3/2A | **127-0466** | 106.73 | 101.65 |
| | | | **Price Each** |
| **Standard Calibration Charge** | | **S** C8 | 45.13 |
| **UKAS Calibration Charge** | | **N** C8 | 73.70 |

## Coming soon

Register your interest for items that are 'Coming Soon' at **www.farnell.co.uk** and we'll email you to let you know that they're in stock.

# Power Supplies - Laboratory/Test - continued

## Bipolar Power Supply

**BP3002**

digimess®




W=158 H=136 D=291mm. Weight 5kg

A low cost general purpose linear dc power supply with both plus and minus outputs. It can operate in either constant voltage or constant current mode and features large red LED displays for both voltage and current. Short circuit and current limit protection are included.

| | |
|---|---|
| **No. of Outputs** | 2 |
| **Output Voltage** | 0 to ±30V dc |
| **Output Current** | 0 to ±2A dc |
| **Line Regulation** | **CV:** <0.01% + 2mV, **CC:** <0.2% + 2mA |
| **Load Regulation** | **CV:** <0.01% + 3mV, **CC:** <0.2% + 3mA |
| **Ripple and Noise** | **CV:** <1mV rms, **CC:** <3mA rms |
| **Display Accuracy** | **Voltage:** ±1.0% + 2 digits, **Current:** ±2.0% + 2 digits |
| **Input Voltage** | 207 - 253V ac 50Hz |

**Supplied with:** mains lead and operating manual

492601.502120

| Output | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| 20A | BP3002 | **147-0313** | 131.58 | 123.72 | 118.42 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | | **S** C5 | 39.11 | |
| **UKAS Calibration Charge** | | | **N** C5 | 61.97 | |

## Power Supply Units

**PM Series**

digimess®

New



The digimess PM series is a comprehensive range of low cost general purpose switch mode power supply units containing single, dual or triple output models. All models can operate in either constant voltage or constant current modes and feature large red LED displays for ease of viewing.
The dual and triple output types also include external switching for independent, tracking, series and parallel modes of opeation. All units are supplied with mains leads and operating manuals.

| **Specifications** | | | | | |
|---|---|---|---|---|---|
| Model No | PM3006 | PM6003 | PM3006-2 | PM3006-3 | PM6003-3 |
| No of outputs | Single | Single | Dual | Triple | Triple |
| Output voltage | 0-30V | 0-60V | 2 x 0-30V | 2 x 0-30V, 5V | 2 x 0-60V, 5V |
| Ouput current | 0-6A | 0-3A | 2 x 0-6A | 2 x 0-6A, 3A | 2 x 0-3A, 3A |
| Line regulation | CV<0.01% +1mV CC<0.2% +1mA | | | | |
| Load regulation | CV<0.01% +5mV CC<0.2% +5mA | | | | |
| Ripple & noise | CV<0.5mVrms CC<3mArms | | | | |
| Display | 2 x 3.5 digit LED Accuracy : V - 1.0% + 2 dig I - 2.0% + 2 dig | | | | |
| Input voltage | 110/220V ± 10% AC (external selector switch) | | | | |
| Dimensions | 291 x 158 x 136mm | 291 x 158 x 136mm | 365 x 265 x 164mm | 365 x 265 x 164mm | 365 x 265 x 164mm |
| Weight | 3kg | 3kg | 5kg | 6kg | 6kg |

525191

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| PM3006 | **166-4825** | 131.58 | 126.48 | 120.36 |
| PM6003 | **166-4826** | 151.98 | 142.80 | 135.66 |
| PM3006-2 | **166-4828** | 253.98 | 233.58 | 221.34 |
| PM3006-3 | **166-4829** | 284.58 | 264.18 | 249.90 |
| PM6003-3 | **166-4830** | 304.98 | 289.68 | 274.38 |

## Triple Output Power Supplies

TENMA®



CALIBRATION SERVICES

Triple output power supply containing two independant power supply outputs and a constant 5V fixed output, The two outputs can be connected in series to double the voltage or current rating, repectively.

H = 145, W = 255, D = 335

- Triple output: two 0 to 30V DC, 3A outputs and one 1x5V, 3A fixed output
- Manually variable voltage and current
- Auto tracking
- Auto series and parallel operation
- Constant voltage and constant current operation
- Low ripple and noise
- Four digital meters for voltage and current
- Continous/dynamic load can be selected
- Overload and reverse polarity protection

| | | | |
|---|---|---|---|
| Outputs | Single | Regulation | Line/Load: <0.2% +3mA |
| Constant Voltage Operation | | Ripple Current | <3mA RMS |
| Regulation | Line/Load: <0.01% +3mV | 5V Fixed Output | |
| Ripple and Noise | <1mV RMS | Regulation | Line: <5mV, Load: <10mV |
| Constant Current Operation | | | |

248549

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| 72-6615 | **428-3272** | 300.90 | 275.40 |
| | | | **Price Each** |
| **Standard Calibration Charge** | | **S** C8 | 45.13 |
| **UKAS Calibration Charge** | | **N** C8 | 73.70 |

## Dual Output Power Supply

**72-7245**

TENMA™



Laboratory grade power supply provides adjustable 0-30V DC output, and 0-3A adjustable current limiting, on each of two isolated channels. Four independant three-digit LED displays simultaneously show output voltage and current for each channel.

- Auto series or parallel tracking operation
- Contstant voltage and constant current operation
- Overload and reverse polarity protection
- Temperature controlled variable speed fan
- Very low ripple and noise
- Supplied with tets leads and instruction manual

| | |
|---|---|
| Output voltage (on each channel) | 0-30V DC |
| Output current (each channel) | 0-3A |
| Tracking series output | 0-60V, 0-3A |
| Tracking parallel output | 0-30V, 0-6A |
| Constant voltage mode (CH-1, CH-2) | |
| Line Regulation | < 0.01% + 3mV |
| Load Regulation | < 0.01% + 3mV (rating current <3A) |
| Ripple & noise | < 0.02% + 5mV (rating current > 3A) |
| Constant current mode (CH-1, CH-2) | < 1mV RMS (5Hz - 1MHz) |
| Line regulation | < 0.2% + 3mA |
| Load Regulation | < 0.2% + 3mA |
| Ripple & noise | < 3mA RMS |
| Dimensions / Weight | 146 x 260 x 273mm / 7kg |

339505.343955

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|---|
| Dual Output | 72-7245 | **491-1787** | 231.52 | 224.40 | 217.70 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | **S** C8 | | 45.13 | |
| **UKAS Calibration Charge** | | **N** C8 | | 73.70 | |

## Troubleshooting tips

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

## Quad Output Power Supply

TENMA

**72-6905**



- Quad independant DC output
- Four LED display with 3 digits, selectable for two sets output voltage and current display simultaneously
- Auto series, parallel and tracking operation
- Low ripple and noise
- Overload and reverse polarity protection
- Selectable for continuous/dynamic load
- Output enable/disable control
- Supplied with test leads, power cord and instruction manual

| | CH1 | CH2 | CH3 | CH4 |
|---|---|---|---|---|
| Output voltage | 0-30V DC | 0-30V DC | 3-6V DC | 8-15V DC |
| Output current | 0-2A | 0-2A | 1A Fixed | 1A Fixed |
| Line Regulation | < 0.01% + 3mV | | ≤5mV | |
| Load Regulation | < 0.01% + 3mV | | ≤10mV | |
| Ripple & noise | ≤1mV RMS 5Hz - 1MHz | | ≤2mV RMS 5Hz - 1MHz | |
| Dimensions / Weight | 146 x 260 x 273mm / 7kg | | | |

339506.343956

| Mftrs. List No. | Order Code | 1+ | 5+ | Price Each 10+ | 25+ |
|---|---|---|---|---|---|
| 72-6905 | **491-1799** | 288.77 | 279.89 | 271.52 | 266.10 |
| **Standard Calibration Charge** | | S C8 | | 45.13 | |
| **UKAS Calibration Charge** | | N C8 | | 73.70 | |

## Bench Top DC Power Supplies

GW INSTEK

**PSP Series**



A range of bench top DC power supplies with multi-function LCD display.

- LCD Display
- Output ON/OFF control
- 3 step fan speed control
- OVP, OCP, OPP, OTP protection
- Key lock to avoid error operation
- Normal, +% & -% output operation key
- Standard RS-232C interface

| | | 491-1751 PSP-603 | 491-1763 PSP-405 | 491-1775 PSP-2010 |
|---|---|---|---|---|
| **Output** | Voltage | 0 to 60V | 0 to 40V | 0 to 20V |
| | Current | 0 to 3.5A | 0 to 5A | 0 to 10A |
| Voltage Regulation | Load | ≤10mV | ≤10mV | ≤10mV |
| | Line | ≤0.05% | ≤0.05% | ≤0.05% |
| Current Regulation | Load | ≤5mA | ≤5mA | ≤5mA |
| | Line | ≤0.05% | ≤0.05% | ≤0.05% |
| Ripple | Voltage (mVrms) | ≤20mV | ≤20mV | ≤20mV |
| | Current (mArms) | ≤10mV | ≤10mV | ≤10mV |
| Resolution | Voltage | 20mV | 20mV | 10mV |
| | Current | 2mA | 2mA | 5mA |
| Program Accuracy | Voltage | ±0.05% rdg + 4 digits | ±0.05% rdg + 3 digits | ±0.05% rdg + 3 digits |
| | Current | ±0.1% rdg + 5 digits | ±0.1% rdg + 5 digits | ±0.3% rdg + 10 digits |
| Readback (Meter) | Voltage | 20mV | 20mV | 10mV |
| Resolution | Current | 2mA | 2mA | 5mA |
| Readback (Meter) | Voltage | ±0.05% rdg + 4 digits | ±0.05% rdg + 3 digits | ±0.05% rdg + 3 digits |
| Accuracy | Current | ±0.1% rdg + 5 digits | ±0.1% rdg + 5 digits | ±0.3% rdg + 10 digits |
| Protection | OVP/OCP/OPP/OTP | ● | ● | ● |
| Output ON/OFF Control | | ● | ● | ● |
| Display | | LCD | | |
| Interface | | RS-232C | | |
| Power | | AC 230V ±15% 50/60Hz | | |
| Accessories | | Power Cord, Instruction Manual, Test Leads | | |
| Dimensions & Weight | | 225 x 100 x 305mm; 4kg | | |

339504.343954

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|---|
| 0-60V 0-3.5A | PSP-603 | C8 **491-1751** | 213.18 | 196.35 | 190.74 |
| 0-40V 0-5A | PSP-405 | C8 **491-1763** | 213.18 | 196.35 | 190.74 |
| 0-20V 0-10A | PSP-2010 | C8 **491-1775** | 213.18 | 196.35 | 190.74 |
| **Standard Calibration Charge** | | S C8 | | 45.13 | |
| **UKAS Calibration Charge** | | N C8 | | 73.70 | |

## Power Supplies

GW INSTEK

**PSM Series**



H=140, W=230, D=380mm Weight = 10kg

- Dual-range voltage / current output: max 200W
- High resolution: 1mV/1mA
- Stable & clear power: 0.01% load/line regulation, 350µVrms ripple
- 100 sets of memory with timer setting
- Auto step running with time
- Self test and software calibration
- High visible vacuum-florecent display
- Front and rear output terminal
- Standard interface: RS-232C, GPIB

| | PSM-2010 | PSM-3004 | PSM-6003 |
|---|---|---|---|
| **DC Output** | | | |
| Low range | 0 - 8V/20A | 0 - 15V/7A | 0 - 30V/6A |
| High range | 0 - 20V/10A | 0 - 30V/4A | 0 - 60V/3.3A |
| **Constant voltage operation** | | | |
| Regulation | | Line and load <0.01% + 2mV | |
| Ripple and noise | <350µVrms/3mVpp | <350µVrms/2mVpp | <50V: <500µVrms/3mVpp<br>>50V: <1mVrms/3mVpp |
| **Constant current operation** | | | |
| Regulation | | Line and load <0.01% + 250µA | |
| Ripple and noise | | <2mArms | |
| **Resolution** | | | |
| Programming | 1mV, 1mA | 1mV, 0.5mA | 2mV, 0.5mA |
| Readback | 0.5mV, 1mA | 0.5mV, 0.1mA | 1mV, 0.5mA |
| Front panel | | 1mV, 1mA | |
| OVP/OCP | | 10mV, 10mA | |
| **Accuracy** | | | |
| Programming | | 0.05% + 10mV, 0.2% +10mA | |
| Readback | | 0.05% + 5mV, 0.15% + 5mA | |
| OVP/OCP | | 0.1% + 10mV, 0.4% + 10mA | |
| **General** | | | |
| Memory | | Store / recall points 0 - 99 | |
| Power | | AC 100V/120V/220V ±10%, 230V: - 6% - 10%, 50/60Hz | |
| Interface | | RS-232C, GPIB | |

381952.403283

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| Power supply, 0-20V/10A | PSM-2010 | **855-4889** | 615.98 | 583.44 |
| Power supply, 0-30V/4A | PSM-3004 | **855-4897** | 615.98 | 583.44 |
| Power supply, 0-60V/3.3A | PSM-6003 | **855-4900** | 615.98 | 583.44 |

## Bench Power Supplies

GRUNDIG digimess

***digimess* HY Series**

CALIBRATION SERVICES



A range of low cost bench power supplies with digital Voltmeters and Ammeters and either single, dual or triple outputs.

- Large LED displays
- Constant voltage or current mode
- Dual and Triple output types incled external switching for independant, tracking, series and parallel modes of operation
- Supplied with mains leads

| | HY3003 | HY3010 | HY3020 | HY3003-2 | HY3003-3 |
|---|---|---|---|---|---|
| Outputs | Single | Single | Single | Dual | Triple |
| Input Voltage | | | 110/240V AC | | |
| Output Voltage | 0 to 30V DC | 0 to 30V DC | 0 to 30V DC | 2x 0 to 30V DC | 0 to 30V DC |
| Output Current | 0 to 3A | 0 to 10A | 0 to 20A | 2x 0 to 3A | 2x 0 to 3A, 3A |
| Line Regulation | <0.02%+1mV | <0.02%+3mV | <0.02%+3mV | <0.02%+1mV | <0.02%+1mV |
| Load Regulation | <0.01%+5mV | <0.01%+10mV | <0.01%+5mV | <0.01%+5mV | <0.01%+5mV |
| Ripple | <1mV RMS | <3mV RMS | <3mV RMS | <1mV RMS | <1mV RMS |
| Accuracy | | | ±1% ±2 digits | | |
| Voltage | | | ±1.5% ±2 digits | | |
| Dimensions: (WxHxD mm) | 136x158x291 | 164x265x365 | 164x265x365 | 365x164x265 | 365x164x265 |

248536

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| HY3003 | **428-3211** | 100.98 | 98.94 |
| HY3010 | **428-3223** | 284.58 | 259.08 |
| HY3020 | **428-3235** | 386.58 | 351.90 |
| HY3003-2 | **428-3247** | 172.38 | 168.30 |
| HY3003-3 | **428-3259** | 202.98 | 198.90 |
| **Standard Calibration Charge** | S C8 | Each 45.13 | |
| **UKAS Calibration Charge** | N C8 | 73.70 | |

## Power Supplies - Laboratory/Test - continued

### Bench Power Supplies

digimess®

**SM Series**



- High currents and voltages
- Can operate in either constant current or constant voltage mode
- Two large red 3.5 digit LED displays for easy viewing
- Switch mode design results in small lightweight units
- All units are supplied with mains leads and operating manuals

W=365 H=165 D=235mm. Weight 7kg

| Model | SM5020 | SM3040 | SM10010 |
|---|---|---|---|
| Outputs | Single | Single | Single |
| Output Voltage | 0 - 50V | 0 - 30V | 0 - 100V |
| Output Current | 0 - 20A | 0 - 40A | 0 - 10A |
| Line Regulation | <0.02% + 3mV | <0.02% + 3mV | <0.02% + 3mV |
| Load Regulation (I<6A) | <0.02% + 10mV | <0.02% + 10mV | <0.02% + 10mV |
| Load Regulation (I>6A) | <0.1% + 5mV | <0.1% + 5mV | <0.1% + 5mV |
| Ripple and Noise | <3mV rms | <3mV rms | <3mV rms |
| Voltage Accuracy | 1.0% + 2 digits | 1.0% + 2 digits | 1.0% + 2 digits |
| Current Accuracy | 2.0% + 2 digits | 2.0% + 2 digits | 2.0% + 2 digits |
| Input Voltage | 110/200 V ac (externally selectable) | | |

417513.428719

| Output | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| 20A | SM5020 | **107-6812** | 437.58 | 392.70 | 367.20 |
| 40A | SM3040 | **107-6813** | 498.78 | 447.78 | 418.20 |
| 100V | SM10010 | **107-6815** | 508.98 | 457.98 | 427.38 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C5 | 39.11 |
| **UKAS Calibration Charge** | N C5 | 61.97 |

### High Voltage Power Supplies

digimess®

CALIBRATION SERVICES

**HV Series**



- Switch mode power supplies
- Can operate in constant voltage or constant current mode
- Large LED displays for voltage and current
- Supplied with power lead and operating instructions

| Mftrs. List No. | Outputs | | Power | Dimensions (WxHxD) | Weight |
|---|---|---|---|---|---|
| HV100001 | Single | 0-100V, 0-1A | 100W | 158 x 136 x 291mm | 4kg |
| HV200001 | Single | 0-200V, 0-1A | 200W | 265 x 164 x 365mm | 7kg |
| HV300001 | Single | 2x 0-300V, 0-1A | 300W | 265 x 164 x 365mm | 7kg |

| | |
|---|---|
| Load regulation (HV10001) | CV: <(0.01% + 5mV) CC: <(0.2% + 5mA) |
| Load regulation (HV10002/3) | CV: <(0.02% + 5mV) CC: <(0.5% + 5mA) |
| Line regulation | CV: <(0.02% + 3mV) CC: <(0.5% + 3mA) |
| Ripple & noise (main outputs) | CV: <10mV rms CC: <60mA rms |

450178.460917

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| HV100001 | **129-3265** | 253.98 | 229.50 | 222.24 |
| HV200001 | **129-3267** | 406.98 | 366.28 | 355.98 |
| HV300001 | **129-3268** | 508.98 | 458.08 | 445.74 |

| | | Price Each |
|---|---|---|
| **Standard Calibration** | S C8 | 45.13 |
| **UKAS Calibration** | N C8 | 73.70 |

### Programmable Power Supply

digimess®

**DP 3005**



- Single Output
- Can operate in constant voltage or constant current mode
- Separate 4 digit LCD displays for voltage and current
- Multiple output settings can be stored and recalled
- Instrument settings can be saved and loaded as required
- 115/230V 50/60Hz 40VA max
- Supplied with power lead, 2x BNC-BNC cables, operating instructions, spare fuses

CALIBRATION SERVICES

| Mftrs. List No. | Outputs | | Power | Dimensions (WxHxD) | Weight |
|---|---|---|---|---|---|
| DP3005 | Single | 0-30V, 0-5A | 150W | 132 x 160 x 270mm | 6.3kg |

| | |
|---|---|
| Load regulation | CV: <5mV CC: <5mA |
| Line regulation | CV: <5mV CC: <5mA |
| Ripple & noise (main outputs) | CV: <1mV rms CC: <3mA rms |
| Meter accuracies | Voltage 0.1% ±2 digit, current 0.5% ±3 digit |

450172

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| DP3005 | **129-3261** | 223.38 | 209.10 | 194.82 |

| | | Price Each |
|---|---|---|
| **Standard Calibration** | S C8 | 45.13 |
| **UKAS Calibration** | N C8 | 73.70 |

### Bench Power Supply - Variable Voltage

TENMA™

New



- Variable voltage and current
- Switch mode technology for improved operating efficiency
- Low ripple and noise
- Compact ergonomic design occupies a small bench area

| | |
|---|---|
| Line Regulation | 20mV |
| Load Regulation | 50mV |
| Dimensions / Weight | 150 x 70 x 250mm / 2kg |

| Output Voltage | Output Current | Mftrs. List No. | Order Code |
|---|---|---|---|
| 1V - 60V | 1.6A | 72-8340 | 157-3426 |
| 1V - 36V | 3A | 72-8345 | 157-3427 |
| 1V - 20V | 5A | 72-8350 | 157-3428 |

509414

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 72-8340 | **157-3426** | 79.95 | 79.15 | 78.36 |
| 72-8345 | **157-3427** | 79.95 | 79.15 | 78.36 |
| 72-8350 | **157-3428** | 79.95 | 79.15 | 78.36 |

### Bench Power Supply

TENMA™

**Single output - 3 voltage / current ranges**



New

- Variable voltage and current
- Switch mode technology for improved operating efficiency
- Low ripple and noise
- Compact ergonomic design occupies a small bench area

| Range | Output Voltage | Output Current |
|---|---|---|
| 1 | 16V | 5A |
| 2 | 27V | 3A |
| 3 | 36V | 2.2A |

| | |
|---|---|
| Line Regulation | 4mV |
| Load Regulation | 20mV |
| Ripple and noise (Pk - Pk) | 30mV |
| Dimensions / Weight | 127 x 54 x 330mm / 1.9kg |
| Voltage supply | 90V |
| Frequency supply | 47Hz |

509417

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 72-8355 | **157-3429** | 117.30 | 116.13 | 114.97 |


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## Programmable Stabilized Triple Power Supply

**BK9130**

BK PRECISION ELECTRONIC TEST INSTRUMENTS

New



- Voltage and current display (fluorescent display)
- 2x30V / 0-3A, 1x0-5V / 1A
- Serial and parallel operating modes
- Programmable for current and voltage
- RS232 and IEEE interface as standard
- Full protection against short circuits and high temperatures
- 1-year warranty

474988

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| BK 9130 | **136-7290** | 559.55 |

## EX1810R Bench Power Supply

**With Remote Sense**



- Single output high power, 0 to 18V at 0 to 10A
- Compact and lightweight design
- Separate 4 digit voltage and current meters
- Switchable remote or local sensing
- Constant voltage or constant current operation
- DC output switch
- Safety/EMC complies with **EN61010-1/EN61326**

| | |
|---|---|
| Load regulation | <0.01% for 90% load change |
| Line regulation | <0.01% for 10% line change |
| Ripple & noise | Typically <2mVrms |
| Meter resolutions | Voltage 10mV, Current 10mA |
| Meter accuracies | Voltage 0.3% ±1 digit, Current 0.6% ±1 digit |

H=160, W=140, D=320

232311

| Mftrs List No. | Output | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|---|
| EX1810R | 18 | **381-2352** | 290.00 | 281.30 | 272.86 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | **S** C8 | | 45.13 | |
| **UKAS Calibration Charge** | | **N** C8 | | 73.70 | |

## 0-20V 0-20A Power Supply

**EX2020R**



- Switchable remote or local sensing
- Coarse and fine controls for voltage output adjustment and a single logarithmic control for the current output
- Uses fan blown cooling
- Power input is 230V AC - 800VA maximum
- Weight: 3.6kg

W=140 H=160 D=320mm

A constant voltage or constant current output power supply with separate 14mm, 4 digit meters for voltage and current.

| | |
|---|---|
| Voltage Range | 0 to 20V |
| Current Range | 0 to 20A |
| Output Protection | Will withstand forward voltages to 25V |
| Ripple & Noise | Typically <2mVrms, <20mVpk-pk (CV mode) |
| Meter Accuracy | Voltage 0.3% ±2 digit, Current 0.6% ±2 digit |
| Weight | 3.6kg |

491872.503444

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| EX2020R | **151-0525** | 410.00 | 397.70 | 385.77 |
| | | | Price Each | |
| **Standard Calibration Charge** | | **S** C8 | 45.13 | |
| **UKAS Calibration Charge** | | **N** C8 | 73.70 | |

## 0-42V 10A Power Supply

**EX4210R**



A constant coltage or constant current output power supply with separate 14mm, 4 digit meters for voltage and current.

- Switchable remote or local sensing
- Coarse and fine controls for voltage output adjustment and a single logarithmic control for the current output
- Ideal as a test source for the new 42V automotive parts
- Uses fan blown cooling
- Power input is 230V AC - 600VA maximum
- Weight: 3.8kg

H = 160, W = 140, D = 320 (mm)

| | |
|---|---|
| Load Regulation | 0.01% of maximum output for a 90% load change |
| Output Impedance | <5mΩ in C.V. mode and < 50kΩ in C.A. mode |
| Ripple & Noise | Typically <2ms (CV mode) |
| Transient Response | <200μs to within 50mV of set level for a 90% load change |
| Meter Accuracy | Voltage 0.3% ±1 digit, Current 0.6% ±1 digit |

248531

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| EX4210R | **428-3181** | 410.00 | 397.70 |
| | | | Price Each |
| **Standard Calibration Charge** | | **S** C8 | 45.13 |
| **UKAS Calibration Charge** | | **N** C8 | 73.70 |

## EB series Bench Power Supplies Triple Output



- Dual isolated outputs of 0 to 20V at up to 0.25A each
- Fixed 5V isolated at up to 1A
- Variable current limit presets on variable outputs
- Meter measures voltage or current for either variable output
- All outputs overload and short circuit protected

H=82, W=22, D=230

| | |
|---|---|
| Voltage range (variable outputs) | 0.3V to 20V each (isolated) |
| Current range (variable outputs) | 1mA to 250mA each |
| Load regulation (variable outputs) | <0.2% for 90% load change |
| Line regulation (variable outputs) | <0.1% for 10% line change |
| Ripple & noise (variable outputs) | Typically <2mV rms |
| Voltage (fixed outputs) | 5V±0.2V |
| Current (fixed output) | >1A |
| Weight | 1.8kg |

227639

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| EB2025T | **351-0864** | 135.00 | 130.95 | 127.02 |
| | | | Price Each | |
| **Standard Calibration Charge** | | **S** C8 | 45.13 | |
| **UKAS Calibration Charge** | | **N** C8 | 73.70 | |

## Bench Power Supplies - Single, Dual, Triple

**EL-R Series**

New



| | | |
|---|---|---|
| 0 - 30V, 0 - 1A | 0 - 56V, 0 - 1.1A | 0 - 30V, 0 -2A Dual |
| 0 - 18V, 0 - 3.3A | 0 - 15V, 0 - 5A | 0 - 30V, 0 -2A Triple |
| 0 - 30V, 0 - 2A | 0 - 30V, 0 - 3A | RS232 model available |

The EL-R series has been developed from the best selling EL series with improved features that include 4 digit meters and switchable remote sense terminals.

- Linear regulation for low noise, four digit meters for high resolution
- Constant voltage or constant current with automatic crossover
- Fully isolated outputs on duals and triples, separate output switches
- Third auxiliary output variable 1.5V to 5.0V at 2A on EL302RT
- Switchable remote sense terminals allow perfect regulation at the load
- Safey & EMC complies with EN61010-1, EN50081-1, EN50082-1
- Model EL302P is digitally programmable via RS232

# Power Supplies - Laboratory/Test - continued

## Bench Power Supplies - Single, Dual, Triple - continued

### EL-R Series - continued

| Mftrs. List No. | Outputs | | Power | Dimensions (WxHxD) | Weight |
|---|---|---|---|---|---|
| EL301R | Single | 0-30V, 0-1A | 30W | 140 x 160 x 320mm | 3.4kg |
| EL183R | Single | 0-18V, 0-3.3A | 60W | 140 x 160 x 320mm | 4.4kg |
| EL302R | Single | 0-30V, 0-2A | 60W | 140 x 160 x 320mm | 4.4kg |
| EL302P | Single | 0-30V, 0-2A | 60W | 140 x 160 x 320mm | 4.4kg |
| EL561R | Single | 0-56V, 0-1.1A | 60W | 140 x 160 x 320mm | 4.4kg |
| EL155R | Single | 0-15V, 0-5A | 75W | 140 x 160 x 320mm | 5kg |
| EL303R | Single | 0-30V, 0-3A | 90W | 140 x 160 x 320mm | 5kg |
| EL302DR | Dual | 0-30V, 0-2A | 120W | 280 x 160 x 320mm | 7.5kg |
| EL302TR | Triple | 0-30V, 0-2A | 130W | 280 x 160 x 320mm | 7.5kg |

| | |
|---|---|
| **Load regulation (main output)** | **<0.01% for 90% load change** |
| Line regulation (main output) | <0.01% for 10% line change |
| Ripple & noise (main output) | Typically <1mV rms |
| Meter accuracies | Voltage 0.3% ±3 digits, current 0.5% ±3 digits |

525616

| | | Price Each | |
|---|---|---|---|
| Mftrs. List No. | Order Code | 1+ | 3+ |
| EL183R | **167-0775** | 169.00 | 162.00 |
| EL155R | **167-0776** | 199.00 | 189.00 |
| EL302P | **471-8471** | 234.00 | 226.98 |
| EL561R | **167-0777** | 169.00 | 162.00 |
| EL301R | **167-0778** | 149.00 | 142.00 |
| EL302R | **167-0779** | 165.00 | 158.00 |
| EL303R | **167-0780** | 199.00 | 189.00 |
| EL302DR | **167-0781** | 285.00 | 270.00 |
| EL302TR | **167-0782** | 310.00 | 295.00 |

## Bench Power Supplies - Single, Dual, Triple

### EX-R Series



New

0 - 35V, 0 - 5A
0 - 35V, 0 - 4A Dual
0 - 35V, 0 - 4A Triple
0 - 75V, 0 - 2A Dual
RS232 model available

The EX-R series has been developed from the best selling EX series with improved features that include 4 digit meters and switchable remote sense terminals on most models.

- Mixed-mode power design with linear final regulation
- Four digit meters for high resolution (not EX752M)
- Constant voltage or constant current with automatic crossover
- Fully isolated outputs on duals and triples, separate output switches
- Third auxiliary output variable 1.5V to 5.0V at 5A on EX354RT
- Switchable remote sense terminals (not EX752M or EX355P)
- Multi-mode operation including 75V/4A single output mode on EX752M
- Safey & EMC complies with EN61010-1, EN50081-1, EN50082-1
- Model EX355P is digitally programmable via RS232

| Mftrs. List No. | Outputs | | Power | Dimensions (WxHxD) | Weight |
|---|---|---|---|---|---|
| EX355R | Single | 0-35V, 0-5A | 175W | 140 x 160 x 320mm | 3kg |
| EX355P | Single | 0-35V, 0-5A | 175W | 140 x 160 x 320mm | 3kg |
| EX354DR | Dual | 2x 0-35V, 0-4A | 280W | 260 x 160 x 320mm | 4.3kg |
| EX354TR | Triple | 2x 0-35V, 0-4A | 305W | 260 x 160 x 320mm | 4.3kg |
| EX752M | Dual | 2x 0-75V, 0-2A | 300W | 255 x 155 x 280mm | 4.3kg |

| | |
|---|---|
| Load regulation (main outputs) | <0.01% for 90% load change |
| Line regulation | <0.01% for 10% line change |
| Ripple & noise (main outputs) | Typically <2mV rms, <10mV pk-pk |
| Meter accuracies | Voltage 0.3% ±3 digits; current 0.5% ±3 digits |

525617

| | Mftrs. | | Price Each | |
|---|---|---|---|---|
| Outputs | List No. | Order Code | 1+ | 3+ |
| Single | EX355R | **167-0786** | 264.00 | 252.00 |
| Single | EX355P | **471-8483** | 336.00 | 325.92 |
| Dual | EX354DR | **167-0783** | 390.00 | 384.00 |
| Triple | EX354TR | **167-0784** | 440.00 | 420.00 |
| Dual | EX752M | **351-0840** | 460.00 | 446.20 |

## PL Series Precision DC Power Supplies

### Standard and Bus Interfaced



New

- Linear regulation for optimum output noise and transient response
- Ultra compact dimensions for minimum bench or rack space
- True analogue controls for simplicity of operation
- Advanced digitally based feature set including V-Span and S-Lock
- **S-Lock** - digitally locks voltage and current settings at the touch of a button
- **V-Span** - enables the full 300° rotation of the voltage control to cover any, user-defined, voltage range

The **PL303QMD** is a dual output power supply with four modes of operation:

- **Independent Mode:** The two outputs are completely independent and electrically isolated from each other.
- **Isolated Tracking Mode:** The two outputs remain electrically isolated, but the voltage control of the Master output sets an identical voltage on the Slave output.
- **Isolated Ratio Tracking Mode:** As normal tracking, but the Slave voltage can be set to any percentage of the Master voltage and retains that ratio as the Master voltage is varied.
- **True Parallel Mode:** All of the power is channelled to the Master output which can then supply up to 6 amps.

| **Model** | **PL303** | **PL155** | **PL601** | **PL303QMD** |
|---|---|---|---|---|
| Voltage Range | 0 to 30V | 0 to 15V | 0 to 60V | 0 to 30V (dual) |
| Current Range | 0 to 3A | 0 to 5A | 0 to 1.5A | 0 to 3A (dual) |
| Power Rating | 90W | 75W | 90W | 180W |
| Ripple & Noise | <0.4mVrms, <2mVpk-pk / <0.2mArms | | | |
| Load Regulation | Voltage - <0.01% + 2mV / Current - typically 0.01% + 500µA | | | |
| Line Regulation | Voltage - <0.01% + 2mV for 10% line change<br>Current - <0.01% + 250µA for 10% line change | | | |
| Transient Response | <50µs to within 50mV for a 90% load change | | | |
| Temperature Coefficient | Typical: <(50ppm + 0.5mV)/°C / <(100ppm + 1mA)/°C | | | |
| Meter Accuracy | Voltage ±(0.1%rdg + 10mV), Current ±(0.3% + 3mA) | | | |
| Weight | 5.2kg | 5.2kg | 5.2kg | 10kg |
| Model | PL303-P | PL155-P | PL601-P | PL303QMD-P |
| Voltage Range | 0 to 30V | 0 to 15V | 0 to 60V | 0 to 30V (dual) |
| Current Range | 0 to 3A | 0 to 5A | 0 to 1.5A | 0 to 3A (dual) |
| Power Rating | 90W | 75W | 90W | 180W |
| Front and Rear Terminals | Yes | Yes | Yes | Yes |
| Analogue Remote Control | Yes | Yes | Yes | No |
| RS-232 Interface | Yes | Yes | Yes | Yes |
| USB Interface | Yes | Yes | Yes | Yes |
| LAN Interface with LXI | Yes | Yes | Yes | Yes |

The -P versions are similar to the standard versions but include a comprehensive set of isolated digital bus interfaces along with front and rear terminals and analogue remote control. The LAN interface is designed to conform with LXI (LAN eXtensions for Instrumentation) v1.2.

- USB, RS-232 and LAN interfaces
- LAN conforms with LXI v1.2
- Analogue remote control (not PL303QMD-P)
- Front and rear terminals

525619

| | | Price Each | | |
|---|---|---|---|---|
| Mftrs. List No. | Order Code | 1+ | 3+ | 5+ |
| PL303 | **151-0521** | 260.00 | 252.20 | 244.63 |
| PL155 | **151-0522** | 260.00 | 252.20 | 244.63 |
| PL601 | **151-0523** | 260.00 | 252.20 | 244.63 |
| PL303QMD | **151-0524** | 520.00 | 504.40 | 489.27 |
| PL303P | **167-0765** | 399.00 | 379.00 | |
| PL155P | **167-0766** | 399.00 | 379.00 | |
| PL601P | **167-0767** | 399.00 | 379.00 | |
| PL303QMDP | **167-0768** | 650.00 | 620.00 | |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | **S** C8 | 45.13 | |
| **UKAS Calibration Charge** | | **N** C8 | 73.70 | |

## QL Digital Control Precision PSU's Standard & BUS Interfaced



- 35V/5A 105W max. or 56V/4A 112W max.
- Setting by direct numeric entry or spin wheel
- 1mV resolution at full output voltage
- Multiple ranges for increased current flexibility
- Excellent noise, regulation and dynamics
- Multiple non-volatile setting memories
- OVP or OCP trips with alarm output
- Selectable remote sense terminals
- Compact modular width for bench or rack
- Front and rear mounted terminals (P version)
- GPIB, RS232 and USB interfaces (P version)

The QL series are linear regulated power supplies offering superior performance including very high precision and full digital control. Output power is more than 100 watts per main output and switchable ranges enable a higher output current to be obtained at lower voltages. Settings can be done by numeric entry or by a spin wheel. Non-volatile memories are provided for instant recall of past settings. The P versions incorporate an isolated bus interface supporting GPIB, RS232 and USB standards.

**Main Output(s)**

| | |
|---|---|
| Output Ranges: | 0V to 35V at 0 to 3A |
| (QL355, QL355P) | 0V to 15V at 0A to 5A |
| | 0V to 35V at 0mA to 500mA |
| Output Ranges: | 0V to 56V at 0 to 2A |
| (QL564, QL564P) | 0V to 25V at 0 to 4A |
| | 0V to 56V at 0mA to 500mA |
| Setting Resolution: | Voltage - 1mV at all voltages |
| | Current - 1mA (0.1mA on 500mA range) |
| Setting Accuracy: | Voltage - 0.03% |
| | Current - 0.2% |
| Setting Memories: | 10 memories plus power-down memory |
| Operating Mode: | Constant voltage or constant current with automatic cross-over |
| Load Regulation: | <0.005% of max. O/P for a 90% change |
| Line Regulation: | <0.005% of max. O/P for a 10% change |
| Ripple & Noise: | Typically <0.35mV rms, CV mode |
| Meter Types: | 5 digit volts display and 4 digit current display with 14mm (0.56") LED displays |
| Watts Display: | Push-button displays of V x I |
| Protection: | Comprehensive protection including settable OVP and OCP limits with external alarm output |
| DC Output Switch: | Sets output voltage level to zero when off |
| Remote Sensing: | Keyboard selectable as Local or Remote. Spring loaded terminal block |

**General**

| | |
|---|---|
| AC Input: | 230V or 115V ±10% AC, 50/60Hz; Installation category II, 200VA max. |
| Safety: | Complies with EN61010-1 |
| EMC: | Complies with EN61326 |

**Remote Control (P versions only)**

| | |
|---|---|
| Bus Interfaces: | Full remote control and readback via GPIB, RS232 and USB interfaces |

### Rack Mounting

A 4U rack mount is available which will take a maximum of three single units or one single plus one triple. Blanking plates are available for unused positions.

333654

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| QL355. | **471-8410** | 360.00 | 349.20 | 338.72 |
| QL355P. | **471-8446** | 510.00 | 494.70 | 479.86 |
| QL564 | **471-8422** | 360.00 | 349.20 | 338.72 |
| QL564P | **471-8460** | 510.00 | 494.70 | 479.86 |
| **Rack Mount Options** | | | | |
| RM410 QL Series Rackmount Shelf | **151-0527** | 82.00 | 79.54 | 77.15 |
| RM415 QL Series Blanking Plate | **151-0528** | 10.00 | 9.70 | 9.41 |
| | | | | Price Each |
| **Standard Calibration Charge** | | S C8 | | 45.13 |
| **UKAS Calibration Charge** | | N C8 | | 73.70 |

## QL Digital Control Precision PSU's Standard & BUS Interfaced



The QL355T is a linear regulated triple output power supply offering superior performance including very high precision and full digital control. Output power is more than 100 watts per main output and switchable ranges enable a higher output current to be obtained at lower voltages. Settings can be done by numeric entry or by a spin wheel. Non-volatile memories are provided for instant recall of past settings. The P version incorporate an isolated bus interface supporting GPIB, RS232 and USB standards.

- Dual outputs of 35V/5A 105W max. each
- Auxiliary output of 2.7/3.3/5.0V at 1A
- Setting by direct numeric entry or spin wheel
- 1mV resolution at full output voltage
- Multiple ranges for increased current flexibility
- Excellent noise, regulation and dynamics
- Multiple non-volatile setting memories
- Linked operation of main outputs for convenient series, tracking or parallel operation
- OVP or OCP trips with alarm output
- Selectable remote sense terminals
- Compact modular width for bench or rack
- Front and rear mounted terminals (P version)
- GPIB, RS232 and USB interfaces (P version)

**Main Output(s)**

| | |
|---|---|
| Output Ranges: | 0V to 35V at 0 to 3A |
| | 0V to 15V at 0A to 5A |
| | 0V to 35V at 0mA to 500mA |
| Setting Resolution: | Voltage - 1mV at all voltages |
| | Current - 1mA (0.1mA on 500mA range) |
| Setting Accuracy: | Voltage - 0.03% |
| | Current - 0.2% |
| Setting Memories: | 30 memories plus power-down memory (10 memories for each main output plus 10 memories for linked-mode operation) |
| Operating Mode: | Constant voltage or constant current with automatic cross-over |
| Load Regulation: | <0.005% of max. O/P for a 90% change |
| Line Regulation: | <0.005% of max. O/P for a 10% change |
| Ripple & Noise: | Typically <0.35mV rms, CV mode |
| Meter Types: | 5 digit volts display and 4 digit current display with 14mm (0.56") LED displays |
| Watts Display: | Push-button displays of V x I |
| Protection: | Comprehensive protection including settable OVP and OCP limits with external alarm output |
| DC Output Switch: | Sets output voltage level to zero when off |
| Remote Sensing: | Keyboard selectable as Local or Remote. Spring loaded terminal block |

**Auxiliary Output**

| | |
|---|---|
| Output Voltage: | Switchable 2.7, 3.3, or 5V |
| Output Current: | >1.0A; overcurrent indication |
| DC Output Switch: | Sets output voltage level to zero when off |

**Main Output(s)**

**Linked Operation**

Linked mode enables settings to be changed on both main outputs simultaneously. This is useful for parallel wiring or tracking operation. An extra set of memories is provided for linked mode

**General**

| | |
|---|---|
| AC Input: | 230V or 115V ±10% AC, 50/60Hz Installation Category II, 500VA max. |
| Safety: | Complies with EN61010-1 |
| EMC: | Complies with EN61326 |

**Remote Control (P version only)**

| | |
|---|---|
| Bus Interfaces: | Full remote control and readback via GPIB, RS232 and USB interfaces |

### Rack Mounting

A 4U rack mount is available which will take a maximum of three single units or one single plus one triple. Blanking plates are available for unused positions.

333655

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| QL355T | **471-8434** | 699.00 | 678.03 | 657.69 |
| QL355TP | **471-8458** | 870.00 | 843.90 | 818.58 |
| **Rack Mount Options** | | | | |
| RM410 QL Series Rackmount Shelf | **151-0527** | 82.00 | 79.54 | 77.15 |
| RM415 QL Series Blanking Plate | **151-0528** | 10.00 | 9.70 | 9.41 |
| | | | | Price Each |
| **Standard Calibration Charge** | | S C8 | | 45.13 |
| **UKAS Calibration Charge** | | N C8 | | 73.70 |

## Power Supply, 30V

Agilent Technologies

New



U8001A



U8002A

- Excellent load and line regulation:(CV: <0.01% +2 mV; CC: <0.02% + 2mA)
- Low output noise: 1 mVrms (20 Hz to 20 MHz)
- Over Voltage and Over Current Protection
- LCD display with backlight capability
- Standby output for safety purposes
- Save-and-recall function up to three memory states
- Security features: keypad lock and physical lock mechanism

| Electrical Specifications | U8001A | U8002A |
|---|---|---|
| Output Ratings (at 0 °C to 40 °C) | 0 to +30 V<br>0 to 3 A | 0 to +30 V<br>0 to 5 A |
| Line and Load Regulation | CV: <0.01% +2 mV<br>CC: <0.02% +2 mA | |
| Ripple and Noise (25 °C ±5 °C) | CV: 12 mVp-p, <1 mVrms;<br>CC: 3 mArms | |
| Programming Accuracy[1] (25 °C ±5 °C) | <0.35% +20 mV<br><0.35% +20 mA | |
| Readback Accuracy[1] (25 °C ±5 ° C) | <0.35% +20 mV<br><0.35% +20 mA | |
| Meter Resolution | Voltage: 10 mV<br>Current: 10 mA | |
| Maximum Output Float Voltage | ±240 Vdc | |
| 1 Specifications are based on one hour warm-up period. | | |
| **Supplemental Characteristics** | | |
| Temperature Coefficient (for 12 months) | CV: <100 ppm/ °C | |
| | CC: <380 ppm/ °C | CC: <300 ppm/ °C |
| **Protection Features** | | |
| Over Voltage Protection Accuracy ± (% of output + offset) | <0.5% +0.5 V | |
| Over Voltage Protection Programmable Range | 1 V to 33 V | |
| Over Current Protection Programmable Range | 1 A to 3.3 A | 1 A to 5.5 A |
| **Physical Specifications** | | |
| Dimensions (W x H x L) | 88.1 mm x 212.3 mm x 394.3 mm | |
| Weight | 7.3 kg | 8.3 kg |

520310

| Mftrs. List No. | Description | Order Code | Price Each 1+ |
|---|---|---|---|
| U8001A | POWER SUPPLY, 30V/3A DC, 90W | **163-7311** | 158.00 |
| U8002A | POWER SUPPLY, 30V5A DC, 150W | **163-7312** | 217.00 |
| Accessories | | | |
| E3600A-100 | TEST LEAD KIT, AGILIENT U8000A | **163-7313** | 8.32 |
| U8001A-1CM | RACK MOUNT KIT, AGILIENT U8000A | **163-7314** | 61.64 |
| U8002A-1CM | RACK MOUNT KIT, AGILIENT U8000A | **163-7315** | 61.65 |

# Power Supplies - Laboratory/Test - continued

## Manual DC Power Supplies

Agilent Technologies

### E361xA Series



LATEST PRICING

- Linear power supply
- Single, dual or triple output
- 10-turn voltage and current controls
- Separate digital voltage and current meters
- Excellent load and line regulation: <0.01% + 2mV
- Meter accuracy: ±0.5% + 2 counts
- Output drift: <0.1% over eight hours
- Temperature coefficient: <0.02% per °C

All E3600 family members give you clean power with dependable regulation and fast transient response.

**E3610A, E3611A, and E3612A**

- Designed for general laboratory use
- The constant-voltage, constant-current output automatically operates as either a voltage or current source depending on the load
- Either the +ve or -ve terminal can be connected to ground, providing a +ve or -ve voltage output
- Outputs can also be floated up to 240V from ground
- Adjustable current limits, letting you set the safest current limit without having to short the output.
- 2 ranges, allowing more current at a lower voltage
- For higher output voltages, supplies can be connected in series

**E3614A, E3615A, E3616A and E3617A**

- Can be used as either voltage or current sources
- Adjustable overvoltage protection circuit that disables the output when output terminal voltage increases to a preset shut-down level
- Remote sensing capability automatically compensates for voltage drop in load leads
- Multiple units can be combined in auto-parallel, auto-series and autotracking configurations for greater output voltage or current capacity
- Front and rear output terminals allow flexible configuration
- Output voltage and current can be controlled with external 0-10V analogue voltage or variable resistance
- Either the +ve or -ve terminal can be connected to ground, providing a +ve or -ve voltage output
- Outputs can also be floated up to 240V from ground
- Adjustable current limits, letting you set the safest current limit without having to short the output.

**E3620A dual-output power supply**

- Overload and short-circuit protection
- Smooth turn-on and turn-off transitions keep power spikes out of your circuits
- Independent and isolated outputs

**E3630A triple-output power supply**

- Overload and short-circuit protection
- Smooth turn-on and turn-off transitions keep power spikes out of your circuits
- Autotracking feature lets you use one voltage control to adjust the +20 V and -20 V outputs simultaneously. The outputs track each other to within 1 percent, making it easy to adjust the power supply for circuits requiring balanced voltages

**30W Single Output Models**

| Model | Power | Range 1 | Range 2 | Ripple and Noise |
|---|---|---|---|---|
| E3610A | 30W | 8V, 3A | 15V, 2A | <2mV$_{pp}$, <1mA$_{pp}$ |
| E3611A | 30W | 20V, 1.5A | 35V, 0.85A | <2mV$_{pp}$, <1mA$_{pp}$ |
| E3612A | 30W | 60V, 0.5A | 120V, 0.25A | <2mV$_{pp}$, <1mA$_{pp}$ |
| Dimensions (WxHxD): | 213 x 91 x 319mm | | Weight: | 3.8kg |

**60W Single Range Models**

| Model | Power | Range | Ripple and Noise |
|---|---|---|---|
| E3614A | 60W | 8V, 6A | <1mV$_{pp}$, <0.02%+3mA |
| E3615A | 60W | 20V, 3A | <1mV$_{pp}$, <0.02%+1.5mA |
| E3616A | 60W | 35V, 1.7A | <1mV$_{pp}$, <0.02%+1mA |
| E3617A | 60W | 60V, 1A | <1mV$_{pp}$, <0.02%+0.5mA |
| Dimensions (WxHxD): | 213 x 91 x 373mm | | Weight: 5.5kg |

**Dual and Triple Output Models**

| Model | Power | Output 1 | Output 2 | Output 3 | Ripple and Noise |
|---|---|---|---|---|---|
| E3620A | 50W | 25V, 1A | 25V, 1A | | <1.5mV$_{pp}$ |
| E3630A | 35W | 6V, 2.5A | 20V, 0.5A | -20V, 0.5A | <1.5mV$_{pp}$ |
| E3620A - Dimensions (WxHxD): | | 213 x 91 x 373mm | | Weight: | 5.5kg |
| E3630A - Dimensions (WxHxD): | | 213 x 91 x 319mm | | Weight: | 3.8kg |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

446510

| Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|
| E3610A | **121-4477** | 236.00 | 233.64 | 231.30 | 228.99 |
| E3611A | **121-4478** | 236.00 | 233.64 | 231.30 | 228.99 |
| E3612A | **121-4479** | 236.00 | 233.64 | 231.30 | 228.99 |
| E3614A | **121-4480** | 369.00 | 365.31 | 361.66 | 358.04 |
| E3615A | **121-4481** | 369.00 | 365.31 | 361.66 | 358.04 |
| E3616A | **121-4483** | 369.00 | 365.31 | 361.66 | 358.04 |
| E3617A | **121-4484** | 369.00 | 365.31 | 361.66 | 358.04 |
| E3620A | **121-4485** | 321.00 | 317.79 | 314.61 | 311.47 |
| E3630A | **121-4486** | 321.00 | 317.79 | 314.61 | 311.47 |
| | | | Price Each | | |
| **Standard Calibration Charge** | S C15 | | 68.51 | | |
| **UKAS Calibration Charge** | N C15 | | 93.63 | | |

## Programmable Lab Power Supplies

Agilent Technologies

### E363xA Series



LATEST PRICING

W=213, H=133, D=348mm. Weight 8.2kg



W=213, H=133, D=348mm. Weight 9.5kg

These supplies combine convenient benchtop capabilities with flexible system features in a compact, multi-output package. For bench-only applications, two models are available without I/O interfaces.

- Address benchtop and ATE applications with up to three isolated dual-range outputs in a small package
- Utilize GPIB and RS-232 interfaces with SCPI command set (drivers available)
- Enhance signal integrity in test systems via low-noise outputs
- Simplify cabling with built-in measurements
- Streamline tasks with front panel control and basic programmable features
- Ensure DUT safety with overvoltage protection

| Model | Max Power | Output 1 | Output 2 | Output 3 |
|---|---|---|---|---|
| E3631A | 80W | 6V, 5A | 25V, 1A | 25V, 1A |
| E3632A | 120W | Range 1: 15V, 7A Range 2: 30V, 4A | | |
| E3633A | 200W | Range 1: 8V, 20A Range 2: 20V, 10A | | |
| E3634A | 200W | Range 1: 25V, 7A Range 2: 50V, 4A | | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

441259

| Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|
| E3631A | **121-4487** | 676.00 | 669.24 | 662.55 | 655.92 |
| E3632A | **121-4488** | 591.00 | 585.09 | 579.24 | 573.45 |
| E3633A | **121-4489** | 715.00 | 707.85 | 700.77 | 693.76 |
| E3634A | **121-4490** | 715.00 | 707.85 | 700.77 | 693.76 |
| | | | Price Each | | |
| **Standard Calibration Charge** | | S C8 | 45.13 | | |
| **UKAS Calibration Charge** | | N C8 | 73.70 | | |

Over 480,000 products online QGO

## Programmable DC Power Supplies

Agilent Technologies

**E364xA Series**



LATEST PRICING

Designed to meet the needs of R&D design verification, production testing, QA verifications and other demanding applications:

- Single and Dual Output
- Dual Output Ranges
- 30W to 100W Output Power
- Front and Rear Output Terminals
- Over-voltage Protection
- Remote Sense
- 5 complete power supply setups can be stored and recalled from internal memory
- GPIB and RS-232 Standard
- Drivers are available for Agilent VEE and National Instruments LabView and LabWindows

**Dual Output Models**

| Model | Power | Range 1 | Range 2 | Weight |
|---|---|---|---|---|
| E3646A | 60W | 8V, 3A | 20V, 1.5A | 7.3kg |
| E3647A | 60W | 35V, 0.8A | 60V, 0.5A | 7.3kg |
| E3648A | 100W | 8V, 5A | 20V, 2.5A | 9.2kg |
| E3649A | 100W | 35V, 2.2A | 60V, 1.3A | 9.2kg |
| Dimensions (WxHxD): | 228 x 133 x 374mm | | | |

**Single Output Models**

| Model | Power | Range 1 | Range 2 | Weight |
|---|---|---|---|---|
| E3640A | 30W | 8V, 3A | 20V, 1.5A | 5.3kg |
| E3641A | 30W | 35V, 0.8A | 60V, 0.5A | 5.3kg |
| E3642A | 50W | 8V, 5A | 20V, 2.5A | 6.2kg |
| E3643A | 50W | 35V, 1.4A | 60V, 0.8A | 6.2kg |
| E3644A | 80W | 8V, 8A | 20V, 4A | 6.7kg |
| E3645A | 80W | 35V, 2.2A | 60V, 1.3A | 6.7kg |
| Dimensions (WxHxD): | 254 x 104 x 374mm | | | |

**Accuracy and Regulation**

| | |
|---|---|
| Load and Line Regulation | <0.01% + 3mV, <0.01% + 250µA |
| Ripple and Noise | <5mV$_{pp}$ (20V models), <8mV$_{pp}$ (60V models), <4mA$_{rms}$ |
| Accuracy - Programming | <0.05%+10mV (<0.1%+25mV on o/p 2 of E3646/47/48/49A), <0.2%+10mA |
| Accuracy - Readback | <0.05%+5mV (<0.1%+25mV on o/p 2 of E3646/47/48/49A), <0.15%+5mA |
| Transient Response | <50µs to recover to within 15mV |
| Settling Time | <90ms |
| Temp. Coefficient (per °C) | <0.01%+3mV (<0.02%+5mV on o/p 2 of E3646/47/48/49A), <0.02%+3mA |
| Stability (over 8 hours) | <0.02%+2mV, <0.1%+1mA |

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

446531

| Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|
| E3640A | **121-4491** | 386.00 | 382.14 | 378.32 | 374.54 |
| E3641A | **121-4492** | 386.00 | 382.14 | 378.32 | 374.54 |
| E3642A | **121-4493** | 412.00 | 407.88 | 403.80 | 399.76 |
| E3643A | **121-4495** | 412.00 | 407.88 | 403.80 | 399.76 |
| E3644A | **121-4496** | 503.00 | 497.97 | 492.99 | 488.06 |
| E3645A | **121-4497** | 503.00 | 497.97 | 492.99 | 488.06 |
| E3646A | **121-4498** | 540.00 | 534.60 | 529.25 | 523.96 |
| E3647A | **121-4499** | 540.00 | 534.60 | 529.25 | 523.96 |
| E3648A | **121-4501** | 645.00 | 638.55 | 632.16 | 625.84 |
| E3649A | **121-4502** | 645.00 | 638.55 | 632.16 | 625.84 |
| **Standard Calibration Charge** | S C17 | | Price Each 73.50 | | |
| **UKAS Calibration Charge** | N C17 | | 101.20 | | |

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## Triple Power Supply - PN300

GRUNDIG digimess

**2 x 30V + 1 x 5V Outputs**



- Mircoprocessor controlled, with self test
- 2 x 30V ±(0.05% +15mV) 2.3A
- 1 x 5V ±5%, 2A max
- Independent, parallel & coupled
- Setting accuracy 0.05%
- Voltage & current display
- RS232 & IEEE interface

241099

| Mftrs. List No. | Description | Order Code | 1+ | Price Each 5+ | 10+ |
|---|---|---|---|---|---|
| HUC40-00 PN300 | Triple Power Supply | **413-0947** | 641.58 | 610.98 | 573.24 |
| **Standard Calibration Charge** | S C8 | | | Price Each 45.13 | |
| **UKAS Calibration Charge** | N C8 | | | 73.70 | |

## Programmable Power Supply

HAMEG

**HM7044**



W=285, H=125, D=380mm

The programmable laboratory power supply HM7044 comes equipped with four independent and isolated power sources. Each output voltage is continuously variable between 0 to 32V up to 3 A.

All outputs can be connected in series (up to 128V, 3A max.) or in parallel and can act either as voltage source or as current source, depending on the load conditions and output values. Reliability of power supplies is of extreme importance. The HAMEG programmable power supplies are designed and manufactured for years of trouble-free life.

- Four isolated outputs, 0-32V / 0-3A (96W)
- Maximum power in a very small cabinet volume (384W)
- Intelligent programmable safety circuits
- Tracking mode up to 4 outputs
- Low effective ripple output voltage
- Programmable via RS-232 interface
- Sense mode - voltage drop compensation

**Constant Voltage Source**

| | |
|---|---|
| Voltage Setting | 0 to 32V DC |
| Resolution | 10mV, 4-digit display |
| Accuracy | ±5 digits |
| Ripple(rms) | <1mV, voltage reg. |
| Current Setting | 5mA to 3A |
| Resolution | 1mA, 4-digit display |
| Accuracy | ±8 digit |
| Ripple(rms) | <1mV/100µA current reg. |

**Parallel Mode**

| | |
|---|---|
| Output voltage | 32V max |
| Output Current | 12A max with 4 outputs |
| Output Power | 384W |

**Serial Mode**

| | |
|---|---|
| Output Voltage | 128V max with 4 outputs |
| Ouput Current | 3A max. |
| Output Power | 384W |

347933

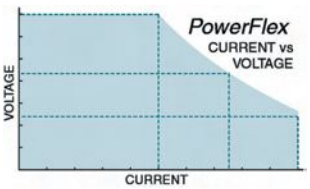
| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| HM7044.. | **398-1782** | 1,075.42 |

## Power Supplies

TTi

**CPX200 & CPX400A**






H=130, W=210, D=350

- Dual isolated outputs
- Total power 350W or 840W
- PowerFlex design allows higher currents at lower voltages
- Current up to 10A (CPX200) or 20A (CPX400)
- Variable OVP trip circuits
- Switchable remote sense terminals
- Compact half-rack 3U case size
- Safety complies with EN61010-1
- EMC complies with EN61326

| | CPX200 | CPX400A |
|---|---|---|
| Output voltage | 2 x 0 - 35V | 2 x 0 - 60V |
| Output current | 2 x 0 - 10A | 2 x 0 - 20A |
| Weight | 5kg | 7kg |
| Load regulation | <0.01% for a 90% load change | |
| Line regulation | <0.01% for a 10% line voltage change | |

337881

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| CPX200 | **864-286** | 610.00 | 591.70 | 573.95 |
| CPX400A | **114-7349** | 820.00 | 795.40 | 771.54 |
| **Standard Calibration Charge** | S C9 | | Price Each 49.44 | |
| **UKAS Calibration Charge** | N C9 | | 72.14 | |

# Power Supplies - Laboratory/Test - continued

## TSX Series Bench Power Supplies

**Standard & Programmable**



Standard Programmable

- High current single PSU's, lightweight & compact
- Standard models have rotary controls
- Programmable models have GPIB, RS-232 and keypad
- Very low noise, excellent transient response
- CV & CI operation with automatic crossover
- Comprehensive protection including variable OVP trip
- High setting resolution, remote sense terminals
- GPIB interface (P models) conforms to **IEEE-488.2**
- RS-232 interface (P models) conforms to ARC standard
- Front and rear terminals

| Type | | H | W | D | Weight (kg) | Mftrs.List No. | Order Code |
|---|---|---|---|---|---|---|---|
| Standard | 0-35V @ 0-10A | 130 | 210 | 350 | 5 | TSX3510 | 666-774 |
| Standard | 0-18V @ 0-20A | 130 | 210 | 350 | 5 | TSX1820 | 666-786 |
| Programmable | 0-35V @ 0-10A | 130 | 210 | 350 | 5.5 | TSX3510P | 666-798 |
| Programmable | 0-18V @ 0-20A | 130 | 210 | 350 | 5.5 | TSX1820P | 666-804 |

| | |
|---|---|
| Line regulation - O/P change for 10% mains change | <0.01% of max. output |
| Load regulation - O/P change for 90% load change | <0.01% of max. output |
| Ripple & Noise | Typically <1mV rms |

205806

| | | | Price Each | |
|---|---|---|---|---|
| **Standard** | **Order Code** | 1+ | 3+ | 5+ |
| 35V, 10A | **666-774** | 536.00 | 519.92 | 504.32 |
| 18V, 20A | **666-786** | 561.00 | 544.17 | 527.85 |
| **Programmable** | | | | |
| 35V, 10A | **666-798** | 765.00 | 742.05 | 719.79 |
| 18V, 20A | **666-804** | 791.00 | 767.27 | 744.25 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | **S** C 9 | | 49.44 | |
| **UKAS Calibration Charge** | **N** C 9 | | 72.14 | |

## 1.2kW PowerFlex, 60V/50A Programmable Power Supply

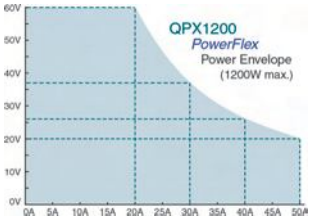
**QPX1200**



W=350 H=130 D=415mm. Weight 8.8kg

Suitable for bench or system use with terminals front and rear. The PowerFlex design offers voltage and current combinations between 60V/20A and 20V/50A. Mixed mode regulation with a linear output stage gives low output noise. Interfaces include analogue, RS232 and USB.

- PowerFlex design gives variable voltage/ current combinations
- Up to 60V and up to 50A within a power envelope
- Setting by direct numeric entry or by spin wheel
- High setting resolution of 1mV in up to 60V
- Multiple non-volatile setting memories
- Bench or rack mounting with front and rear terminals
- Interfaces include analogue, RS-232, and USB




**Output Specifications**

| | | |
|---|---|---|
| Voltage & Current Range | 0-60V | 0-50A |
| Power Range | Up to 1200W (see PowerFlex envelope graph) | |
| Operating Mode | Constant voltage or constant current with automatic cross-over. | |
| Voltage Setting | By floating point numeric entry or rotary jog wheel; resolution 1mV. | |
| Current Setting | By floating point numeric entry or rotary jog wheel; resolution 10mA. | |
| Accuracy | V: ±(0.05%+5mV) | A: ±(0.5%+10mA) |
| Load Regulation | <0.02% + 5mV for a 90% load change | |
| Line Regulation | <0.01% + 5mV for a 10% line voltage change | |
| Ripple & Noise | Typically <5mVrms, <40mV pk-pk (20MHz bandwidth) | |
| Protection Functions | Power Limiter, over-voltage, over-current and temperature trips. | |
| Over Voltage (OVP) | Settable 1V to 65V in 0.1V steps | |
| Over Current (OCP) | Settable 0.1A to 55A in 0.1A steps | |
| Status Indication | LCD indication of Output On, CV, CI and Power Limit, Trip status | |
| Output Switch | Push switch operating electronic power control | |
| Output Terminals | Front and rear output and sense terminals | |
| Sensing | Selectable local or remote sensing, front or rear | |

**Metering**

| | |
|---|---|
| Meter Functions | Voltage, Current, and Power. |
| Meter Resolution | Voltage: 1mV (CV mode) or 10mV (CI mode). Current: 10mA. Power: 0.1W |
| Meter Accuracy | Voltage: ±(0.05%rdg+2d) Current: ±(0.5%rdg+2d) Power: ±(0.5%rdg+2d) |

**Interfaces**

| | |
|---|---|
| Analogue Interfaces | Analogue control voltage (0-5V or 0-10V), V & I monitor inputs, trip output signal |
| Connectivity | USB and RS232 |

**General**

| | |
|---|---|
| AC Input | 110V to 240V AC ±10%, 50/60Hz, 1.5kVA max. Installation Category II. |
| Display | Large dot-matrix LCD with backlight |
| Storage | Ten non-volatile memories for complete instrument set-ups |
| Operation | Fitted with folding legs for bench operation (rack mount option available) |

| | |
|---|---|
| Load regulation (main outputs) | <0.01% for 90% load change |
| Line regulation | <0.01% for 10% line change |
| Ripple & noise (main outputs) | Typically <1mV rms, <10mV pk-pk |
| Meter accuracies | Voltage 0.3% ±1 digit, current 0.6% ±1 digit |

450025

| | Mftrs. | | | Price Each | |
|---|---|---|---|---|---|
| Outputs | List No. | **Order Code** | 1+ | 2+ | 5+ |
| Single | QPX1200 | **129-6393** | 950.00 | 921.50 | 893.86 |
| Triple | QPX1200-T | **167-0770** | 1,050.00 | 999.00 | – – |
| **Standard Calibration Charge** | | **S** C 8 | | 45.13 | |
| **UKAS Calibration Charge** | | **N** C 8 | | 73.70 | |

## Laboratory Power Supplies

**EA-PS 9000 Series**



- Flexible output power 1.5kW or 3kW
- PFC Power Factor >0.99
- Current up to 100A, Voltage up to 300V
- Output voltage and current are continuously adjustable
- V + I externally programmable and controllable via 0...10V
- Over Voltage Protection (OVP)
- 3½ digit LCD display

| Model | Order Code | Input Voltage | DC Output Power | Output Voltage | Output Current |
|---|---|---|---|---|---|
| EA-PS 9080-50 T/ 19" | 143-7548/ 143-7500 | 88V ac...264V ac | 1500 W | 0 - 80V dc | 0 - 50A |
| EA-PS 9080-100 | 143-7524 | 188V ac...264V ac | 3000 W | 0 - 80V dc | 0 - 100A |
| EA-PS 9300-15 | 143-7502 | 180V ac...264V ac | 1500 W | 0 - 300V dc | 0 - 15A |

377565

| | | Price Each |
|---|---|---|
| Mftrs. List No. | **Order Code** | 1+ |
| EA-PS 9080-50 T | **143-7548●** | 1,339.52 |
| EA-PS 9080-50 19" | **143-7500●** | 1,470.84 |
| EA-PS 9080-100 | **143-7524●** | 2,100.15 |
| EA-PS 9300-15 | **143-7502●** | 1,836.00 |
| **Accessories** | | |
| EA-UTA12 INTERFACE | **133-5824●** | 87.20 |
| Leads f. Interface (SL12 - 1,5m) | **126-8159** | 29.42 |

## Programmable Laboratory Power Supplies

**EA-PSI 9000 Series**



These power supplies are designed for engineering laboratory and complex industrial applications. The user-friendly and interactive menu guidance simplifies the configuration of user profiles and function sequences. Complex applications can be put into practice quickly and simply.
Function sequences or user profiles can be filed and documented for better repeatability of tests. The integrated monitoring functions with adjustable delays simplify test assemblies because no external monitoring circuits are required.

- Output power: 1.5kW and 3kW (6kW and 9kW on request)
- Output continuously short-circuit proof
- PFC power factor >0.99
- Output voltages: 0...80V and 0...300V
- Remote Sense
- Adjustable Over voltage protection OVP
- Programmable Supervision of V >(t), V<(t), I >(t) und I <(t)
- Integrated Function Generator: 1...254 cycles, max. 5 sequences, 254 or unlimited sequence cycles, 10 sequence points/sequence
- Alarm Management
- User profile with Password protection
- Lockable front panel
- Cooling via temperature controlled fan
- Safety: **EN 60950, CE**, EMV: **EN 61000-6-2, EN 55022 Class B**

New

| Manuf. Part No. | Order Code | Power rating | Current, output | Current, output |
|---|---|---|---|---|
| EA-PSI 9080-50 | 143-7505 | 1500W | 0-80V | 0-50A |
| EA-PSI 9080-100 | 143-7506 | 3000W | 0-80V | 0-100A |
| EA-PSI 9300-15 | 143-7507 | 1500W | 0-300V | 0-15A |
| EA-PSI 9300-25 | 143-7508 | 3000W | 0-300V | 0-25A |
| EA-PSI 9300-50 | 163-9701 | 3000W | 0-300V | 0-25A |

446152

| Manuf. Part No. | Order Code | Price Each 1+ |
|---|---|---|
| EA-PSI 9080-50 | **143-7505●** | 1,838.55 |
| EA-PSI 9080-100 | **143-7506●** | 2,626.50 |
| EA-PSI 9300-15 | **143-7507●** | 2,065.48 |
| EA-PSI 9300-25 | **143-7508●** | 2,941.68 |
| EA-PSI 9300-50 | **163-9701●** | 4,526.94 |
| **Accessories** | | |
| Interface RS232 | **126-8145●** | 76.87 |
| Interface USB | **126-8147●** | 111.36 |

## LD300 Electronic Load

**80A, 80V, 300W**



- Versatile solution for testing DC power sources
- Constant current, resistance, conductance, voltage and power modes
- Wide voltage and current range, 80V and 80A max
- Low minimum operating voltage of <1V at 40A
- Built-in transient generator with variable slew
- Current monitor output for waveform viewing
- Variable drop-out voltage for bettery testing
- Analogue remote control capability

The LD300 is an inexpensive electronic load which is suitable for testing and characterising a wide variety of DC power sources such as modular power supplies, charging circuits and batteries.
Its wide voltage/current range and built-in transient generator give it the versatility to provide test solutions from the design laboratory through to the component test area.

**Ratings**

| | |
|---|---|
| Voltage and Current | 80 volts maximum, 80 amps maximum |
| Power Dissipation | 300 watts maximum continuous at 28°C |
| Minimum Operating Voltage | Increases with current, <0.5V at 10A, <1V at 40A, <2V at 80A |

**Constant Current Mode**

| | |
|---|---|
| Setting Range | 0 to 80A in 2 ranges, set by 10 turn control |
| Meter Resolution | 1mA on 8A range, 10mA on 80A range |
| Setting Accuracy | ± (0.2% + 20mA) |
| Regulation | <10mA for a 90% power change |

**Constant Resistance Mode**

| | |
|---|---|
| Setting Range | 0.05Ω to 100Ω in 2 ranges, 10 turn control |
| Meter Resolution | 10mΩ on 10Ω range, 100mΩ on 100Ω range |
| Setting Accuracy | ± (0.5% + 2 digits) |
| Regulation | <2% for a 90% power change |

**Constant Conductance Mode**

| | |
|---|---|
| Setting Range | 0.05A/V to 40A/V in 2 ranges, set by 10 turn control |
| Meter Resolution | 0.001A/V or 0.01A/v depending on range |
| Setting Accuracy | ± (0.5% + 2 digits) |
| Regulation | <2% for a 90% power change |

**Constant Voltage Mode**

| | |
|---|---|
| Setting Range | Vmin to 80V in 2 ramges, 10 turn control. Vmin varies with current - see Ratings |
| Meter Resolution | 1mV on 8V range, 10mV on 80V range |
| Setting Accuracy | ± (0.2% + 2 digits) |
| Regulation | <10mV for a 90% power change |

**Constant Power Mode**

| | |
|---|---|
| Setting Range | 0 to 300W, set by 10 turn control |
| Meter Resolution | 1W |
| Setting Accuracy | ± (0.5% + 2 digits) |
| Regulation | <2% for a 90% voltage charge |

**Level Control**
Level A, Level B (set by individual 10 turn pots), Transient Internal (Switching between A and B using external switching signal), and Remote (level proportional to external voltage).

**Slew Rate Control**
All changes of level control are subjected to slew rate control which is adjustable over 3000:1 range by 3 position switch and vernier.

**Transient Generator**

| | |
|---|---|
| Pulse Repetition Rate | 0.1Hz to 10kHz in 3 overlapping ranges |
| Setting Resolution | 0.1Hz, 1Hz, 10Hz depending on range |
| Setting Accuracy | ± 2% of range |
| Pulse Duty Cycle | 5% to 95% continuously variable |

**Displays and Metering**
Dual 4 digit LED displays showing a variety of settings or measurements as set by a five position switch

| | |
|---|---|
| Setting Displays | Level A & Level B, Frequency & Duty Cycle, Slew Rate & Drop Out |
| Measurements | Amps & Volts, Watts & Ohms (calculated from V and I measurements) |
| Meter Accuracy | Voltage ±(0.1% + 1 digit), Current ±(0.1% + 20mA) |

**Dropout Voltage**
Defines a minimum voltage below which the load current will reduce to zero.
Useful for battery discharge testing and for power supplies without short-circuit protection

**Remote Control**
Analogue - the level for any mode can be set by an external analogue voltage (4V full scale). The control voltage has a compliance of ±80V relative to the load negative terminal.
Switching - the change between the Level A and Level B setting for any mode can be done in response to an external logic signal.

**Current Monitor**
An analogue signal representing the current waveform is available for connection to an oscilloscope or external meter. Scaling is 50mV/Amp and compliance is ±2V to the load negative terminal

**Protection**
The load incorporates both a power limiter circuit and a fault trip which responds to excess voltage, current, power or temperature

**General**

| | |
|---|---|
| Resr Terminals | 6mm terminal/binding posts, remote sense, current monitor, remote control |
| Front Terminals | |
| Power Requirement | 230V or 115V ±14%, 50/60Hz, by internal adjustment. Installation Category II |
| Safety and EMC | Complies with EN610-1 and EN61326 |

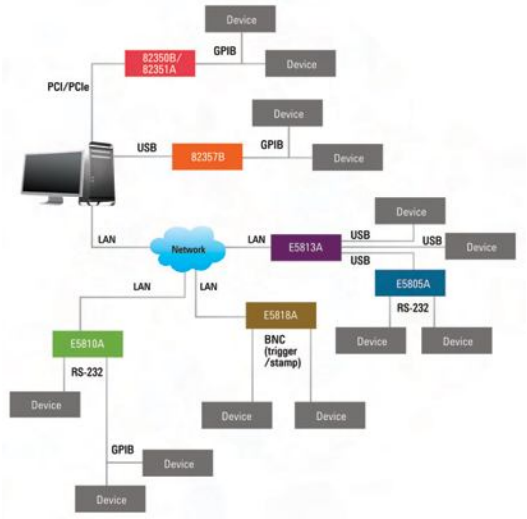
337908

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| LD300 | **471-8525** | 725.00 |
| | | **Price Each** |
| **Standard Calibration Charge** | **S** C8 | 45.13 |
| **UKAS Calibration Charge** | **N** C8 | 73.70 |

## Instrument Networks

### I/O Hardware for PC-Instrument Communication

Agilent Technologies



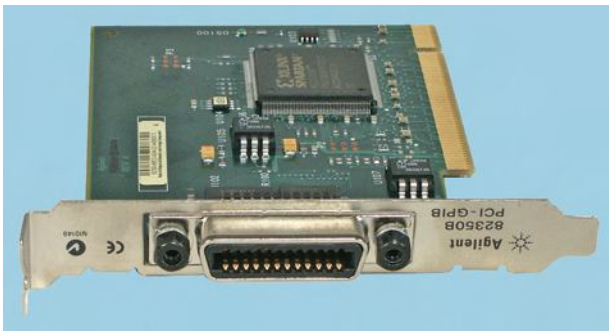

LATEST PRICING

- Easy, "plug and go", connection to GPIB and RS-232 instruments
- Use standard PC interfaces: PCI, USB or LAN
- Included industry-standard VISA I/O libraries make it easy to use existing software and mix and match test instruments and software fromdifferent vendors in a single system



**82357B USB/GPIB Interface**

- Uses standard USB and IEEE488 interfaces
- Maximum GPIB transfer rate of more than 1.15 MB/s
- An easy way to add GPIB connectivity, especially for notebook computers
- No external power supply necessary







Farnell

## Instrument Networks - continued

### I/O Hardware for PC-Instrument Communication - continued

**82350B High Performance 5V PCI GPIB Interface Card**

- PCI IEEE488 interface for PCs
- Transfer rates up to 900 KB/s
- Dual processor support on Windows 2000/XP
- Ideal for high-performance applications like manufacturing test



**82351A High Performance 3.3V PCIe GPIB Interface Card**

- Compact half-size board (68.9mm)
- Transfer rates up to 1.4 MB/s
- High flexibility via up-plugging (to x4 or x8 PCIe slots
- Low power consumption (3.3V signal level)
- Interface up to 14 GPIB boards
- Ideal for bandwidth intensive PC applications




**E5810A LAN/GPIB Gateway**

- Remotely access and control GPIB instruments via LAN
- Can be controlled from multiple locations by multiple users
- Easy setup and use via digital display and web browser
- Ideal for connecting remote instruments and for use in shared test systems




**E5805A USB/4-Port RS232 Interface**

- Easy connection from PC USB port to upto four RS232 instruments or devices
- Baud rates up to 230Kb/s per serial port
- 4 DB9 serial connectors and ships with a 1.8m USB cable
- Fully compatible with the Windows COM driver and industry standard VISA I/O software
- Ideal for easily connecting RS232 devices to notebook computers
- No external power supply required

**E5813A Networked 5-Port USB Hub**

- Uses LAN technology to overcome the 5m distance limitation for USB cabling, so you can place USB devices anywhere on a LAN
- Interface a variety of GPIB, RS232 and USB devices to complete your test system
- Extend USB devices beyond 5 metres
- USB ports appear to be locally attached and are locked to one computer

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

446545

| Mfrs. List No. | Description | Order Code | Price Each 1+ | 2+ | 5+ | 10+ |
|---|---|---|---|---|---|---|
| 82357B | USB/GPIB Interface | **142-5679** | 321.00 | 317.79 | 314.61 | 311.47 |
| 82350B | PCI/GPIB Interface | **121-4521** | 312.00 | 308.88 | 305.79 | 302.73 |
| 82351A | PCIe GPIB Interface Card | **142-5680** | 332.00 | 328.68 | 325.39 | 322.14 |
| E5810A | LAN/GPIB Gateway | **121-4522** | 649.00 | 642.51 | 636.09 | 629.72 |
| E5805A | USB/RS232 Interface | **121-4523** | 189.00 | 187.11 | 185.24 | 183.39 |
| E5813A | Networked USB Hub | **121-4525** | 244.00 | 241.56 | 239.14 | 236.75 |
| **Cable Assembly GPIB** | | | | | | |
| 10833D | 0.5m | **121-4530** | 41.02 | 40.61 | 40.20 | 39.80 |
| 10833A | 1m | **121-4526** | 41.02 | 40.61 | 40.20 | 39.80 |
| 10833B | 2m | **121-4527** | 46.49 | 46.03 | 45.57 | 45.11 |
| 10833C | 4m | **121-4528** | 51.96 | 51.44 | 50.93 | 50.42 |
| 10833F | 6m | **121-4531** | 62.90 | 62.27 | 61.65 | 61.03 |
| 10833G | 8m | **121-4532** | 68.37 | 67.69 | 67.01 | 66.34 |
| 10834A | GPIB-to-GPIB Adaptor | **121-4533** | 20.76 | 20.55 | 20.35 | 20.14 |

## Low Ohmeters

### Milli-Ohmeter

RHOPOINT COMPONENTS

**M210**




H=150, W=80, D=38 (Meter)
H=155, W=145, D=45 (Case)

Resistance is measured using a 'Kelvin' configuration of four wires terminating into two crocodile clips, thereby eliminating errors caused by test lead resistance and simplifies circuit connection.

Suitable for testing the resistance of relay and switch contacts, transformer and motor windings, pcb track and through hole plating, earth bonding, mains ring circuits, and for selecting and matching resistors and strain gauges.

- Battery operated
- Accurate low resistance measurement between 0.001Ω to 200Ω.
- Autoranging
- Auto power off, 3 minutes after last measurement
- Supplied with 'Ever Ready' carrying case, test leads and operating instructions
- Lightweight, portable

| | | | |
|---|---|---|---|
| Ranges | 1.999R,19.99R,199.9R | Temperature drift | 0.013%/°C |
| Accuracy | ±0.1% of range | Display | 3½ digit LCD, 12mm character height |
| Resolution | 0.001R,0.01R,0.1R | Operating temperature | 5 to 35°C |
| Zero offset | ±0.001R | Battery | One 9V PP3 (20hrs life, continuous use) **not supplied** |
| Test current | 5mA (max) | | |
| Test power | 5mW (max) | Weight | 510g (inc. case) |

The meter requires a 9V PP3 battery **not supplied.**

222340

| Mftrs. List No. | Order Code | | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| M210 | **109-279** | | 236.02 | 227.86 | 222.62 |
| | | | **Price Each** | | |
| **Standard Calibration Charge** | | S C 9 | 49.44 | | |
| **UKAS Calibration Charge** | | N C 9 | 72.14 | | |

### Micro and Milli Ohmeter

**BS407**




H=98, W=219, D=240, Weight 1.5kg

The BS407 is a fully portable instrument capable of measuring very low resistances to high accuracy. The unusually wide measuring range combined with features such as a 20mV clamp make it suitable for a wide range of applications. Supplied with Kelvin test lead set, operating manual and mains lead.

- Wide measurement range of 1μΩ to 20kΩ
- Four terminal measurement using Kelvin lead set
- High basic accuracy of 0.1%
- Current reversal switch for thermal emf detection
- Current diversion switch for easy zero setting
- Battery operation (Ni-MH) with built-in charger
- Minimal warm-up time
- Switchable 20mV clamp for 'dry circuit' testing

| Range | Resolution | Test Current |
|---|---|---|
| 1999μΩ | 1μΩ | 250mA |
| 19.99mΩ | 10μΩ | 50mA |
| 199.9mΩ | 100μΩ | 10mA |
| 1999mΩ | 100mΩ | 5mA |
| 19.99Ω | 10mΩ | 500μA |
| 199.9Ω | 100mΩ | 50μA |
| 1Ω | 100mΩ | 50μA |
| 19.99kΩ | 100Ω | 10μA |

| | |
|---|---|
| Accuracy: | 0.1% range ± 0.05% reading |
| Temp Coeff. | ±30ppm |
| Power: | Internal, non-removable, Ni-MH batteries giving from 8 to 150 hours operation. Built-in mains charger 230V or 115V internal setting. |
| Safety and EMC: | Complies with **EN61010-1** and **EN61326** |

232308

| Mftrs. List No. | Order Code | | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| BS407 | **381-2364** | | 505.00 | 489.85 | 475.15 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | S C 10 | | 50.45 | |
| **UKAS Calibration Charge** | | N C 10 | | 79.41 | |

## Help us to help the environment

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**Please recycle after use.**

# Calibrators & Simulators

## Current Loop Calibrator 4-20mA

**LC-603**




A pocket sized battery powered 4-20mA Current Loop Checker. It is an ideal precision source for checking the calibration of any indicators or controllers. It can also be used as a current source to set up process devices. Simply plug in the supplied connection lead to the device to be checked, select the desired range and check the device readout. If the displayed value is the same as the selected range, the device being checked is within calibration.

L=100, W=75, D=30mm

- Simulates 3 outputs 4mA, 12mA and 20mA
- High accuracy ±0.2mA
- Impact-resistant ABS case
- Membrane keypad
- Bright red LED indicators for selected mA output
- Bright red LED indicator for overload
- Low battery indicator
- Supplied with battery & connection lead with red and green leads with connection spades

| | | | |
|---|---|---|---|
| Range | 4mA, 12mA, 20mA | Power | 1 x PP3 9V battery |
| Accuracy | ±0.2mA | Weight | 160g |

339400

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| LC-603 | **494-8920** | 69.69 | 58.97 | 54.76 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C3 | 28.38 | |
| **UKAS Calibration Charge** | | N C3 | 58.75 | |

## Digital Current Calibrator

TENMA



An easy to use portable, hand-held instrument for calibrating process devices.

- Adjustable 0 to 24mA current source
- Current calibration drives load up to 500Ω
- 2 ranges
- Large 13mm display
- Over input indication
- Includes owner manual, test leads and battery
- CE marked

W = 78, D = 38, L = 185

| Range | Resolution | Accuracy |
|---|---|---|
| 0 to 19.99mA, 0 to 24mA | 0.01mA,0.1mA | ±(0.25% FS +1 digit), ±(0.5%FS + 1 digit) |
| Power | 9V PP3 | |

230668.460882

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| 72-6694 | **356-2682** | 71.35 | 66.30 |
| | | | Price Each |
| **Standard Calibration Charge** | | S C3 | 28.38 |
| **UKAS Calibration Charge** | | N C3 | 58.75 |

## Voltage / Current Calibrator




New

- Portable instrument for calibrating process devices and measuring process signals
- Adjustable 0 - 24mA current source
- Adjustable 0 - 10V DC voltage source
- 24V loop supply with simultaneous current measurement
- 88888 count LCD display
- Measure loop current and process voltages frm PLC's etc.
- Supplied with manual, test leads, battery and aluminium carry case

| Range | Resolution | Accuracy |
|---|---|---|
| **DC V Input and Output** | | |
| 100mV | 0.01mV | ±(0.2%+2d) |
| 10V | 1mV | ±(0.2%+2d) |
| **DC mA Input and Output** | | |
| 24mA | 0.001mA | ±(0.015%+2d) |

**Loop Power**
24V ±10%

**General Specifications**

| | |
|---|---|
| Power | 9V PP3 |
| Dimensions (WxHxD) | 89 x 190 x 42mm |
| Weight | 350g |

468362.468356

| Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| Voltage / Current Calibrator | **133-9598** | 101.56 | 91.93 | 86.43 |
| | | | | Price Each |
| **Standard Calibration Charge** | | | S C6 | 39.92 |
| **UKAS Calibration Charge** | | | N C6 | 79.41 |

## Voltage / Current Calibrator




New

- Portable instrument for calibrating process devices and measuring process signals
- Adjustable 0 to 24mA current source
- Adjustable -199.9mV to +199.9mV DC voltage source
- Current calibrator drives loads up to 500Ω
- 1999 count 13mm LCD display
- Auto and Manual ranging
- Supplied with manual and test leads

| Range | Resolution | Accuracy |
|---|---|---|
| **Current Source** | | |
| 0-19.99mA | 0.01mA | ±(0.25%+1d) |
| 0-24mA | 0.1mA | ±(0.5%+1d) |
| **Current Measurement** | | |
| 0-19.99mA | 0.01mA | ±(0.25%+1d) |
| 0-24mA | 0.1mA | ±(0.5%+1d) |
| **Power & Current Measurement of 2-wire Loop** | | |
| 0-19.99mA | 0.01mA | ±(0.25%+1d) |
| 0-24mA | 0.1mA | ±(0.5%+1d) |
| **DC mV Source** | | |
| -199.9 to 199.9mV | 0.1mV | ±(0.25%+1d) |

**General Specifications**

| | |
|---|---|
| Power | 9V PP3 |
| Dimensions (WxHxD) | 78 x 185 x 38mm |
| Weight | 265g |

467615.467597

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| Calibrator | **133-8779** | 85.46 | 76.01 |

## Voltage and Current Calibrator

**1044**

Time Electronics



H=142, W=78, D=50mm

- Easy to use
- Housed in a pocket sized, rugged ABS case
- Supplied with a leatherette carry case containing a compartment for storing test leads
- Connections are by standard 4mm plugs or by simply clamping the wires under the terminals
- A single 9V battery powers the unit
- Source and Measure Voltage & Current
- 3 Voltage Ranges 0 - 20V
- 3 Current Ranges 0 - 20mA
- 0.05% Accuracy

The 1044 can source and measure voltage and current in one compact unit and the 0.05% accuracy is ideal for simulation and calibration in most engineering applications.
Combines the advantages of digital accuracy with analogue controls. The large, easy to read LCD display shows the actual output, even when the connected load exceeds the specifications. This important feature eliminates the risk of large errors when connecting to unknown loads. The display even shows if the battery becomes low.
In the source mode, voltage up to 20V and current up to 20mA may be generated in three ranges. When in current source mode the 1044 has a high 24V compliance voltage which is ideal for powering process control loops. In the measurement mode, the range and function can be easily selected with the measured input accurately shown on the LCD display, operating in a similar way to a multimeter.

| **Voltage Source and Measure** | | **Current Source and Measure** | |
|---|---|---|---|
| Ranges | 0 - 200mV / 100µV resolution<br>0 - 2V / 1mV resolution<br>0 - 20V / 10mV resolution | Ranges | 0 - 200µA / 100nA resolution<br>0 - 2mA / 1µA resolution<br>0 - 20mA / 10µA resolution |
| Accuracy | 0.05% of full scale + 2 Counts | Accuracy | 0.05% of full scale + 3 Counts |
| Output Current | 20mA Max | Output Voltage | 24V Nominal |
| T / C & Noise (source only) | 150ppm/°C Noise <30ppm | T / C & Noise (source only) | 200ppm/°C Noise <50ppm |

339577

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Voltage Calibrator | 1044 | **505-8223** | 425.00 | 382.24 | 372.44 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C5 | 39.11 | |
| **UKAS Calibration Charge** | | | N C5 | 61.97 | |

## Calibrators & Simulators - continued

### Voltage and Current Loop Calibrator

Time Electronics

**1048**



A current, voltage, and process loop calibrator that covers the needs of an R&D lab and process control engineer. Source and measure in three current and voltage ranges plus a transmitter simulator/sink function. It has 4.5 digit (0.005% of span) resolution.
Output functions include step, ramp and inching. There are no key press menus to learn, just switches and buttons. A multi-turn potentiometer controls the output with up/down incrementing buttons for fine control. The output can be reversed ± and zeroed at the flick of a switch. The front panel features a large easy-to-read 4.5 Digit LCD display which auto-ranges. Manual reset of the ramp function is also provided for quick restore.

H=140, W=80, D=50mm
Weight=280g

- Source & Measure, both Current & Voltage
- 3 source range ranges 0 - 22mA & 0 - 22V
- 3 measure ranges 0 - 70mA & 0 - 50V
- Transmitter Simulator/Sink
- Output Steps and Ramps
- Fine adjustment (Inching)
- Accuracy 0.02% of span
- 4.5 digit display
- 9V internal battery
- Handheld, rugged
- Easy to use

**DC Current Source and Measure**

| | |
|---|---|
| Ranges | 0 - 22mA over-range to 70mA for measure only / Resolution: 1µA (0-19.9mA), 10µ (above 20mA)<br>0 - 2.2mA/ Resolution: 0.1µA (0-1.9999mA), 1µA (above 2mA)<br>0 - 220µA/ Resolution: 10nA (0-199.99µA), 0.1µA (above 200µA) |
| Accuracy | 0 - 22mA, 0 - 2.2mA - 0.02% of span, 0 - 220µA - 0.05% of span |
| Max source load | 1.1kΩ @ 20mA. Max drive: 22V |
| Measure load | 1k,110,16Ω for 0.22, 2.2, 22 mA |

**DC Voltage Source and Measure**

| | |
|---|---|
| Ranges | 0 - 22V over-range to 50V for measure only / Resolution: 1mV (0-19.999V), 10mV (above 20V)<br>0 - 2.2V / Resolution: 100µV (0-1.9999V), 1mV (above 2V)<br>0 - 220mV / Resolution: 10µV (0-199.99mV), 0.1mV (above 200mV) |
| Accuracy | 0.02% of span (0 - 220µV 0.05% of span) |
| Output resistance | Approx <2Ω. Max current 50mA |
| Measure load | 1MΩ on all ranges |

339578

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Voltage Calibrator | 1048 | **505-8247** | 433.50 | 371.58 | 356.31 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | | S C5 | 39.11 | |
| **UKAS Calibration Charge** | | | N C5 | 61.97 | |

### Loop Calibrator

FLUKE

**Fluke 705**



H=164, W=75, D=47mm
Weight = 0.35kg

The Fluke 705 Loop Calibrator is feature-rich solution to loop calibration, maintenance and repair. It offers:-

LATEST PRICING

- A large display and simple, push button interface for ease of use
- Simultaneous mA and % readout for quick, easy, interpretation of readings
- mA accuracy of 0.02%
- Push button 25% steps for fast, easy linearity checks. Save time over traditional knob type controls
- "Span Check" for fast confirmation of zero and span
- Selectable slow ramp, fast ramp, and step to provide smooth outputs for valve slewing and loop functional tests
- 24 volt internal loop supply, so you can power and read a transmitter at the same time without carrying a DMM.
- Single 9V battery that is easily changed
- 0-20mA or 4-20mA default start up modes

| Function | Range | Resolution | Accuracy |
|---|---|---|---|
| Voltage measure | 0 to 28V | 1mV | 0.025% Rdg + 1 LSD |
| Current measure | 0 to 24mA | 0.001mA | 0.025% Rdg + 2 LSD |
| Current source* | 0 to 20mA | .010mA | 0.025% Rdg + 2 LSD |
| Loop supply | 24Vdc | n/a | 10% |

Temperature coefficient, -10 to 18°C, 28 to 55°C, ±0005% of range per °C
* Max load, 1000 Ohms; Max applied voltage for simulation, 30V

| | |
|---|---|
| Maximum voltage | 30 volts |
| Non-operating temperature | -40°C to 60°C |
| Operating temperature | -10°C to 55°C |
| Relative humidity | 0 to 90% (0 to 35°C);<br>0 to 70% (35 to 55°C) |
| Operating altitude | 3,000m max |
| Shock and vibration | Per **MIL-T 28800** for a Class 2 instrument |
| Safety | **CSA CC22.2 No. 1010.1:1992** |
| EMC | **EN50082-1:1992 and EN55022:1994 Class B** |
| Battery | One 9V alkaline |
| Battery life | 18 hours typical, at 12mA |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

222575

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| FLUKE 705 | **318-3312** | 416.00 | 403.52 | 391.41 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C3 | 28.38 | |
| **UKAS Calibration Charge** | | N C3 | 58.75 | |

### Loop Calibrator

FLUKE

**Fluke 707**





Ex

LATEST PRICING

The 707 is the quickest and the easiest to use, with the most features, the best resolution and accuracy.

- Intuitive user interface combines the best features of dial and button based calibrators
- Measure mA and volts accurately to test and calibrate mA control loops
- Source / simulate mA to test 4-20mA devices such as valve positioners or input cards to PLCs
- Perform fast linearity tests with 25% and 100% stepping
- Conduct remote tests with auto-step and auto-ramp features
- Power transmitters using loop supply with simultaneous mA measurement
- Small, streamlined shape, with protective holster, makes it easy to carry
- Industry leading mA performance with 0.015% accuracy and ∅ .001mA resolution
- Rugged and reliable
- Ex version available

| Function | Range | Resolution | Accuracy |
|---|---|---|---|
| Voltage measure | 0 to 28V | 1mV | 0.015% Rdg + 2 LSD |
| Current measure | 0 to 24mA | 0.001mA | 0.015% Rdg + 2 LSD |
| Current source* | 0 to 20mA | .010mA | 0.015% Rdg + 2 LSD |
| Loop supply | 24Vdc | n/a | 10% |

Temperature coefficient, -10 to 18°C, 28 to 55°C, ±0005% of range per °C
* Max load, 1000 Ohms; Max applied voltage for simulation, 30V

| | |
|---|---|
| Maximum voltage | 30 volts |
| Non-operating temperature | -40°C to 60°C |
| Operating temperature | -10°C to 55°C |
| Relative humidity | 0 to 90% (0 to 35°C);<br>0 to 70% (35 to 55°C) |
| Operating altitude | 3,000m max |
| Shock and vibration | Per **MIL-T 28800** for a Class 2 instrument |
| Safety | **CSA CC22.2 No. 1010.1:1992** |
| EMC | **EN50082-1:1992 and EN55022:1994 Class B** |
| Battery | One 9V alkaline |
| Battery life | 18 hours typical, at 12mA |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

232289

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| FLUKE 707 | **389-0508** | 497.00 | 482.09 | 467.63 |
| FLUKE 707EX | **492-0223** | 665.00 | 645.05 | 625.70 |
| Carry CaseC101 | **947-9783** | 34.00 | 32.98 | 31.99 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C3 | 28.38 | |
| **UKAS Calibration charge** | | N C3 | 58.75 | |

### Volt/mA Loop Calibrator

FLUKE

**FLUKE 715**



CALIBRATION SERVICES

LATEST PRICING

A compact and lightweight Volt/mA process calibrator combining multiple features and ease of use. Ideal for installation, maintenance and repair applications. Supplied with protective holster with bench stand, test leads, alligator clips and battery.

- Clear 5 digit display
- 4-20mA loop current measurement
- Low level voltage measurement for use with sensor, transmitter and PLC outputs
- mA or % measurement display
- Source or simulate 24mA loop current
- 100mV or 10V source voltage
- 24 volt internal loop supply with simultaneous current measurement, so you can power and read a transmitter at the same time without carrying a DMM.
- Single 9V battery that is easily changed
- 4 to 20hrs battery life (depending on functions used)

| | | | |
|---|---|---|---|
| **Voltage Measurement** | | Range | 0-24mA |
| Range | 0-100mV/0-10V | Resolution | 0.001mA |
| Resolution | 10µV/1mV | Accuracy | 0.015% |
| Accuracy | 0.02% rdg+ 2LSD | **Current Sourcing** | |
| **Current Measurement** | | Range | 0-20mA or 4-20mA |

37

| | | | |
|---|---|---|---|
| Accuracy | 0.0015% rdg+ 2LSD | **Voltage Sourcing** | 0-100mV/0-10V |
| Drive Capability | 1000Ω @ 24mA | **Dimensions (WxHxD)** | 83x210x32mm |
| Supply Voltage | 24V | | |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

248540

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| 715 | C6 431-4499 | 760.00 | 737.20 |
| C101 Carry Case | 947-9783 | 34.00 | 32.98 |
| | | **Price Each** | |
| **Standard Calibration Charge** | S C6 | 39.92 | |
| **UKAS Calibration charge** | N C6 | 79.41 | |

## Loop Tester

**UPS III**

GE Druck




- Built in 24V DC power supply loop
- mA and % displayed simultaneously, as linear or square root (flow)
- Automatic PAS mode and ramp adjustable from 1 to 599 secs
- Contacts test mode
- Predefined values for the quick testing of linear loops, flow loops and the control of valves
- HART tramsmitter compatible
- Supplied with user manual, cables, batteries and calibration certificate

H=129, W=77, D=24mm

| | | | |
|---|---|---|---|
| Measurement/generation | 0 to 24mA DC | Accuracy | 0.01% |
| Measurement range | 0 to 60 VDC | resolution | 0.001 mA |

339620

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| UPS III Calibrator | **495-0276** | 475.00 | 460.75 | 446.93 |
| UPS III 38023 Protective Case | **495-0290** | 29.00 | 28.13 | 27.29 |
| UPS III 38016 Carrying Bag | **495-0306** | 29.00 | 28.13 | 27.29 |
| UPS III 191-129 Mains Adaptor | **495-0318** | 53.00 | 51.41 | 49.87 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C6 | 39.92 | |
| **UKAS Calibration Charge** | | N C6 | 79.41 | |

## Thermocouple Calibrator

**MM2030**

TME




°C/°F/°A selectableMilli-Volt measurement/outputSimulation of thermocouple outputHigh accuracyResolution 0.1 to 1000°Switchable thermocouple types K / T / J / R / N / E / SFull retention of thermocouple type and temperature scale-User configurable auto switch off capabilitySelf-calibratin-gOverrange/open circuit sensor indicationLow battery indi-cationSupplied with shock resistant holster

H=130, W=70, D=33mm
Weight=155g

| | | | |
|---|---|---|---|
| Ambient operating range | -30 to +50°C | Temperature scales | °C / °F / °A |
| Measurement/ simulate ranges | mV: -10 to 60mV | Accuracy @23°C | ±0.1% of reading ±0.2°C |
| | K: -200 to +1372°C | Characterising Accuracy | <0.05°C |
| | T: -200 to +400°C | Temperature Coefficient | 0.01% of reading /°C |
| | J: -200 to +1200°C | Cold Junction Compensation | 0.0075 |
| | R: 0 to +1767°C | Resolution | 0.1° to 1000, 1° above 1000 |
| | N: -200 to +1200°C | Functions | Measure temperature / Simulate T/C |
| | E: -200 to +1000°C | Battery | 9V PP3 |
| | S: 0 to +1767°C | Battery life | >100 hours |

339606

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| MM2030 | **492-1070** | 210.10 | 179.58 | 166.77 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C6 | 39.92 | |
| **UKAS Calibration Charge** | | N C6 | 79.41 | |

## Technical information at your fingertips

Over **352,000** technical datasheets available online.

Visit **www.farnell.co.uk** and look for the **Tech Info** heading in your search results.

## Thermocouple Calibrator

**FLUKE 714**

FLUKE




CALIBRATION SERVICES

A compact and lightweight, single function process calibrator for the calibration, testing and simulation of 9 common types of thermocouple. Ideal for installation, maintenance and repair applications. Supplied with protective holster with bench stand and battery.

LATEST PRICING

- Clear 5 digit display
- Dust, splash and EMI tolerant
- Suitable for use with the common J,K,T,E,R,S,B, L and U type thermocouples
- Temperature measurement from the thermocouple
- Simulation of thermocouple output
- mV source for the calibration of linear thermocouple transmitters
- Selectable °F or °C ranges
- Mini jack TC termination

| **Measure/Simulate TC** | | **Measure/Simulate mV** | |
|---|---|---|---|
| Range | -200 °Cto 1800°C | Range | -10 to +75mV |
| Resolution | 0.1°C | Resolution | 0.01mV |
| Accuracy | 0.3°C to 10µV | Accuracy | 0.025% + 1 Count |
| | | **Dimensions (WxHxD)** | 83x187x32mm |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

248542

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| 714 | C8 431-4505 | 760.00 | 737.20 |
| C101 Carry Case | 947-9783 | 34.00 | 32.98 |
| | | **Price Each** | |
| **Standard Calibration Charge** | S C8 | 45.13 | |
| **UKAS Calibration charge** | N C8 | 73.70 | |

## Temperature Calibrator

**FLUKE 724**

FLUKE




**The temperature solution.**
A powerful yet easy-to-use field calibrator with measurement and source functions to tets and calibrate almost any temperature instrument or device. Supplied with test leads, test clips and batteries.

LATEST PRICING

- Large, easy to read dual LCD display allows the user to view the input and output simultaneously
- Display backlight
- Compact, streamlined and rugged design for field use
- RTD, Thermocouple, Ohms, Volts, measurements to test sensors and transmitters
- Source/simulate Thermocouples, RTDs, Volts, Ohms, to calibrate transmitters
- Linearity tests with 25% and 100% steps
- Execute remote test with auto step and auto ramp
- Power transmitters during tests
- Stores frequently used test setups for later use

| **Function** | **Range** | **Resolution** | **Accuracy** |
|---|---|---|---|
| Voltage | 0 to 100mV | 0.01mV | 0.02% rdg + 2 LSD |
| | 0 to 10V (source) | 0.001V (source) | |
| | 0 to 30V (measure) | 0.001V (measure) | |
| mA (measure) | 0 to 24mA | 0.001mA | 0.02% rdg + 2 LSD |
| mV | -10.00mV to +75.00mV | 0.01mV | 0.025% rdg + 1 LSD |
| Resistance | 0Ω to 3.2KΩ (measure) | 0.01Ω to 0.1Ω | 0.10Ω to 1.0Ω |
| | 15Ω to 3.2KΩ (source) | | |
| Loop Supply | 24V dc | N/A | 10% |
| Thermocouples | J,K,T,E,L,N,U | 0.1°C | to 0.7°C |
| | B,R,S | 1°C | to 1.4°C |
| RTDs | Ni120 (672), Pt 100, 200, 500, 1000 | 0.1°C | to 0.2°C |
| Dimensions (WxHxD) | 96x200x47mm | | |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

248559

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| 724 | **431-4529** | 1,298.00 | 1,259.06 |
| C101 Carry Case | **947-9783** | 34.00 | 32.98 |
| | | **Price Each** | |
| **Standard Calibration Charge** | S C16 | 68.51 | |
| **UKAS Calibration charge** | N C16 | 95.81 | |

## Troubleshooting tips

WWW

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

## Calibrators & Simulators - continued

### Temperature Calibrators - Dry Block

GE Druck

**DBC 150**



The DBC series is a highly stable dry block temperature calibrator for lab, workshop and portable use. Features rapid settling time , excellent set-point stability and high accuracy.

- Available from -45 to 150°C
- Full numeric keypad and LCD with backlight
- Rapid heating, cooling and settling
- Measures and displays PT100 reference probe
- Switch test, ramp, step and preset functions
- Wide range of standard interchangeable inserts
- Supplied with B3 reference probe

| | |
|---|---|
| Ranges | DBC 150: -45 to 150°C |
| Fast response | Rapid heating, cooling and settling |
| Reference probe | PT100 reference probe input |
| Interface | RS 232 for PC control |
| Switch test | Open/closed detection with hysterisis displayed |
| Ramp, preset, step | Programmable, preset recall and calibration sequences |

382056

| Range | Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| -45 to 150°C | DBC150TS+B3 | **857-0647** | 2,951.00 | 2,862.47 |

### Multifunction Calibrator

GE Druck

**DPI880**



The DPI880 Multi-function Calibrator is an ultra compact and simple to use tool for testing, configuring and calibrating virtually all process parameters. It measures, sources and simulates mA, mV, V, RTDs, thermocouples, ohms, frequency, pulses and pressure, captures switch values and provides 24 V loop power.

**Applications:**

- Test and maintenance
- Transmitter calibration
- Loop set-up and diagnostics
- Switch, trip and alarm verification

W=85 H=180 D=50mm. Weight 425g

**Features:**

- Sources and reads mA, mV, V, ohms, frequency and pulses
- Simulates and reads 8 RTDs and 12 thermocouples
- 32 pressure modules from 25 mbar to 700 bar
- Simultaneous dual reading capability
- Automatic switch test and pressure leak test
- 1000 point data storage with real time clock
- 24 V loop power supply
- HART loop resistor
- Large backlit display
- Robust and weatherproof
- Compact, simple to use, easy to carry
- Convenient one-handed operation
- Plug/play connector for IDOS Universal Pressure Modules

**Electrical Specifications**

| | Measure Range | Measure Accuracy | Source Range | Source Accuracy |
|---|---|---|---|---|
| Current | 0 to 55mA | 0.02% + 3 counts | 0 to 24mA | 0.02% + 2 counts |
| Voltage | 0 to 30V | 0.03% + 2 counts | 0 to 12V | 0.02% + 2 counts |
| Resistance | 0 to 4kΩ | 0.1 to 1.3Ω | 0 to 4kΩ | 0.1 to 1.3Ω |
| Switch Detection | Open and closed, 2mA current | | | |
| Loop Power | 24V ±10% (35mA maximum) | | | |
| HART mA Loop Resistor | 250Ω (menu selection) | | | |

**Frequency Specifications**

| | Measure Range | Measure Accuracy | Source Range | Source Accuracy |
|---|---|---|---|---|
| Frequency | 0 to 1kHz | 0.003% + 2 counts | 0 to 1kHz | 0.003% + 0.0023Hz |
| | 0 to 50kHz | 0.003% + 2 counts | 0 to 50kHz | 0.003% + 0.0336Hz |
| Counter | 0 to 999999cpm | 0.003% + 2 counts | 0 to 59999 | 0.003% + 0.138cpm |
| | 0 to 999999cph | 0.003% + 2 counts | 0 to 99999 | 0.003% + 0.5cph |
| Output Waveform | Square wave (zero crossing) | | | |
| Voltage Input | 30V maximum | | | |
| Trigger Level | 0 to 12V (resolution 0.1V) | | | |
| Output Amplitude | 0 to 12V (10mA maximum) | | | |

**Temperature Specifications**

| Type | Standard | Accuracy | Range |
|---|---|---|---|
| PT50 (385) | IEC751 | 0.5°C | -200°C to 850°C |
| PT100 (385) | IEC751 | 0.25°C | -200°C to 850°C |
| PT200 (385) | IEC751 | 0.6°C | -200°C to 850°C |
| PT500 (385) | IEC751 | 0.4°C | -200°C to 850°C |
| PT1000 (385) | IEC751 | 0.2°C | -200°C to 400°C |
| D100 (392) | JIS 1604-1989 | 0.25°C | -200°C to 650°C |
| Ni 100 | DIN 43760 | 0.2°C | -60°C to 250°C |
| Ni 120 | MINCO 7-120 | 0.2°C | -80°C to 260°C |
| K | IEC584 | 0.6°C | -270°C to 1370°C |
| J | IEC584 | 0.5°C | -210°C to 1200°C |
| T | IEC584 | 0.3°C | -270°C to 400°C |
| B | IEC584 | 1.0°C | 50°C to 1820°C |
| R | IEC584 | 1.0°C | -50°C to 1769°C |
| S | IEC584 | 1.4°C | -50°C to 1769°C |
| E | IEC584 | 0.4°C | -270°C to 910°C |
| N | IEC584 | 0.6°C | -270°C to 1300°C |
| L | DIN43710 | 0.3°C | -200°C to 900°C |
| U | DIN43710 | 0.3°C | -200°C to 600°C |
| C | | 1.0°C | 0°C to 2315°C |
| D | | 1.0°C | 0°C to 2495°C |

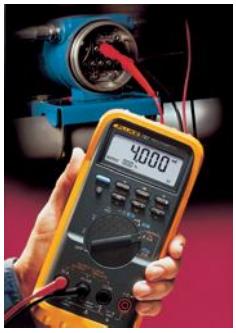
419388

| Model | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| DPI880 Calibrator | **102-2673** | 1,605.00 | 1,556.85 | 1,510.14 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C 20 | 108.78 | |
| **UKAS Calibration Charge** | | N C 20 | 128.40 | |

### Fluke 787 Process

FLUKE

**MeterCurrent, Source and Simulate**



H=187 (*201), W=87 (*98),D=32 (*52) *incl. holster

The Fluke 787 ProcessMeter combines a DMM and loop calibrator in one. It has the ability to source, simulate and measure dc current with 1µA resolution.

CALIBRATION SERVICES

The ProcessMeter has been designed for troubleshooting and calibrating current loop applications. It is EMI shielded, dust and splash resistant and has a removable battery door making it easy to change the battery without opening the meter.

3 WARRANTY YEARS

Supplied complete with protective yellow holster, TL75 test leads, AC70A alligator clips, 9V battery and user manual and quick reference guide.

LATEST PRICING

- DMM and Loop calibrator in one tool
- Precision 1000V, 440mA digital multimeter
- Measure both ac/dc volts, ac/dc current, resistance, continuity and frequency
- Min./Max./Average/Hold/Relative modes
- dc 20mA current source/loop calibrator
- Manual step, auto step, auto ramp
- Clear LCD with backlight, 4,000 count, 30,000 count for dc current

| | | | |
|---|---|---|---|
| dc/ac volts | 4000mV, 4V, 40V, 400V, 1000V | dc current O/P | 0-20mA or 4-20mA |
| dc/ac volts | 1A (0.44A continuous) | dc current simulate | 0-20mA or 4-20mA |
| dc mA | 30mA | Ext. 24V loop supply | overanging to 24mA |
| Resistance | 400R,4KR,40KR,4MR,40MR | Current adjustment | Manual: course, fine, 25% stepl |
| Frequency | 199.99Hz, 1999.9Hz, 19.999KHz | modes | Automatic: slow ramp, |
| Continuity | 100Ω | | fast ramp, 25% step |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

222498

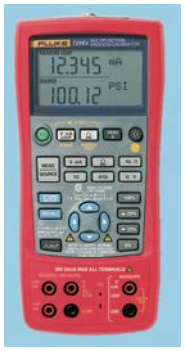
| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| Fluke 787 | **892-968** | 586.00 | 568.42 | 551.37 |
| C101 Carry Case | **947-9783** | 34.00 | 32.98 | 31.99 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C 8 | 45.13 | |
| **UKAS Calibration Charge** | | N C 8 | 73.70 | |

### Multifunction Process Calibrator

DURACELL Ultra M3 AA

FLUKE

**725 and 725Ex**





LATEST PRICING

H=96
W=200
D=47

The Fluke 725 Multifunction Calibrators are a versatile, easy to use field calibrators. Use the measure and source functions to test and calibrate almost anything. The 725Ex model is an ATEX compliant intrinsically safe version ideal for locations where explosive gasses may be present.

- Rugged, reliable design stands up to field use

- Easy to read measure/source screen lets you view input and output simultaneously
- Measure volts, mA, RTDs, thermocouples, frequency, and ohms to test sensors and Transmitters
- Source/simulate volts, mA, thermocouples, RTDs, frequency, ohms, and pressure to calibrate transmitters
- Support flow meter testing with frequency and CPM (counts per minute) functions
- Perform fast linearity tests with auto step and auto ramp features
- Power transmitters during test using loop supply with simultaneous mA measurement
- Store frequently used test setups for later use
- Backlight lets you work in poor light
- Remote interface allows benchtop automated operations

**Summary specifications (18°C to 28°C for one year)**

| Function | | | | |
|---|---|---|---|---|
| Measure or source | **Range** | **Resolution** | **Accuracy** | **Notes** |
| Voltage | 0 to 100mV | 0.01mV | 0.02% Rdg + 2 LSD | Max Load 1 mA |
| | 0 to 10V (source) | 0.01V | | |
| | 0 to 30V (measure) | 0.01V | | |
| mA | 0 to 24 | 0.001mA | 0.02% Rdg + 2 LSD | Max load 1000Ω |
| mV | -10.00mV to + 75.00mV | 0.01mV | 0.025% + of range + 1 LSD | |
| Resistance | 15Ω to 3200Ω | 0.01Ω to 0.1Ω | 0.01Ω to 0.1Ω | |
| Frequency | 1CPM to 10kHz | 5 digits | 0.05% + 1 count | Squareware |
| Loop supply | 24Vdc | N/A | 10% | |
| Thermocouples | J,K,T,E,L,N,U | 0.1°C | 0.7°C | |
| Thermocouples | B,R,S | 1°C to 1.4°C | | |
| RTDs | Ni120 (672)<br>Pt 100, 200, 500, 1000 (385)<br>Pt 100 (3916)<br>Pt 100 (3926) | | | |
| Maximum voltage | 30V | | | |
| Storage temp. | -40°C to 71°C | | | |
| Operating temp. | 10°C to 55°C | | | |
| Relative humidity | 95%(10°C to 35°C); 75%(30°C to 40°C); 45%(40°C to 50°C); 35%(50°C to 55°C) | | | |
| Shock | 30g, 11ms, half-sine shock (or 1 metre drop test) | | | |
| Vibration | Random, 2g, 5-500 Hz | | | |
| Safety (Model 725) | **CSA C22.2 No. 1010.1:1994 Class B** | | | |
| Safety (Model 725Ex) | **ATEX Ex (II 1G EEx ia IIB) 171°C KEMA 04ATEX 1303X, I.S. Class I, Div I Groups B-D, 171°C compliant** | | | |
| Weight | 650g | | | |
| Battery | 4 AA alkaline batteries. Battery life; 25 hours typical | | | |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

222577

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| FLUKE 725 | **318-3300** | 1,828.00 | 1,773.16 | 1,719.97 |
| FLUKE 725EX | **947-9880** | 2,214.00 | 2,147.58 | 2,083.15 |
| C101 Carry Case | **947-9783** | 34.00 | 32.98 | 31.99 |
| | | | Price Each | |
| **Standard Calibration Charge** | | **S** C18 | 89.27 | |
| **UKAS Calibration Charge** | | **N** C18 | 123.00 | |

## Temperature and mV/mA Calibrator

Time Electronics

### 1090



The 1090 is a portable high performance instrument that combines source and measurement functions for thermocouples, PT100s, uV, mV and mA.

- Measure/simulate J, K, T, R, S, B, N thermocouples
- Measure/simulate PT100
- ITS 90 standard
- Measure/source (uV/mV/mA)
- Display in °C and °F
- Automatic CJC selectable
- 10 points memory recall
- Inching and step functions
- Mains/battery + auto power down
- Process loops 4-20mA and 0-50mA

| **Thermocouple type** | Range | Resolution | Accuracy |
|---|---|---|---|
| J | -200 to 580°C | 0.1°C | 0.7°C |
| K | -200 to -150°C | 0.1°C | 2.5°C |
| | -150 to 750°C | 0.1°C | 0.5°C |
| T | -200 to 0°C | 0.1°C | 1.5°C |
| | 0 to 400°C | 0.1°C | 0.4°C |
| R | -50 to 400°C | 0.1°C | 3.0°C |
| | 400 to 1750°C | 0.1°C | 1.5°C |
| S | -50 to 100°C | 0.1°C | 3.0°C |
| | 100 to 1750°C | 0.1°C | 1.5°C |
| B | 110 to 1000°C | 0.1°C | 3.5°C |
| | 1000 to 1800°C | 0.1°C | 1.5°C |
| N | -100 to 890°C | 0.1°C | 0.6°C |
| E | -50 to 400°C | 0.1°C | 0.4°C |
| **Function** | | | |
| mV measure | 0 to ±30mV | 10µV | 0.05% of f.s. ± 1 digit |
| mA measure | 0 to ±0 to ±60mA | 20µA | 0.05% of f.s. ±1 digit |
| PT 100 simulation | -100, -50, -20, 0, 20, 50, 100, 200 300, 400, 500, 600, 700, 800°C | 14 set points | 0.5°C approx |
| PT 100 measure | -200 to 700°C, 2 wire | | 0.7°C |
| mV source | 0 to ±80mV | 0 to 8mV: 0.5µV | ±4µV |
| | | 8 to 80mV: 5µV | 0.02% of f.s. |
| mA source | 0 to +80mA | 0 to 8mA: 0.5µV | ±10µA |
| | | 8 to 80mA: 5µV | 0.02% of f.s. |

382399

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| 1090 | **863-6010** | 1,249.50 | 1,198.50 | 1,173.00 |

## Multifunction Calibrator

GE Druck

### TRX-II



H=120, W=120, D=50mm Weight=1.2kg

The TRX-II is a multi function calibrator available in standard and intrinsically safe models. It can simulate and measure RTDs, thermocouples and resistors. It can also read and source mA, mV, V and frequency. The menu driven display takes the operator through the desired test sequence.

- Menu driven software with help screens
- Large backlit 60x60mm graphic LCD display
- Up to 9 user defined sequences can be stored and recalled by a single key stroke
- Robust IP53 housing, carrying case holds all leads and quick reference guide
- 2 wire temperature sensor output displayed in mA or temperature units (°C or °F)
- 2, 3 or 4 wire RTDs detected automatically
- Fully programmable ramp or step output functions
- Switch test captures value at status change

**TRX-II Intrinically Safe Features**

- Certified to ATEX II 2 (1) G EEx ia IIC T5
- Current source 21mA

| | **Range** | **Resolution** | **Accuracy** |
|---|---|---|---|
| **Voltage** | | | |
| Measure | 0 - 100mV | 0.001 | 0.02% + 0.01% |
| | 100 - 600mv | 0.01 | 0.025% + 0.005% |
| | 0 - 6V | 0.0001 | 0.025% + 0.005% |
| | 6 - 60V | 0.001 | 0.05% + 0.005% |
| Source | -10 - 100mV | 0.001 | 0.01% + 0.005% |
| | 0 - 24V | 0.0001 | 0.01% + 0.005% |
| | 0 - 12V (IS Version) | 0.0001 | 0.01% + 0.005% |
| **Current** | | | |
| Measure | 0 - 52mA | 0.001 | 0.01% + 0.01% |
| Source | 0 - 24mA | 0.001 | 0.01% + 0.02% |
| **Resistance** | | | |
| Measure | 0 - 400Ω | 0.01 | 0.005% + 0.02% |
| | 400 - 2000Ω | 0.1 | 0.02% + 0.015% |
| Source | 0 - 400Ω | 0.01 | 0.005% + 0.02% |
| | 400 - 2000Ω | 0.1 | 0.02% + 0.015% |
| **Frequency** | | | |
| Measure | 0 - 655Hz | 0.01 | 0.006% |
| | 655 - 1310Hz | 0.01 | 0.1Hz |
| | 1310Hz - 20kHz | 1 | 1Hz |
| Source | 0 - 100Hz | 0.01 | 0.01Hz |
| | 0 - 20kHz | 1 | 1Hz |
| **Pulse** | | | |
| Measure | 0 to $6x10^5$ counts/min | 1 | 2 c/min |
| | 0 to $10^7$-1 counts/hour | 1 | 2 c/hour |
| | 0 to $10^8$ - 1 counts | infinite | 2 counts |
| Source | 0 - 6000 pulse/min | 1 | 1 p/min |
| | 0 - 99 999 pulses/hr | 1 | 1 p/min |
| | 0 - 10 pulses | 1 | infinte |
| **Temperature** | | | **Measure/Source** |
| J | -210 to 1200°C | 0.1 | 0.3 0.2 |
| L | -200 to 900°C | 0.1 | 0.3 0.2 |
| K | -250 to 1370°C | 0.1 | 0.3 0.2 |
| T | -250 to 400°C | 0.1 | 0.3 0.2 |
| U | -200 to 600°C | 0.1 | 0.3 0.2 |
| B | 250 to 1820°C | 0.2 | 0.9 0.7 |
| R | -50 to 1768°C | 0.1 | 1.0 0.5 |
| S | -50 to 1768°C | 0.1 | 1.1 0.7 |
| E | -250 to 1000°C | 0.1 | 0.3 0.2 |
| N | -200 to 1300°C | 0.1 | 0.6 0.3 |
| C | 0 to 2320°C | 0.1 | 0.7 0.6 |
| D | 0 to 2495°C | 0.2 | 1.0 0.5 |
| **RTD** | | | |
| pt1000 | -200 to 400°C | 0.1 | 0.5 |
| pt500 | -200 to 850°C | 0.1 | 0.4 |
| pt200 | -200 to 850°C | 0.1 | 0.6 |
| pt100 | -200 to 850°C | 0.03 | 0.3 |
| pt50 | -200 to 850°C | 0.01 | 0.5 |
| D-100 | -200 to 630°C | 0.03 | 0.3 |
| Ni100 | -60 to 250°C | 0.1 | 0.2 |
| Ni120 | -80 to 260°C | 0.1 | 0.2 |
| Cu10 | -200 to 260°C | 0.3 | 2.0 |

339621

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| TRX II | **495-0320** | 2,070.60 | 2,008.79 | 1,922.70 |
| TRX-II/IS Instrinically safe | **495-0331** | 2,079.78 | 2,017.69 | 1,931.23 |
| | | | Price Each | |
| **Standard Calibration Charge** | **S** C18 | | 89.27 | |
| **UKAS Calibration Charge** | **N** C18 | | 123.00 | |

## Calibrators & Simulators - continued

### DC Multi Function Calibrator

**1017**



- 10nV - 100V DC Volts
- 100nA - 100mA DC Current
- 10mΩ - 10kΩ Resistance
- 0.005% accuracy
- Mains/Battery operation
- Portable

W=290, D=250, H=110mm
Weight=2.4kg

The 1017 is a high performance portable DC calibrator for use in the field or laboratory. It is constructed in a durable, compact plastic case with a tilt stand/carry handle.
Five DC voltage ranges from 10mV to 100V full scale are available, each with a 6-digit (1ppm) resolution. The DC current range is 100mA full scale with a 100nA (1ppm) resolution. Resistance from 0.01 ohm to 10 Kohm is available 0.01 ohm steps. The voltage, current, and resistance ranges make it suitable for calibrating a wide range of transducers, from thermocouples, 4-20mA and 0-10V transmitters, to platinum resistance thermometers, all with the same instrument.

| | |
|---|---|
| Voltage Ranges/Accuracy | 0 - 9.99999mV in 10nV steps, ±0.02% of setting ±0.005% of range<br>0 - 99.9999mV in 100nV steps, ±0.01% of setting ±0.004% of range<br>0 - 999.999mV in 1µV steps, ±0.005% of setting ±0.002% of range<br>0 - 9.99999V in 10µV steps, ±0.005% of setting ±0.002% of range<br>0 - 99.9999V in 100µV steps, ±0.01% of setting ±0.004% of range |
| Current Range/Accuracy | 0 - 99.9999mA in 0.1µA steps, ±0.02% of setting ±0.004% of range<br>Drive voltage max: 10V |
| Resistance Range/Accuracy | 0 - 9.99999kΩ in 0.01Ω steps, ±0.05% of full scale<br>Power rating : 0.25W per resistor<br>End resistance : less than 200mΩ |
| Deviation Control | 0% to 0.999% in 0.001% steps. Deviation accuracy: V&I output, 0.5% |
| Temperature Coefficient | <5 ppm per °C |
| Long Term Stability | <5ppm/day, <15ppm/90day, <25ppm/year |
| Sort Term Stability - Noise | 10mV range: <0.2µV/sec, <0.3µV/10sec, <0.4µV/min<br>100mV range: <0.2µV/sec, <0.4µV/10sec, <0.6µV/min<br>1V range: <0.2µV/sec, <0.5µV/10sec, <1.5µV/min<br>10V range: <1.0µV/sec, <2.0µV/10sec, <8.0µV/min<br>100V range: <40µV/sec, <100µV/10sec, <500µV/min<br>100mA range: <0.2µA/sec, <0.4µA/10sec, <1.0µA/min |
| Warm-up and Settling time | Warm-up: <10 mins to full accuracy. Settling: <0.5 sec, 100V range 5sec |
| Output Connections | via low thermal emf terminals (0.2µV/°C). |
| Power Supply | 230V 50/60Hz mains, or from internal rechargeable Ni-Cad battery pack |

339591

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Calibrator | 1017 | **506-3231** | 1,230.79 | 1,054.97 | 1,011.62 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | C 18 | **89.27** |
| **UKAS Calibration Charge** | C 18 | **123.00** |

### Handheld PT 100 Simulator

**1049**




H=112, W=61, D=55mm
Weight=170g

The 1049 is a precision simulator for PT100 Platinum Resistance elements used for accurate temperature measurement.

- -200°C to +800°C
- ±0.3°C accuracy
- Meets DIN EN0751 (ITS90) spec
- 23 set points
- Good temperature coefficient
- Battery powered compact unit
- Passive Resistance Source

| | |
|---|---|
| Set points °C | -200, -100, -50, -20, -10,<br>0, 10, 20, 30, 40, 50, 60, 80, 100,<br>150, 200, 250, 300, 400, 500, 600, 700, 800 |
| Accuracy | -200 to -100°C ± 0.3°C<br>-50 to +60°C ±0.15°C<br>+80 to +200°C ±0.3°C<br>+250 to +500°C ±0.5°C<br>+600 to +800°C ±0.65°C |
| Temp Coefficient | Less than 30 ppm per °C |
| Maximum Current | 50 mA |

339581

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 1049 | **505-8272** | 229.00 | 210.92 | 205.51 |

**FREE global legislation support**

RoHS, REACH, WEEE, EuP, Batteries Directive - we've got it covered at:
**www.global-legislation.com**

### Voltage and Current Source

**1030**




H=115, W=62, D=55mm

The 1030 is a compact portable voltage and current calibrator for general purpose signal injection. It is suitable for voltage and current loop signal simulation as well as thermocouple simulation. The precision 10 turn dial provides a conventional feel to setting the output with a setting resolution of 0.1%.
Three voltage ranges give an adjustable output from 10µV to 1V and two current ranges for 10µA to 100mA.
An additional 0 to 8V output can be obtained by using a precision 1KΩ resistor (supplied) connected across the output terminals and the 10mA current range selected. This allows the output to be set between 0 and ± 8V with a 10mV resolution and an accuracy of 0.3% of full scale.

- Simple to use
- Does not require any standardisation prior to use
- Supplied with a leatherette carry case
- 10mV, 100mV, 1V ranges
- 10mA, 100mA ranges
- 0.1% accuracy
- 0 - 8V available
- Precision 10 turn dial
- Battery Powered 9V PP3
- Battery level indicator

| | |
|---|---|
| Voltage Ranges | 0 - 1V (1mV resolution)<br>0 - 100mV (100µV resolution)<br>0 - 10mV (10µV resolution) |
| Current Ranges | 0 - 100mA (100µA resolution)<br>0 - 10mA (10µA resolution) |
| Accuracy | 1V and 100mV ranges: ±0.1% of full scale<br>10mV, current ranges: ±0.2% of full scale |
| Linearity | 0.15% |
| Temperature Coeff | 150ppm per °C |
| Noise | 30ppm of full scale (1V range) |
| Battery | PP3 size, 9V. Approx 60 hours life. |
| Output Polarity | Positive or negative, switch selected. A centre 'off' position is also provided |
| Maximum o/p Current | 1V, 100mV ranges: 20mA, 10mV, 8V ranges: Limited by output resistance |
| Maximum o/p Voltage | 8V (current ranges) |
| Output Resistance | 0.2Ω on 1V and 100mV range<br>10Ω on 10mV range, 1KΩ on 8V range |
| Maximum Overload | Can withstand continuous open circuit or short circuit on all ranges |

339576

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Voltage Source | 1030 | **505-8200** | 363.00 | 318.39 | 305.30 |

### Loop Simulator

**Loop-Mate 7006**




H=150, W=85,
D=25mm Weight=280g

The Loop-Mate provides 4 to 20 mA and 0 to 10V signals to simulate sensors or check that sensors are transmitting correctly. It has automatic power off, and audible beeps that change pitch in sympathy with the output signal level. Automatic stepping of the signal through the range allows the calibration engineer to leave the Loop-Mate connected and controlling a device. The Loop-Mate has several additional functions. It can generate current and source this from its internal supply (the RX Test mode) and it can control current when the source of the supply is provided externally (the TX sim mode). It can also generate a 0 to 10v signal instead of the 4 to 20mA signal.

- 7 Point 4..20mA, 0...10V Hand Held Simulator
- Auto-Step - adjustable speed
- Audible and visual LED indication
- Tx Test and Tx Sim Modes
- Battery Powered PP3
- Auto Power off

| | |
|---|---|
| Ranges | 4 - 20mA, 0 - 10V |
| Resolution | 7 points, 0, 10, 25, 50, 75, 90, 100% |
| Accuracy | 0.1% |
| Indication | High brightness LEDs |
| Modes | Tx Test and TX Sim (mA) |
| Control | Manual Up/Down buttons |
| Auto Control | Automatic step Up/Down. Rates 0.5,1,2,4,8 sec/step |
| Beeping | A beep is sounded with increasing pitch each step |
| Error indicator | Erroneous loop conditions |
| Power | PP3 battery |

339590

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 7006 | **506-3220** | 180.17 | 175.34 | 169.29 |

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# Electrical Installation Testers

## Proving Device 240V

MARTINDALE ELECTRIC

New




The PD240 is a convenient pocket-sized, battery powered proving unit that produces a 240Vdc output.
A proving unit is essential for the proving of voltage indicators before and after use, in order to follow safe electrical working practices.
The PD240 is current limited to 3.5mA and is suitable for use with neon voltage indicators and with other voltage indicators that have an input impedance greater than 120kΩ.
The unit is actuated by microswitch when probes of a voltage indicator are inserted into the probe apertures on front face.
The Indicator LED adjacent to probe apertures shows when unit is powered.
Switch-mode electronics ensure long battery life.
Flush-mounted pocket clip permits stable bench use when desired.

| | | | |
|---|---|---|---|
| Output Voltage: | 240V DC | Battery: | Alkaline PP3/ MN1604 9V DC (not supplied) |
| Output Current: | 2mA max across 120kΩ | | Shut-off below 5V |
| | 3.5mA max | Body: | Flame retardent ABS |
| Short circuit protected | | Dimensions: | 144 x 63 x 31mm |
| | | Weight: | 180g including battery |

525475

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| PD240 | **167-0753** | 51.10 | 48.53 |

## Proving Unit

**P240**

TTi




The P240 is a hand-held battery powered proving unit that provides a nominal 240V DC, 2mA source intended for proving the integrity of neon type test voltage indicators.
For safety compliance, voltage indicators should be checked for correct operation from this known voltage source before and after every use. The unit houses a high efficiency switch-mode power supply to provide long battery life.

- Essential for safety compliance
- Battery operated
- Automatic switch-free operation
- Compact ABS case with integral belt clip for hands-free operation
- LED indication for battery condition
- Requires 1x PP3 9V type battery

249340

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| P240 | **892-890** | 51.00 | 49.47 |

## Voltage Indicator

**VI13700G**

MARTINDALE ELECTRIC






W=84 H=143 D=50mm. Weight 270g

- Instant, clear indication shows if a circuit is live, its voltage range and whether AC or DC
- Tough, moulded construction and long life neons, combined with heavy duty, double insulated cable, large finger guard and a retractable, lockable prod sheath
- Easy to use and HRC fuse protected
- Safety Category EN61010 CAT III 600V

| | |
|---|---|
| Voltage Range | 0 - 600V |
| Voltage Indications (AC) | 0 - 50 - 100 - 200 - 400V AC rms |
| Voltage Indications (DC) | 0 - 75 - 150 - 240 - 560V DC |

The PD690 proving unit produces 690V AC/DC to enable voltage indicators to be fully checked. This unit is suitable for indicators with 230V and 415 / 440V AC or DC detection ranges, such as the VI13700G. The PD690 is one of the few proving units to checkindicators with ranges above 250V. The PD690 can also check Drummond and other filament lamps due to its output being sufficient to illuminate the bulb.

| | |
|---|---|
| Output Voltage | 230V into a 5kΩ load / 700V into a 700kΩ |
| Output Loading | >4kΩ |
| Batteries | 6x AA (not included) |

449925

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|---|
| MARVI13700/G | Voltage Indication | **979-8544** | 38.95 | 34.88 | 33.31 |
| PD690 | Proving Unit | **979-8552** | 76.88 | 73.29 | 68.09 |

## 13A Socket Tester



The socket tester is for testing 13A sockets to **BS1363**. Plug the tester into a socket and if it is correctly wired all three lamps on the tester will illuminate. If any of the live, neutral or earth cables are not connected, or if the live cable is transposed with either of the other cables then one or more of the lights on the tester will not illuminate. A series of diagrams on the tester show the probable fault.

H=22 (excl. pins), Dia=58

222333

| Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|
| **108-089** | 11.39 | 10.03 | 9.34 |

## 13A Socket Testers

SOCKET & SEE



A range of 13A socket testers with features that allow quick and safe testing. Different faults are indicated via the hi-brightness LEDs with audible indications on the Craftsman and Professional models.

- Logical 'Green for Go' indication
- The latest design means no RCD tripping
- Detects good plus 13 wiring fault conditions
- Conforms to EN61010-1 and GS TUV approved

**The Craftsman tester Also has::**

- Continuous audible tone to indicate good wiring condition
- Warbling tone indicates faulty wiring
- Advanced electronics allow clear indications even on noisy circuits

**The Professional tester also has:**

- Built-in self test at the beginning of the test sequence
- Patented 'Fault Locate' electronics gives a clear indication of 17 wiring fault conditions - more than any other tester
- The first socket tester in the world to show where the actual fault is - live, earth or neutral

248610

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|---|
| Quick Test | SOK12 | **428-3399** | 10.30 | 9.58 |
| Craftsman | SOK22 | **428-3405** | 15.47 | 14.44 |
| Professional | SOK32 | **428-3417** | 20.65 | 17.54 |

## Non-Trip Earth Loop Impedance Indicator

**EZ150**

MARTINDALE ELECTRIC




An earth loop indicator with voltage and wiring checks. Conventional indicators have the weakness that only tell you if the earth is connected, they don't tell you how safe it is. Martindale's new T-Safe™ technology gives safe, earth loop impedance checking within carefully selected bands without tripping the RCDs.

- Non-trip earth loop test
- Voltage test
- Socket test
- T-Safe™ technology
- Identifies faults oither checkers can't

| | |
|---|---|
| Nominal Supply | 230V, 50Hz |
| Earth Loop Impedance Span | 0 to 1.7Ω, 1.7 to 5Ω, 5 to 10Ω, 10 to 100Ω, 100 to 200Ω, 200 to 500Ω |
| Earth Loop Threshold Accuracy | ±(10% + 0.3Ω) |
| Voltage Low Indication | <195V |
| Voltage High Indication | >270V |
| Open Earth Indication | >500Ω |
| Dimensions | 65 x 65 x 50mm |
| Weight | 64g |
| Power Consumption | <1.6W |
| Overvoltage | Cat II / 300V |
| Pollution Degree | 2 |

339543.343998

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| EZ150 | **505-7838** | 51.05 | 47.15 | 43.56 |

## Electrical Installation Testers - continued

### Socket Testers

**SocketMaster Series**

FLUKE



**SM 100**
- Clear LED indication of wiring status
- Modern, ergonomic design with unique soft finger grip
- Compact, durable - designed to Safety Standard BS EN 61010

**SM 200**
- Clear LED indication of wiring status
- Audible notification of wiring condition
- Modern, ergonomic design with unique soft finger grip
- Compact, durable - designed to safety standard BS EN 61010

**SM 300**
- Clear bi-colour LED and audible indicaton of wiring status
- Unique soft-touch RCD test checks 30mA RCD's for trip within 300mS
- Earth Volts Touchpad indicates raised earth voltages >50V, indicating potentially dangerous situations

The easy way to find out if your sockets are safe! A range of simple and precise socket testers designed for the rapid identification of faults on 13A domestic sockets.

524978

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| SM100 | **491-7297** | 14.00 | 13.58 | 13.17 |
| SM200 | **491-7303** | 19.00 | 18.43 | 17.88 |
| SM300 | **491-7315** | 29.00 | 28.13 | 27.29 |

### Phase Testers

**EPF Series**

SOCKET & SEE

New



**All Models**
- Low cost solution to finding the phase - live supply
- Construction and finger guard configuration give full conformance with latest European safety standards
- Fully drop proof from 2 metres gives robust working life

**EPF 30 only**
- Patented TPL (True Phase Locator) Technology finds the true phase supply even in the presence of open circuit conductors
- Auto power off to conserve battery life

| Features | EPF 10 | EPF 20 | EPF 30 |
|---|---|---|---|
| Positive LED indication of live conductor | ● | ● | ● |
| Audible indication of live conductor | | ● | ● |
| Sefl-test for all functions | | ● | ● |
| Elimination of phantom signals | | | ● |
| Belt-mounted carry case | | | ● |

480716.472552

| Description | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| EPF 10 | **143-0690** | 9.95 | 9.17 | 8.16 |
| EPF 20 | **143-0691** | 15.47 | 14.18 | 12.70 |
| EPF 30 | **143-0692** | 31.00 | 28.41 | 25.44 |

### Coming soon

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Register your interest for items that are 'Coming Soon' at **www.farnell.co.uk** and we'll email you to let you know that they're in stock.

### Phase Rotation Tester

**9062**

FLUKE






H=124, W=61, D=27mm Weight=150g

**Key Functions**
- Three-in-one Tester:
  1. Rotary Field Indicator - indication of the three phases via LED
  2. Motor Rotation Indicator - Display of motor rotation direction
  3. Contact free determination of the rotation direction of running motors

LATEST PRICING

**General Information**
- Swift determination of the rotary field as for conventional rotary field indicators
- Magnetic field detection to detect AC solenoid valve

**Special Features**
- Contact-free determination of rotation direction of running motors. Ideal if motor shafts are not visible or difficult to access. (i.e. circulating pumps)
- Voltage free and safe detection of three phase motor connectors (UVW)
- Indicates the motor rotation before starting the motor

| | | | |
|---|---|---|---|
| Voltage Range | 1 to 440 V AC | Pollution Degree | 2 |
| Phase Display | 120 to 440 V AC | Measurement category | CAT III / 300 V |
| Frequency range | 2 to 400 Hz | Protection Degree | IP 40 |
| Test Currents | <3.5 mA | Safety Complying with | IEC61010 / EN61010 / IEC61557-7 / EN61557-7 |
| Operation time | continuous | Power Supply | 1 x 9 V, IEC 6LR 61 |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

416551

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|---|
| UK only version | 9062/UK | **101-8350** | 119.00 | 115.43 | 111.97 |
| Euro version | 9062 | **101-8351** | 119.00 | 115.43 | 111.97 |

### Phase Rotation & Continuity Indicator

**PC15250**

MARTINDALE ELECTRIC



The PC15250 continuity indicator will quickly and simply prove continuity of all three lines, or identify which are faulty and shows the sequence of phase rotation.
A fast, effective method of identifying worn or unmarked cables, and ensuring 3-phase outlets and machinery are wired correctly.
The retractable GS38 probe sheilds give a choice between long exposed tips for reaching inaccessible contacts and safer, shorter lengths for increased safety.
Supplied with one fused crocodile clip and two fused prods with retractable shrouds this unit is fully compliant with GS38 and BS EN 61010.

- For use on 100V to 6900V phase to phase, 40Hz to 60Hz
- Proves continuity
- Identifies faulty lines
- Shows direction of phase rotation
- Fitted with GS38 fused croc clips and two fused prods with retractable shrouds
- Dimensions: 230 x 140 x 80mm
- Weight: 354g

339552

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| PC15250 | **505-7978** | 69.70 | 64.58 | 60.48 |

### Express checkout

WWW

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## Audible Socket Tester

MARTINDALE ELECTRIC

**BZ101**




The Buzz IT is a fast and easy way to ensure 13A sockets are wired correctly in the same way as the classic check plug. The Buzz It gives an audible signal in addition to the three neon lights when the wiring is correct. This allows for awkwardly placed, or not easily visible sockets to be checked quickly.
The Buzz It can also be used as a basic fuse finder! - when the correct fuse is pulled the buzzer stops.

339542

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Buzz It Plug | BZ101 | **505-7814** | 14.35 | 13.84 | 13.17 |

## Circuit Breaker Finder and AC Wire Tracer

AMPROBE

**ECB50A**




The ECB50A is a microprocessor-driven tracer that allows three types of trouble-shooting - circuit breaker identification, wire tracing in walls, and wire sorting. The included transmitter module generates a coded signal that is injected into a powered AC line. The microprocessor-enabled receiver wand uses this encoded signal to reject noise, eliminate false reports, and correctly identify the right circuit breaker or wire. The ECB50 is UL listed to US and Canadian safety standards and is rated at CAT III 300V for general residential and commercial use.

- Three Testers in one
- Identify circuit breakers
- Trace AC cables in walls
- Sort AC wire bundles
- Coded transmission for separation of transmitter signal
- Loud and clear audible response tone
- UL and c-UL listed
- CAT II 300V rated
- Cable tracing length to 150m nominal
- Cable tracing depth to 40cm nominal
- Ships as complete - coded transmitter, microprocessor reciver and heavy duty carrying case

489619.503091

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| UK Version | ECB50A-E | **146-6469** | 49.00 | 47.53 | 46.10 |
| Euro Version | ECB50A-FGIS | **146-6470** | 49.00 | 47.53 | 46.10 |

## Elite Professional Fuse Finder Kit

MARTINDALE ELECTRIC

**FD650**





The Elite Fuse Finder kit brings microprocessor controlled multi-level sensitivity to fuse and breaker identification. Supplied in a robust case complete with transmitter (FD600/T) and receiver (FD650/R) it is capable of operating with eother the 13A plug top lead for sockets, or the TL83 lead for light fittings and other points in a circuit without power sockets. This allows tracing from socket to fuse or location to location.

The Elite Fuse Finder operates in two modes:
**Automatic Mode:** which has a memory and auto adjusting for sensitivity for foolproof identification.
**Manual Mode:** which allows very rapid fuse finding using the bargraph.

- Microprocessor Controlled
- 6 segment bargraph
- Non contact Voltage Indicator
- Manual and Auto modes

| | |
|---|---|
| **Transmitter** | |
| Voltage Rating | 230V |
| Frequency Range | 50-60Hz |
| Switching Frequency | 5Hz (Approx) |
| Transmission Pulse Width | 1.7µs (Approx) |
| Transmission Pulse Amplitude | 20A max |
| Dimensions | 65 x 65 x 46mm |
| Weight | 65g |
| Earth Leakage | Nil |
| Power Supply | From Mains |
| Power Consumption | 1W (Approx) |
| Overvoltage Catergory | CAT III / 300V |
| Pollution Degree | 2 |
| Protection Class | IP20 |
| **Receiver** | |
| Tracing depth for fuse assignment | 0-10cm (conditions dependant) |
| Sensitivity setting | via on/off potentiometer |
| Dimensions | 202 x 32 x 22mm |
| Weight | 150g |
| Protection class | IP20 |
| Power Supply | 9V battery - not included |

339546

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| FD650 | **505-7863** | 99.43 | 93.79 | 87.13 |

## Cable Locator

FLUKE

**2042**







LATEST PRICING

H=190, W=85, D=50mm
Weight=400g

- Tracing of cable in walls and locating interruptions and short circuits in cables
- Tracing of underground cables
- Locating of fuses and assignment to circuits
- Locating of concealed sockets and distribution boxes
- Locating of interruptions and short-circuits in unshield electrical underfloor heating
- Tracing of metal water and heating pipes General Information
- Set comprising of a transmitter and a receiver in a shockproof carrying case
- Transmitter with a LC-display for transmitting level, transmitting code and external voltage
- Receiver with a LC-display for level of receiving signal, code of receiving signal and live voltage indication
- Automatic or manual adjustment of sensitivity
- Acoustical receiving signal switchable
- Auto-Power-Off
- Backlight
- For all applications (live or dead cables) without additional instruments
- Safe locating via display of a specified letter on the receiver
- Additional torch lamp function for working in dark environments

| | | | |
|---|---|---|---|
| Display | LCD-Bargraph | Max. Voltage | up to 400V AC/DC |
| Voltage Range | 12 to 400V (12V, 50V, 120V, 230V, 400V) | Measurement category | CAT III / 400 V |
| Frequency Range | 0 to 60Hz | Pollution Degree | 2 |
| Output signal | 125kHz | Power Supply | 6x 1.5 V, IEC LR6 batteries |

**The Cable Locator Kit includes:** transmitter, receiver, 4 test leads, batteries, 2 crocodile clamps, 2 test probes, carrying case and user manual

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

416554

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Cable Locator Kit | 2042 | **101-8352** | 430.00 | 417.10 | 404.59 |
| Additional Transmitter | 2042T | **101-8353** | 216.00 | 209.52 | 203.23 |

## Megohmmeter

CHAUVIN ARNOUX

**CA 6511**




H=167, W=106, D=55mm Weight=600g

The CA 6511 is an insulation and economic continuity tester, popular with contractors, installers and after-sales departments for measuring electrical instruments and installations.

- Insulation: up to 1000MΩ (1cal.) at 500V DC
- AC voltage: 0 to 600V
- Continuity: -10Ω to +10Ω (I=200mA)
- Automatic testing of absence of voltage by direct measurement
- Single input on two colour-coded terminals
- Highly readable display and logarithmic scale
- Measurement in compliance with IEC 61557, NF C 15-100, IEC 364, VDE 0413 and BS 7671
- Electrical safety: IEC 1010 600V Cat III-2

339483

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| CA 6511 | **324-6231** | 244.00 |

## Electrical Installation Testers - continued

### Digital Insulation Tester

New



- 22mm 1999 count LCD display
- Audible and visual alarm
- Continuity Buzzer <50Ω
- Over Range indication
- Data Hold
- Safety category: IEC1010-1 CATIII 600V

| | Range | Resolution | Best Accuracy |
|---|---|---|---|
| AC Voltage | 700V | 1V | ±(1.2%rdg+5d) |
| DC Voltage | 1000V | 1V | ±(0.8%rdg+3d) |
| **Insulation Resistance** | | | |
| Test Voltage: 250V | 0 - 200MΩ | 0.1MΩ | ±(3%rdg+5d) |
| Test Voltage: 500V | 0 - 200MΩ | 0.1MΩ | ±(3%rdg+5d) |
| Test Voltage: 1000V | 0 - 1GΩ | 1MΩ | ±(3%rdg+5d) |
| Test Voltage: 1000V | 1GΩ - 2GΩ | 1MΩ | ±(5%rdg+5d) |
| Test Current: 1mA, | Short Circuit Current: <2.5mA | | |
| Continuity Resistance | 200Ω | 0.1Ω | ±(1%rdg+3d) |
| Dimensions | W=122 H=192 D=55mm. Weight 545g | | |

**Includes:** tester, hard carry case, soft carry bag, 2x alligator test leads, 2x probe test leads, screwdriver, user manual and 6x AA batteries.

468367.468366

| Description | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| Insulation Tester | **133-9603** | 73.76 | 63.07 | 56.65 |
| | | | | Price Each |
| **Standard Calibration Charge** | | S C4 | | 34.10 |
| **UKAS Calibration Charge** | | N C4 | | 58.75 |

### Insulation Multimeter

New



A combined multimeter / insulation tester for electrical applications and ideal for the troubleshooting and maintenance of motors and switchgear.

- Large LCD with full icon display and backlight
- Auto / manual range selection
- TRMS measurements
- Insulation resistance measurement
- AC/DC current measurement
- Voltage, resistance, capacitance and frequency measurement
- Min/Max modes and data hold
- Continuity buzzer and diode test
- 99 record datalogging
- Sleep mode and low battery warning
- Supplied with test leads, test clips, 9Vbattery and user manual

| Function | Range | Best Accuracy |
|---|---|---|
| **Insulation Resistance** | | |
| 500V<br>1000V | 0.1MΩ to 60MΩ, 60MΩ to 500MΩ | ±(2%+5) |
| **General** | | |
| DC Voltage | 60mV, 600mV, 6V, 60V, 600V, 1000V | ±(0.09%+2) |
| AC Voltage | 6V, 60V, 600V, 1000V | |
| DC Current | 60mA, 400mA | ±(0.2%+2) |
| AC Current | 60mA, 400mA | |
| Resistance | 600Ω, 6kΩ, 60kΩ, 600kΩ, 6MΩ, 40MΩ | ±(0.9%+2) |
| Capacitance | 10nF, 100nF, 1µF, 100µF | ±(1%+3) |
| Frequency | | |
| Safety | IEC1010 600V CATIV/1000V CATIII | |
| Dimensions | 97x202x46mm (WxHxD) | |
| Dimensions | 505g | |

510042.509500

| Description | Order Code | 1+ | Price Each 3+ |
|---|---|---|---|
| Insulation Multimeter | **156-3723** | 90.20 | 86.10 |

### Digital Insulation Tester

TENMA

**72-6782**



- Compact easy to read battery powered insulation tester
- Wide measuring range
- Built in over-input and low battery indication
- Overload protection on all ranges
- Sensitive ohm meter scale 0-200Ω for measuring low resistance circuits
- Automatic zero adjust and circuit discharge
- Includes instruction manual and alligator clips

| Range | Accuracy | Resolution |
|---|---|---|
| 200MΩ(500V) | ±(3% +1d) | 0.1MΩ |
| 1000MΩ(1000V) | ±(3% +1d) | 1MΩ |
| 2000Ω | ±(1% +1d) | 0.1Ω |
| Power | DC 12V (8 x 1.5V AA batteries) | |

232197

| Mftrs. List No. | Description | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| 72-6782 | Insulation Tester | **360-6958** | 86.70 | 76.50 | 66.30 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | S C4 | | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | | 58.75 | |

### Insulation/Continuity Tester

SOCKET & SEE

**DIT400**





- Super Fast System (SFS) for quick results
- 3 way - 250, 500 and 1000V insulation
- Insulation / resistance measurement up to 999MΩ
- Continuity test up to 999Ω
- Supplied with test leads, carry case and manual
- DIT400 Plus Part P Tester also includes SS130 socket adaptor
- Auto power off

**Insulation Test Ranges**

| Test Voltage | Range | Tolerance |
|---|---|---|
| 250V | 0.01 to 199MΩ | ±3% to ±6% |
| 500V | 10.0 to 500MΩ | ±3% to ±6% |
| 1000V | 0.01 to 999MΩ | ±3% to ±6% |

**Output Voltage**

| Voltage | Load | Tolerance |
|---|---|---|
| 250V | 250kΩ | -0% + 20% |
| 500V | 500kΩ | -0% + 20% |
| 1000V | 1MΩ | -0% + 20% |

**Continuity Test Ranges**

| Ranges | Tolerance |
|---|---|
| 0.00 to 9.99Ω | ±3% ±2 digits |
| 10.0 to 99.9Ω | ±3% ±2 digits |
| 100 to 999Ω | ±3% ±2 digits |

**General**

| | |
|---|---|
| Power | 4x AA alkaline batteries (not supplied) |
| Operating temp | 0°C to 40°C |
| Storage temp | -10°C to 60°C |

H=157, W=89, D=39mm Weight = 400g

381733.381806

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| DIT400 | **853-0645** | 206.04 | 185.65 | 177.35 |
| DIT 400 PLUS | **143-0694** | 195.62 | 189.41 | 162.60 |

### Digital Insulation Tester

Di-log

**DL9050**



CALIBRATION SERVICES

- Large dual LCD display
- Rugged double moulded design
- AC voltage to 750V
- DC voltage to 1000V
- Insulation Resistance to 2000MΩ
- Continuity Buzzer <40Ω
- Over Range indication
- Auto power off
- Test hold and lock function
- Supplied with carry case and 6x AA batteries

W=92 H=200 D=50mm. Weight 700g

| | Range | Resolution | Best Accuracy |
|---|---|---|---|
| AC Voltage | 750V | 1V | ±(1.2%rdg+10d) |
| DC Voltage | 1000V | 1V | ±(0.8%rdg+3d) |
| **Insulation Resistance** | | | |
| Test Voltage: 250V | 0 - 200MΩ | 0.1MΩ | ±(3%rdg+5d) |
| Test Voltage: 500V | 0 - 200MΩ | 0.1MΩ | ±(3%rdg+5d) |
| Test Voltage: 1000V | 0 - 1000MΩ | 1MΩ | ±(5%rdg+5d) |
| Test Voltage: 1000V | 1000MΩ - 2000MΩ | 1MΩ | ±(5%rdg+5d) |
| Test Current: 1mA, | Short Circuit Current: <1mA | | |
| Continuity Resistance | 2000Ω | 0.1Ω | ±(1%rdg+2d) |

450320.460919

| Mftrs. List No. | Description | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| DL9050 | Insulation Tester | **129-6886** | 185.27 | 174.92 | 167.67 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | S C4 | | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | | 58.75 | |

## Troubleshooting tips

WWW

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

## Insulation Tester
**IN2001**

MARTINDALE ELECTRIC




The IN2001 insulation tester is amazing value for money. You can now do 16th Edition testing with the proper equipment at very low cost. With an automatic zero adjust feature to remove the resistance of the leads, you are guaranteed fast, accurate continuity testing at 200mA. Fully meets all relevant regulations: BS7671, HD384 and BS EN 61557.

| | |
|---|---|
| Insulation | 10kΩ to 100MΩ at 500V |
| Continuity | 0 to 200Ω |
| Voltage Range | 500V AC |
| Complies with | BS EN 61557 and 16th Edition |
| Dimensions | 190 x 90 x 54mm |
| Supplied With | Soft protective carry case, test leads, battery and user manual |

339544.343999

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| IN2001 | **505-7840** | 199.88 | 189.63 | 182.45 |
| **Standard Calibration Charge** | | **S** C4 | **Price Each** 34.10 | |
| **UKAS Calibration Charge** | | **N** C4 | 58.75 | |

## Insulation Testers
**1503 and 1507**

FLUKE



LATEST PRICING

W=100 H=203 D=50mm. Weight 550g

DURACELL Ultra M3 AA

The Fluke 1503 and 1507 Insultaion Testers are compact, rugged, reliable and easy to use. With their multiple test voltages, they are ideal for many troubleshooting, commissioning, and preventative maintenance applications. Additional features, like the remote probe on these tools save both time and money when performing tests.

**Includes:** remote probe, test leads, test probes, alligator clips, holster and user documentation.

- Automatic calculation of both Polarisation Index and Dielectric Absorption Ratio
- Remote test probe for repetitive or hard-to-reach testing
- Live circuit detection prevents insulation test if a voltage larger than 30V is detected
- Make repetitive tests easy with Compare (Pass/Fail) functionality (1507 only)
- Auto discharge of capacitive voltage
- Auto power off
- Large backlit display
- **EN61010-1 CAT IV 600V**
- One year warranty

**Insulation resistance**

| Test Voltage | Ranges | Resolution | Test Current | Accuracy |
|---|---|---|---|---|
| **Fluke 1503** | | | | |
| 500 V | 0.1MΩ - 20MΩ, 20MΩ - 200MΩ, 200MΩ - 500MΩ | 0.01MΩ, 0.1MΩ, 1MΩ | 1mA at 500kΩ | ±(2% + 5 digits) |
| 1000 V | 0.1MΩ - 200MΩ, 200MΩ - 2GΩ | 0.1MΩ, 1MΩ | 1mA at 1MΩ | ±(2% + 5 digits) |
| **Fluke 1507** | | | | |
| 50 V | 0.01MΩ - 20MΩ, 20MΩ - 50MΩ | 0.01MΩ, 0.1MΩ | 1mA at 50kΩ | ±(3% + 5 digits) |
| 100 V | 0.01MΩ - 20MΩ, 20MΩ - 100MΩ | 0.01MΩ, 0.1MΩ | 1mA at 100kΩ | ±(3% + 5 digits) |
| 250 V | 0.01MΩ - 20MΩ, 20MΩ - 200MΩ | 0.01MΩ, 0.1MΩ | 1mA at 250kΩ | ±(1.5% + 5 digits) |
| 500 V | 0.01MΩ - 20MΩ, 20MΩ - 200MΩ, 200MΩ - 500MΩ | 0.01MΩ, 0.1MΩ, 1MΩ | 1mA at 500kΩ | ±(1.5% + 5 digits) |
| 1000 V | 0.1MΩ - 200MΩ, 200MΩ - 2GΩ, 2GΩ - 10GΩ | 0.1MΩ, 1MΩ, 100MΩ | 1mA at 1MΩ | ±(1.5% + 5 digits) / >2GΩ: ±(10% + 3 digits) |

| Function | Range | Resolution | Accuracy |
|---|---|---|---|
| **Earth Bond Resistance Measurement** | | | |
| Resistance | 20R, 200R, 2kR, 20kR | 0.01Ω, 0.1Ω, 1Ω, 10Ω | ±(1.5% + 3 digits) |
| **AC/DC Voltage Measurement** | | | |
| Voltage | 600 V | 0.1 V | ±(2% + 3 digits) |
| **General Specifications** | | | |
| Operating Temperature | -20°C to +55°C | | |
| Batteries | 4x AA batteries. Can perform 1000 insulation tests. | | |
| Protection Standard | IP40 | | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

416604.429124

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | + |
|---|---|---|---|---|---|---|
| Insulation Tester | 1503 | **101-8357** | 234.00 | 226.98 | 220.17 | – – |
| Insulation Tester | 1507 | **101-8361** | 311.00 | 301.67 | 292.62 | – – |
| Hard Carry Case | C101 | **947-9783** | 34.00 | 32.98 | 31.99 | – – |

## Insulation and Continuity Testers
**MIT200 Series**

Megger




One of the smallest insulation testers available on the market today. With options of a two voltage, or three voltage instrument, the MIT200 instruments offer a range of safety and operation features expected from a Megger tester. The combined analogue pointer and digital readout provide both accuracy and charge/discharge characteristics. Auto continuity testing removes the need for a third hand. Replacing the highly respected BM120 and BM220 range, the new MIT220 and MIT230 use the same small case, but now up-rated to CATIII 600V. Voltage warning and display, plus voltage lockout protect both the user and the instrument, if accidentally connected to a live circuit. Both instruments meet the requirements of BS7671, as well as BSEN 61557 and IEC61010.

W=98 H=195 D=40mm. Weight 530g

**Common features:**
- 250V and 500V insulation testing
- 1000MΩ range
- Continuity testing at 200mA down to 0.01Ω
- Digital display and "Analogue arch"
- Alkaline or rechargeable batteries
- IEC61010-1 CATIII 600V
- Test leads and probes
- Hard carry case
- Calibration certificate included
- 3 year warranty

**MIT230 additional features:**
- 250, 500, 1000V insulation testing

419191.428556

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Insulation Tester | MIT220-EN | **108-6217** | 249.00 | 244.02 | 239.14 |
| Insulation Tester | MIT230-EN | **108-6218** | 295.00 | 289.10 | 283.32 |
| Fused Test Leads | 6220-789 | **108-6238** | 40.00 | 39.20 | 38.42 |

## Insulation and Continuity Testers
**MIT400 Series**

Megger




W=108 H=232 D=55mm. Weight 800g

CALIBRATION SERVICES

**General features:**
- Insulation testing to 1000V and to 200GΩ
- Continuity testing at 200mA down to 0.01Ω
- Analogue and dual digital display
- PI/DAR insulation timer / display
- Bluetooth data transfer
- TRMS voltage measurement and test data storage
- IEC61010-1 CATIV 600V

Combining the latest range of measurement techniques with new instrument design to provide a state-of-the-art tester that is compact and comfortable to hold. All primary results are displayed in the larger digital display and repeated on the analogue arc. Additionally, auxiliary test information such as frequency, leakage current, Insulation or circuit voltage is displayed in the smaller secondary digital display. Rubber over moulding combines the tough shock absorbing outer protection with excellent grip, on a strong modified ABS housing, providing an almost indestructible case.

**Industrial Applications:** service, maintenance and electrical installations testing.
- **MIT400:** Basic CATIV 600V tester
- **MIT430:** Advanced CATIV 600V tester, results storage and Bluetooth download

| Instrument | MIT400 | MIT430 |
|---|---|---|
| **Insulation Voltage Range** | | |
| 50V (10GΩ) | | ● |
| 100V (20GΩ) | | ● |
| 250V (50GΩ) | ● | ● |
| 500V (100GΩ) | ● | ● |

# Electrical Installation Testers - continued

## Insulation and Continuity Testers - continued

### MIT400 Series - continued

| Instrument | MIT400 | MIT430 |
|---|---|---|
| **Insulation Voltage Range** | | |
| 1000V (200GΩ) | ● | ● |
| Insulation Range | 20GΩ | 200GΩ |
| Leakage Current Display | | ● |
| INS test voltage display | ● | ● |
| **Continuity** | | |
| 0.01 to 100Ω | ● | ● |
| Variable Current Limit (200mA/20mA) | ● | ● |
| Fast Buzzer - selectable threshold | ● | ● |
| kΩ range to 999kΩ | ● | ● |
| **Voltage** | | |
| Live circuit warning at 50V | ● | ● |
| Default voltmeter | ● | ● |
| TRMS measurement to 600V | ● | ● |
| **Measurement Ranges** | | |
| Frequency (40 to 400Hz) | | ● |
| Capacitance (0.1nF to 10µF) | | ● |
| mV / transducer (0.1 to 19.99V) | ● | ● |
| **Features** | | |
| Backlight | ● | ● |
| Battery condition display | ● | ● |
| Insulation timed PI-DAR tests | | ● |
| Test button / Lock button | ● | ● |
| Limit alarm pass band on INS | | ● |
| Auto power down | ● | ● |
| Result Storage | | ● |
| Bluetooth Connectivity | | ● |

**General Accuracy (at 20°C)**

| | |
|---|---|
| Insulation | ±3% ±2 digits (up to 10MΩ)<br>±5% (up to 100MΩ)<br>±30% (up to fullscale) |
| Continuity | ±3% ±2 digits (0.01 to 100Ω) |
| Resistance | ±5% ±2 digits (10Ω to 1MΩ) |
| Voltage | ±1% ±2 digits (max. 600V ac or dc) |
| Frequency | ±2% ±2 digits |
| mV | ±2% ±2 digits |
| mA | ±2% ±2 digits |
| Capacitance | ±5% ±2 digits |
| General Specifications | |
| Batteries | 6 x AA (alkaline or NiMH) gives 3000 consecutive tests of any type. |
| Protection | IP54 |
| Operating Temperature | -10°C to 55°C |
| Safety | IEC61010-1 600V CATIII (MIT430 is 600V CATIV) |

**Supplied with:** red/black silcone lead set with clips, protective rubber boot, remote switch probe (except MIT400) and batteries.

419195.428557

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|---|
| Industrial Insulation Tester | MIT400-EN | **108-6221** | 299.00 | 293.02 | 287.16 |
| Industrial Insulation Tester | MIT430-EN | **108-6225** | 349.00 | 342.02 | 335.18 |
| Test Leads | 6220-779 | **108-6237** | 23.00 | 22.54 | 22.09 |
| Fused Test Leads | 6220-789 | **108-6238** | 40.00 | 39.20 | 38.42 |
| | | | | Price Each | |
| **Standard Calibration Charge** | | **S** C4 | | 34.10 | |
| **UKAS Calibration Charge** | | **N** C4 | | 58.75 | |

## Insulation / Continuity Tester with Multimeter functions

HIOKI

### 3454



H=148, W=175, D=56mm Weight = 530g

These multimeters not only offers voltage, resitance and continuity measurements for basic fault finding but also perform insulation tests over a range of voltage levels.

- Easy-to-read digital display
- Auto-discharge
- Live-wire warning
- Safety system for high voltage measurement
- Sliding cover
- 3454-11 has insulalation volage range of 250V, 500V and 1000V
- 3454-10 offers low voltage levels of 50V, 125V, 250V and 500V

| | 3454-11 | 3454-10 |
|---|---|---|
| Insulation test voltage | 250V, 500V, 1000V | 50V, 125V, 250V, 500V |
| Measurement range | 4 to 4000MΩ | 4 to 2000MΩ |
| 1st effective range | 0.2 to 200MΩ | 0.2 to 100MΩ |
| 2nd effective range | 0 to 4000MΩ | 0 to 2000MΩ |
| Accuracy | 1st effective range: ±3 %rdg. ±4 dgt. / 2nd effective range: ±5 %rdg. ±5 dgt. | |
| No load voltage | Not more than 1.2 x rated measurement voltage | |
| Short circuit current | 1.2 mA max | |
| Response time | ∞ to center, ∞ to 0 MΩ within 5s | |
| Low resistance range | 40Ω to 4MΩ short circuit current: 200 mA | |
| Accuracy | ±3 %rdg. ±6dgt. (±5 %rdg. ±6dgt. at 400 kΩ range or higher) | |
| AC voltage range | 0 to 750V | |
| Accuracy | ±3 %rdg. ±6dgt. (up to 600V) | |

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| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| HITESTER 3454-11 | **842-1439** | 203.98 | 193.78 | 188.68 |
| HITESTER 3454-10 | **842-1447** | 203.98 | 193.78 | 188.68 |
| | | | Price Each | |
| **Standard Calibration Charge** | | **S** C3 | 28.38 | |
| **UKAS Calibration Charge** | | **N** C3 | 58.75 | |

## Insulation and Continuity Tester

Megger

### MIT300 Series



The Megger MIT300 series is an isulation and continuity tester that has applications in all aspects of domestic, commercial and industrial areas. The series includes four models, all of which offer automatic discharge of the circuit after testing, audible and visual warning if the test probes are applied to a live circuit, and a test inhibit feature which operates automatically under live circuit conditions.

- Easy to use
- Tough rubber armoured case
- Self contained protective cover
- Live circuit warning
- Auto power off
- Weatherproof to IP54
- Digital display for MIT300, MIT310 and MIT320
- Analogue needle display for MIT310A
- MIT330 offers PC interface for storage and downloading
- Hand-free use via neck strap
- Intelligent safety system
- EN61010-1 CAT IV 300V, CATIII 600V
- Supplied with carry case

| Features | 300 | 310 | 320 | 310 A |
|---|---|---|---|---|
| **Insulation testing** | | | | |
| 250V | ● | ● | ● | ● |
| 500V | ● | ● | ● | ● |
| 1000V | | ● | ● | ● |
| Test range | | | 999MΩ | |
| Insulation limit alarm | | | ● | |
| **Continuity testing** | | | | |
| Continuity to 100Ω | ● | ● | ● | ● |
| Continuity buzzer | ● | ● | ● | ● |
| Lead null to 9Ω | ● | ● | ● | <2Ω |
| Adjustable buzzer 1-100Ω | | | ● | |
| Audible buzzer disable | | | ● | |
| **Voltage measurement** | | | | |
| Volts AC/DC | | 600V | 600V | 600V |
| **Resistance measurement** | | | | |
| 10Ω to 1MΩ | | | ● | |
| 10Ω to 2kΩ | | | | ● |
| **Features** | | | | |
| Voltage warning | ● | | | |
| Default voltmeter | | ● | ● | ● |
| Digital display | ● | ● | ● | |
| Analogue display | | | | ● |
| PC interface (MIT330 only) | | | ● | |
| Backlit display | | | ● | |
| Locking test button | ● | ● | ● | ● |
| 30min power off | ● | ● | ● | |
| Switched test probe | | | ● | |
| IP54 weatherproof | ● | ● | ● | ● |

**Insulation Ranges**

| | |
|---|---|
| Nominal test voltage | 250V, 500V, 1000V |

**Measuring Ranges**

| | |
|---|---|
| All instruments | 10kΩ - 999MΩ |
| Accuracy | ±(3%+2) |

**Continuity**

| | |
|---|---|
| Ranges | 0.01-99.9Ω<br>(0-50Ω on analogue scale) |
| Accuracy | ±(3%+2) |
| Zero offset | 0-9Ω (and 0-2Ω for 310A) |

**Continuity Buzzer**

| | |
|---|---|
| MIT300, 310 | Operates at <5Ω |
| MIT320/330 | Adjustable 1Ω to 50Ω |
| MIT310A | Operates at <2Ω |

**Resistance (MIT320 only)**

| | |
|---|---|
| Ranges | 10Ω - 1MΩ |
| Accuracy | ±(5%+2) up to 100kΩ |
| Voltage | |
| Ranges | 0 - 600V a.c. (50/60Hz) or d.c. |
| Best accuracy | ±(1%+2) |

**Power Supply**

| | |
|---|---|
| Batteries | 8x 1.5V AA Batteries |
| Rechargeables | 8x 1.2V NiCd orNiMH cells |
| Battery life | 5000 consecutive tests |
| **Dimensions** | 190x140x75mm |
| **Weight** | 980g |

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| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ | 10+ |
|---|---|---|---|---|---|
| MIT300-EN | **754-3816** | 279.00 | 273.42 | 267.95 | 262.59 |
| MIT310-EN | **754-3824** | 365.00 | 357.70 | 350.55 | 343.54 |
| MIT310A-EN | **754-3832** | 315.00 | 308.70 | 302.53 | 296.48 |
| MIT320-EN | **754-3840** | 395.00 | 387.10 | 379.36 | 371.77 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C3 | 28.38 |
| **UKAS Calibration Charge** | N C3 | 58.75 |

## Insulation Testers

**CA6521, CA6523 & CA6525**

CHAUVIN ARNOUX



The innovative range of megaohmmeter models CA6521, CA6523 and CA6525 make measurement both straightforward and convenient. A large backlit display coupled with a logarithmic bargraph provide clear data readouts.

- Up to 2GΩ at 250, 500 and 1000V AC
- Automatic voltage: 0 to 600V AC/DC
- Resistance: 0 to 400Ω (CA 6523/25)
- Continuity + buzzer: 0 to 20Ω (I = 200mA) Possibility of current reversal
- Backlighting, programming of alarms and remote control probe option (CA6523 and CA 6525) plus timer function (CA6525)
- Long life battery charge life: Six 1.5V batteries
- Measurement in accordance with IEC 61557, NF C 15-100 and VDE0413
- Electrical safety: IEC1010, 600V CAT III-2
- Dimensions: 211x108x60mm
- Weight: 830g

| | **324-6127 CA6521** | **324-6139 CA6523** | **324-6140 CA6525** |
|---|---|---|---|
| **Insulation** | 250V 500V | 500V 1000V | 250V 500V 1000V |
| Range | 50kΩ to 2000MΩ | 100kΩ to 2000MΩ | 50kΩ to 2000MΩ |
| Resolution | 0.01 / 0.1 / 1MΩ | 0.01 / 0.1 / 1MΩ | 0.01 / 0.1 / 1MΩ |
| Accuracy | ±3% R ± 5cts max | ±3% R ± 5cts max | ±3% R ± 5cts max |
| **Continuity** | | | |
| Beep Sound | yes, rapid | yes, rapid | yes, rapid |
| Range | 0 to 20Ω | 0 to 20Ω | 0 to 20Ω |
| Resolution | 0.01Ω | 0.01Ω | 0.01Ω |
| Accuracy | ±3% R ± 1ct | ±3% R ± 1ct | ±3% R ± 1ct |
| Lead Comparison | – | ● | ● |
| **Resistance** | | | |
| Range | – | 0 TO 400Ω | 0 TO 400Ω |
| Resolution | – | 0.1 / 1 / 10 / 100Ω | 0.1 / 1 / 10 / 100Ω |
| Accuracy | – | ±3% R ± 2cts max | ±3% R ± 2cts max |

338582

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| CA 6521 | **324-6127** | 253.12 | 252.29 |
| CA 6523 | **324-6139** | 310.85 | 302.88 |
| CA 6525 | **324-6140** | 331.62 | 324.99 |

## Insulation/Continuity tester

**KMP 3050DL**

ROBIN



A high performance insulation/continuity tester offering three levels of insulation test voltage and user friendly features including an easy to read bar graph display, giving clear indication that the insulation under test is being stressed to the requirements of the regulations, continuous operation feature, and test lead Auto-Null facility.

- 250V DC insulation test voltage
- 500V DC insulation test voltage
- 1000V DC insulation test voltage
- Trac-Lok for extended battery life
- Lock-down test button for continuous operating
- Test lead resistance zero adjustment
- Live circuit warning
- Protects against accidental connection to live circuit
- Illuminated scale
- Automatic capacitive circuit discharge facility
- Bar graph
- Insulation / continuity test currents to **BS7671**

232318

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| KMP3050DL | **370-5791** | 399.00 | 387.03 | 375.42 |

**Premium service without a premium price**

With thousands of prices already reduced, go online to see our most up-to-date pricing: **www.farnell.co.uk**

## Multifunction Installation Tester

**POWERTEST 1557**

SEAWARD ELECTRONIC LTD



New

Comprehensive 16th edition and Part-P testing features allow for a multitude of tests including: Earth Continuity, Insulation (100v, 250v, 500v), Non-trip Loop Impedance, Line Impedance, RCD Trip current, and Voltage/Frequency measurement. The cordless probe makes testing a breeze as it allows you a free hand to hold your tester - therefore you can view your results, as you're testing.

**Supplied with:**

- 6x 1.5V AA alkaline batteries,
- Test lead, 1.5M 13A UK plug to Red, Black, Green 4mm shrouded safety plugs
- Alligator Clips: Red, black, green
- Test lead, set 1.5M Red, Black, Green 4mm shrouded safety plugs to Red, Black, Green 4mm shrouded safety test probes
- Red, cordless, 4mm shrouded safety test probe

W=100 H=260 D=55mm. Weight 950g

**Earth Continuity**

| **Test Current** | **Display Range** | **Resolution** |
|---|---|---|
| >200mA | 0 to 199Ω | 0.01Ω |
| Test Lead Compensation | Null lead resistance, 0 to 10Ω | |
| Live Circuit Detection | Test inhibit if >30V detected | |

**Insulation Resistance**

| **Test Voltage** | **Display Range** | **Resolution** |
|---|---|---|
| 100V, 250V, 500V | 0.5MΩ to 199MΩ | 0.01MΩ |
| Live Circuit Detection | Test inhibit if >30V detected | |

**Loop Impedance**

| **Supply Voltage** | **Display Range** | **Resolution** |
|---|---|---|
| 195 - 253V, 45 - 65Hz | 0.1Ω to 2MΩ | 0.01Ω |
| Test Current | 15mA (non-tripping for RCD protected circuits) | |
| Loop Impedance | Phase to Earth | |
| Line Impedance | Phase to Neutral / Phase to Phase | |
| PFC / PSC Range | 0 to 26kA | |

**RCD Trip Time**

| | |
|---|---|
| Supply Voltage | 195 - 253V, 45 - 65Hz |
| Test Currents | 10, 30, 100, 300, 500mA |
| Trip Time Ranges | 0 - 2s at ½IΔn; 0 - 300ms at IΔn general; 0 - 500ms at IΔn selective; 0 - 40ms at 5x IΔn |
| Auto Test | Auto sequence for ½IΔn, IΔn and 5x IΔn at 0° and 180° |
| RCD Type | General (G), Selective (S), Pulsed (A) and AC (AC) |

**RCD Trip Current (Ramp Test)**

| **Supply Voltage** | **Test Currents** | **Ramp Current Range** |
|---|---|---|
| 195 - 253V, 45 - 65Hz | 10, 30, 100, 300, 500mA | ½IΔn to 1.1 IΔn |

**Voltage & Frequency Measurement**

| **Voltage Range** | **Voltage Resolution** | **Frequency Range** |
|---|---|---|
| 0 - 440V | 1V | 45 to 65Hz |

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| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| POWERTEST 1557 | **150-2557** | 603.93 | 558.25 | 506.49 |

## Multifunction Installation Tester - Part P

**1651**

FLUKE

CALIBRATION SERVICES

DURACELL Ultra M3 AA 4 Pk - BT0225795



W=250 H=100 D=125mm. Weight = 1.17kg

The ideal tool for testing domestic electrical installations. The unit can ensure that fixed wiring is safe and correctly installed to meet the requirements of IEC 60364 and BS 7671 16th Edition wiring regulations. It is also ideal for Part P of the building regulations.

- Ergonomic design and low weight
- Padded neck strap for hands free use
- Easy to operate controls
- Large display with wide viewing angle

LATEST PRICING

| | **Range** | **Resolution** | **Accuracy (50-60Hz)** |
|---|---|---|---|
| **AC Voltage Measurement** | 500 V | 0.1 V | 0.8% + 3 digits |
| **Continuity Testing** | 20Ω, 200Ω, 2000Ω | 0.01Ω, 0.1Ω, 1Ω | ±(1.5% + 3 digits) |
| **Insulation Resistance Measurement (Test Voltage 500 - 1000V)** | | | |
| | 100 kΩ - 200 MΩ | 0.1 MΩ | ±(1.5% + 3 digits) |
| | 200 MΩ - 500 MΩ | 1 MΩ | 10% |
| **Loop Impedance Measurement (Phase to Earth, Phase to Neutral)** | | | |
| | 100 - 500 VAC (50/60 Hz) | | ±(3% + 10 digits) |

# Electrical Installation Testers - continued

## Multifunction Installation Tester - Part P - continued

### 1651 - continued

| | |
|---|---|
| **RCD Testing** | AC, General (no delay), Time delay |
| **Tripping Time Test** | |
| Trip Time Multiplier & Accuracy | x 1/2 ±(1% Reading + 1 digit) |
| Current Settings & Accuracy | 10, 30, 100, 300, 500, 1000mA +0% -10% |
| **General, Safety and Environmental Specifications** | |
| Operating Temperature | -10°C to 40°C |
| Safety Rating | EN 61010-I CAT III 500 V |
| Dimensions (WxHxD) | 250 x 125 x 100mm |
| Weight | 1.17kg |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

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| Mftrs. List No. | Description | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| 1651 | Installation Tester | **921-0075** | 593.00 | 563.35 | 548.53 |
| **Standard Calibration Charge** | S C18 | | | 89.27 | |
| **UKAS Calibration Charge** | N C18 | | | 123.00 | |

## Installation Testers

FLUKE

### 1650B Series



1651B



1652B

New



1653B

- **Easy:** simply turn knob, press the button and see results
- **Efficient:** measure loop impedancewithout tripping RCDs, eliminating the need to by-pass them
- **Rugged:** withstands a one-meter drop for demanding field use
- **Safe:** slim probe with test button keeps your eyes on the panel while probing hard to reach points
- **Comfortable:** compact and lightweight (less than 1.2kg) for all day testing
- **Compliant:** meets all relevant standards including EN 61557 and BS 7671 16th Edition IEE wiring regulations
- **Current:** High current loop impedance test
- **Extra:** Includes Zero Adapter for easy test lead compensation.

| | 1652B | 1653B |
|---|---|---|
| **Measurement functions** | | |
| Voltage and Frequency | ● | ● |
| Wiring polarity | ● | ● |
| Insulation Resistance | 250, 500, 1000V | 50, 100, 250, 500, 1000V |
| Continuity | ● | ● |
| Loop & Line Resistance | ● | ● |
| PFC/PSC (short-circuit current) | ● | ● |
| RCD tripping time | ● | ● |
| RCD tripping current level | ● | ● |
| | ramp test | ramp test |
| Automatic RCD test sequence | ● | ● |
| Test DC-sensitive RCDs | ● | ● |
| Earth Resistance | | ● |
| Phase Sequence Indicator | | ● |
| **Other features** | | |
| Self-test | ● | ● |
| EN61557*/VDE0413 compliant | ● | ● |
| Illuminated display | ● | ● |
| Line voltage indicator | ● | ● |
| Battery indicator and battery test | ● | ● |
| **Memory, Interface** | | |
| Memory (500 measurements) | | |
| Computer interface | | ● |
| Time stamp (with FlukeView Forms) | | ● |
| Software | | Option |

525835

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| Installation Tester | FLUKE 1651B | **167-1237** | 629.00 | – – | – – |
| Installation Tester | FLUKE 1652B | **167-1238** | 879.00 | – – | – – |
| Installation Tester | FLUKE 1653B | **167-1239** | 1,095.00 | – – | – – |
| **Accessories** | | | | | |
| Earth Spike Kit | ES165X | **483-2759** | 85.00 | – – | – – |
| Test Probe - Remote | TP165X | **483-2760** | 42.00 | – – | – – |
| Test Lead Set | TL165X STD | **491-7133** | 90.72 | 88.00 | 85.36 |
| Test Lead Set - Fused | TL165X FUSED | **491-7145** | 62.00 | 60.14 | 58.34 |
| PC Software | FVF-SC2. | **359-6473** | 144.00 | 139.68 | 135.49 |

Over 480,000 products online GO

## Multifunction Installation Tester

Megger



W=85 H=150 D=235mm.
Weight: 1.44kg

The MFT1500/2 combines all the essential features necessary for testing domestic, commercial and industrial fixed wiring in accordance with International Standards and National Wiring Regulations including BS7671 (16th Edition wiring regulations) and European Standard EN61557.
The MFT1500/2 series features the patented Megger digital/analogue arc display. The analogue arc provides an indication of fluctuationg readings, while the digital readout provides the ability to record accurate results.

- Guaranteed non-tripping loop test range
- Simple and intuitive to use
- Ergonomic design
- Voltage, Continuity, Insulation, Loop and RCD testing
- Selectable touch voltage
- Touch (fault) voltage and display
- Calibrated earth loop test lead

| | |
|---|---|
| **Supply Voltage Range** | |
| Voltage AC | 0 - 500V 50/60Hz ±2% ±2 digits |
| Voltage DC | 0 - 500V ±2% ±2 digits |
| Polarity indicated above 1kV | |
| **Insulation Test Ranges** | |
| Short circuit current | <2mA |
| | 250V 0.01MΩ - 99.9MΩ |
| | 500V 0.01MΩ - 299MΩ |
| | 1000V 0.01MΩ - 499MΩ |
| | ±2% ±2 digits up to 99MΩ |
| | 250V, 500V and 1kV into 1mA (BS7671, HD384 and IEC364) |
| Output Voltage | +20% - 0% rated load or less |
| **RCD Test Ranges** | |
| Supply | 100V - 270V 45Hz to 65Hz |
| Ranges | 1000mA, 500mA, 300mA, 100mA, 30mA, 10mA |
| Type | ½I - ½ times the selected RCD rated current |
| I | One times selected RCD rated curmet |
| 5I | Five times I RCD rated current |
| RAMP | A ramp test that displays actual trip current |
| DC Sensitive | A DC test current at I current |
| Current Accuracy | No Trip (½I) +0%, -10%. Trip (I) ±1% |
| Trip Time Accuracy | ±1% ±1ms |

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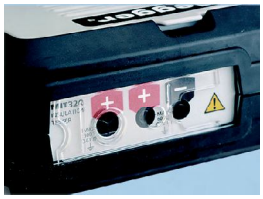
| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| **UK Versions** | | | | |
| MFT1502/2 | **102-3633** | 919.00 | 900.62 | 882.61 |

## Residual Current Device Tester

Megger

### RCDT300 Series





Designed for testing standard, DC and selective residual current devices (RCDs). The series includes three models both of which are easy to hold and use, and have a robust rubber case with a built-in lid to protect the display.

**All models include:**
- Tests standard, DC and selective RCDs
- Ramp testing
- Auto (remote) testing
- Enables testingon 110V centre tapped supplies
- Tough rubber armoured case with built-in cover
- ΔI, I, 5I RCD trip time test
- Selective breakers
- DC breakers (½I, I, 5I)
- 30, 100, 300, 500 mA RCDs
- 0°/180° polarity selection
- Touch voltage display (selectable)
- Max touch voltage (25V/50V)
- 3 phase safe
- Large clear display
- Battery status indication
- Auto power off
- Fuse blown indication
- Weatherproof to IP54
- Supplied with carry case

**RCDT320 Extra features**
- 10mA/1A RCDs
- RCD trip current test (RAMP)
- Auto sequence test
- Operating range: 100-280V and 50-290V
- Backlight

| | | | |
|---|---|---|---|
| **RCD test current accuracy** | | | 200 to 450Hz ±1Hz |
| No trip test | (ΔI)-8% to -2% | **Fault (touch) voltage** | |
| Trip test | (I, 5I) +2% to 8% | Displayed range | 0 - 90V |
| Trip time | ±1%±1ms | Error | +5%/+15%±0.5V |
| **Voltage measurement** | | **Power Supply** | |
| Range ac | 0 - 300V 25 to 450Hz | Batteries | 8x 1.5V AA Batteries |
| Accuracy | ±2%±2 digits | Rechargeables | 8x 1.2V NiCd orNiMH cells |
| **Frequency measurement** | | Battery life | 1000 consecutive tests |
| Range | 25 to 450Hz | **Dimensions** | 190x140x75mm |
| Accuracy | 25.0 to 199.9Hz ±0.1Hz | **Weight** | 980g |

339410.344500

| Mftrs. List No. | Order Code | 1+ | 3+ | Price Each 5+ | 10+ |
|---|---|---|---|---|---|
| RCDT310 500mA | **754-3891** | 315.00 | 308.70 | 302.53 | 296.48 |
| RCDT320 1000mA | **754-3905** | 355.00 | 347.90 | 340.94 | 334.12 |

## Earth Loop Tester

**PDL200**





H=140, W=80, D=31mm Weight = 250g

- 4 in 1 digital tester - loop, mains voltage, correct wiring and correct polarity
- No-trip loop test technology
- Supplied with carry case
- 5 LEDs for loop test
- 3 LEDs for Phase voltage

**Wiring test**

| | |
|---|---|
| Detects | Missing E or N, L-E or L-N swap |
| Phase voltage display | 3 LEDs: Low, Standard, High |

**Loop test**

| | |
|---|---|
| Display | 5 LEDs: <1Ω, <2Ω, <20Ω, <200Ω, >200Ω |
| Accuracy | ±10% |

**General**

| | |
|---|---|
| Operating temperature | 0°C to 40°C |
| Storage temperature | -10°C to 60°C |
| Humidity | 80% @ 31°C to 50% @ 40°C |

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| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | 10+ |
|---|---|---|---|---|---|
| PDL200 | **853-0653** | 76.25 | 68.70 | 65.63 | 62.84 |

## 16th Edition Multifunction Loop Tester

**DL420**

New





- 4 in 1 digital tester - loop (including PFC), mains voltage, correct wiring, correct polarity
- No-trip loop test technology
- Fully protected against accidental phase to phase connection
- Uses true impedance technique for accurate measurement of Loop and Prospective Fault Current (PFC) at origin
- Accurate mains voltage measurement to latest BS 7697
- Built in proven SOK 32 correct wiring indication
- Unique Socket & See Polarity test gives ultimate overall system safety check
- **Includes:** Tester, 13A Plug to IEC Female test lead, carry case
- **IN05204:** DL420 Plus Kit also includes the ITLS400 Test Lead Kit (IN05206)

**Wiring test**

| | |
|---|---|
| Detects | Missing E or N, L-E or L-N swap |
| Phase voltage display | LCD 1.0% ± 1V |

**Loop test**

| | |
|---|---|
| No Trip Mode - 3 Wire Testing | |
| Range | 0.00 to 500Ω |
| Accuracy | ±(3% + 3d) |
| High Current Mode - 2 Wire Testing | |
| Range | 0.00 to 500Ω |
| Accuracy | ±(3% + 3d) |

**PFC Measurement**

10A - 19.9kA (accurate true impedance measurement)

**Over Voltage Protection**

440V ac - complete recovery with no damage

**General**

| | |
|---|---|
| Dimensions (WxHxD) | 89 x 157 x 39mm |
| | 400g |

480728.472480

| Model | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 3340 | **143-0696** | 196.65 | 186.30 | 162.60 |
| 3340 | **143-0697** | 205.97 | 191.48 | 186.99 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |

## Loop Impedance Testers

**LT300**



New

Stringent safety design ensures the instrument can be used on single phase supplies in CATIV environments without the current safety concerns of using a CATIII tester. The instrument can also be used across phases in CATIII applications. The LT300 is a HIGH CURRENT ONLY tester providing a fast and accurate test result on installations where there are no RCDs installed. The LT300 offers loop testing over a wide range of frequencies and supply voltages with very simple 2 wire operation. Supply voltages from 50V to 550V are supported, with nominal frequencies of 16Hz, 50/60Hz and 400Hz, providing a loop test solution for a huge range of applications. Automatic testing starts the moment the loop test is connected, allowing hands free to hold the test probes. Repeat test is provided by the TEST button as normal.

Additional features of the LT300 are:

- Voltage display
- Frequency indication
- Tough rubber armoured housing which is weatherproof to IP54
- Meets all the requirements of IEC61010 and IEC61557.

**LT300 supplied with:** red/green two wire test lead set, batteries, hard carry case.
**LT300-BS supplied with:** mains plug test lead, batteries, hard carry case.

**Voltage**

| | |
|---|---|
| Range | 0V - 550V |
| Accuracy | ±(5%+2V) |

**Loop Test**

| | |
|---|---|
| Operating Frequencies | 16Hz, 50/60Hz, 400Hz |
| Accuracy | 20Ω Range: ±(5% + 0.03Ω) 200Ω Range: ±(5% + 0.05Ω) |

**Test Currents**

| Voltage | Current (20Ω Range) | Current (200Ω Range) |
|---|---|---|
| 550V | 27A | 2.7A |
| 230V | 12A | 1.2A |
| 115V | 6A | 0.6A |
| 50V | 3A | 0.3A |

**General Specs**

| | |
|---|---|
| Batteries | 8x 1.5V AA or NiMH rechargeable batteries |
| Dimensions (WxHxD) | 203x148x78mm |
| **Weight** | 980g |

493466.502121

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| LT300 | **151-1503** | 319.00 | 312.62 | 306.37 |
| LT300 BS | **151-1504** | 319.00 | 312.62 | 306.37 |

## Combined Loop and RCD Testers

**LRCD200 Series**



W=148 H=203 D=78mm. Weight 980g

The latest generation of combined non-tripping loop tester and RCD test instruments that provide simple, affordable and flexible test tools forelectrical contractors testing energised circuits. The instruments are designed using the new Megger electrician's tester case, providing tough rubber armouring, built-in front cover, weatherproof to IP54 and easy-to-use functions and layout. The instruments can be hung around the neck or hand held and will not slip if placed on a bench or shelf. Test leads can remain attached with the front cover open or closed. L-N-E connection indicator LEDs show connection status and reverse polarity supplies.

**LRCD 210**

The instrument provides three phase safe nontrip loop testing and ½I, I, and 5I RCD testing for

## Electrical Installation Testers - continued

### Combined Loop and RCD Testers - continued

**LRCD200 Series - continued**

standard, selective and DC RCDs. Suitable for domestic installers testing to UK Part P requirements. Also includes 110 V loop testing and 2 wire fast testing, plus phase to phase and phase to earth measurement and automatic RCD testing with result recall.

- Non-tripping Loop test. RCDs rated 30 mA or greater are not tripped by the loop test, even electronic RCDs
- 3 wire low current non-tripping loop test provides measurements from 0.01 ohms to 2 kohms
- RCD testing from 10 mA to 1000 mA
- Auto RCD testing (LRCD220 only)
- Extremely easy and safe to use
- Built-in protective front cover
- Tough Rubber armoured case
- Weatherproof to IP54
- 3 year warranty

| | LRCD220 |
|---|---|
| **Loop Testing** | |
| Non-trip loop test | ● |
| PFC calculation and display | ● |
| Single phase | |
| High current loop test | ● |
| Phase to phase | ● |
| 3-phase safe | ● |
| Voltmeter | ● |
| **RCD Testing** | |
| ½I, I and 5I RCD testing | ● |
| Touch / Contact voltage | ● |
| Selectable 25V / 50V touch voltage | ● |
| 10, 30, 100, 300 and 500mA ranges | ● |
| 1000mA RCD testing capability | ● |
| AC, AC selective, DC and DC selective RCD types | ● |
| Selectable phase 0 / 180 | ● |
| RCD ramp test (20% to 110%) | ● |
| **General Testing** | |
| Frequency | ● |
| Phase rotation | ● |
| Backlight | ● |
| Supports 230V operation | ● |
| Supports 110V operation | ● |

| | Range | Accuracy |
|---|---|---|
| **Supply Voltage Measurements** | | |
| Voltage | 0 to 500 V | ±2% ±2 digits |
| Frequency | 25 to 450Hz | ±1 Hz |
| **Loop Testing** | **Range** | **Accuracy** |
| **Line / Earth** | 0.01Ω to 9.99Ω | ±5% ±0.03Ω |
| No Trip Loop Test, 3-wire, 15mA | 10Ω to 99.9Ω | ±5% ±0.5Ω |
| | 100Ω to 999Ω | ±5% ±5Ω |
| | 1kΩ to 2kΩ | ±5% ±30Ω |
| **Line / Earth** (LRCD220 only) | 0.01Ω to 9.99Ω | ±5% ±0.03Ω |
| High current loop test, 2-wire, 15mA to 1.4A | 10Ω to 99.9Ω | ±5% ±0.5Ω |
| | 100Ω to 999Ω | ±5% ±5Ω |
| | 1kΩ to 2kΩ | ±5% ±30Ω |
| **Line / Line** (LRCD220 only) | 0.01Ω to 19.99Ω | ±5% ±0.03Ω |
| 100 to 480V, 45 to 65Hz | | |

| | |
|---|---|
| **RCD Test Ranges** | **LRCD220** |
| Ranges | 10, 30, 100, 300, 500, 1000mA |
| Supply voltages | 100 to 280V, 45 to 65Hz |
| **RCD Test Accuracy** | **Trip Test (I, 5I)** |
| Current Accuracy | +2% / +8% |
| Trip Time | ±1% ±1ms |

| | Range | Accuracy |
|---|---|---|
| **Fault (Touch) voltage** | 0 to 50 V | +5% / +15% ±0.5V |

**Power Supply**
8 x AA alkaline batteries giving 2000 consecutive tests.

419186.428555

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Loop/RCD Tester | LRCD220 | **979-9982** | 525.00 | 514.50 | 504.21 |
| 2 Wire Test Lead Set | 6220-784 | **108-6234** | 20.90 | 20.17 | 19.86 |
| Earth Bond Test Lead | 6231-586 | **108-6235** | 40.00 | 39.20 | 38.42 |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | S C12 | | 60.93 | |
| **UKAS Calibration Charge** | | N C12 | | 89.27 | |

### Installation Tester

**Checkbox 16**



This versatile, compact instrument is designed to provide a convenient check point for installation of test instruments; earth loop testers, insulation continuity testers and RCCB testers. The Checkbox 16 provides a simple and convenient method of confirming the functionality and accuracy of installation tester reading as required for NICEIC assessments.

- Compliance with NICEIC recommendations
- Tests most manufacturers' 16th edition instruments
- Continuity check
- Insulation check
- Test voltage
- Loop test
- RCCB test
- Voltage measurement

H = 180, W = 44, D = 96

| | |
|---|---|
| Tests performed: | Continuity check against precision 1Ω and 10Ω<br>Insulation check against precision 1MΩ<br>Earth loop impedance/resistance check against 5Ω<br>RCD 60mS trip time and 30mA test current check<br>Voltage measurment check 45-85v a.c. specific value for each unit |
| Power | 230V, 50Hz |
| Weight | 440g |

231150.402960

| Checkbox 16 | Order Code **356-4850** | Price Each 206.77 |
|---|---|---|

### Instrument Check Box

**CB 100**



The type of check box recommended by the NICEIC, it provides a quick and simple method of checking the ongoing accuracy of electrical installation test instruments. Whilst it does not replace the calibration requirements, it provides a ready check, on instrument accuracy helping to minimise costly revisits to confirm installation compliance and greatly extend periods between costly formal calibrations. The CB 100 offers the user checks for:

- Continuity Testing
- Insulation Resistance
- Earth Fault Loop Impedance
- Fast check option for Site Checks
- Local earth fault impedance
- Earth fault impedance plus 1Ω

Supplied with a mains power lead, 4mm test leads and manual .

480730.472566

| Model | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 3340 | **143-0703** | 87.98 | 83.84 | 81.28 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## Earth/Ground Testers

### Ground Loop Tester

**Fluke 1630**



W=100 H=257 D=47mm. Weight 640g

Earth Ground loop resistance measurements for commercial, industrial, and utility applications. The clamp-on ground testing technique used by the Fluke 1630 simplifies ground loop testing and enables non-intrusive leakage current measurement. The Fluke 1630 uses the Stakeless testing method, which eliminates the need to disconnect parallel ground rods and find suitable locations for placing auxiliary ground stakes. This saves time and enables users to perform earth ground loop tests in locations where it is not possible to use other techniques, including inside buildings or on power pylons.

- A wide ground loop resistance range, from 0.025Ω to1500Ω, to satisfy all requirements
- Large 35mm jaw opening for tests on ground conductors and/or equipotential bus bars
- Measurement of ground leakage current, from 0.2mA to 1000mA, without needing to disconnect - ideal for system troubleshooting
- Wide ac current measurement range from 0.2A to 30A allows one instrument for multiple applications
- User-defined HI / LO Alarm limits, for rapid measurement evaluation
- Display Hold button for capturing readings in hard-to-reach places
- Memory function automatically records and stores measured values
- Automatic self calibration ensures correct measurement every time
- Overload protection: 200A
- Carrying case and resistance test loop included
- 8 hours battery life (continuous operation)

| | |
|---|---|
| **Ground Loop Resistance** | |
| Measuring range | 0.025Ω to 1500Ω Auto Ranging |
| Resolution | 0.002Ω to 20Ω (range dependant) |
| Accuracy | ±1.5% to ±20% (range dependant) |
| Continuity | Audible beep if resistance <40Ω |
| **Ground/Leakage Current AC** | |
| Parameters | 50/60Hz; TrueRMS, Crest factor <3.0 |
| Measuring range | 0.2mA to 30A, Auto Ranging |
| Resolution | 0.001mA to 100mA (range dependant) |
| Accuracy | ±2% to ±2.5% (range dependant) |
| **AC Current Measurement** | |
| Parameters | 50/60Hz; TrueRMS, Crest factor <3.0 |
| Measuring range | 0.2 to 30A |
| Resolution | 0.01A |
| Accuracy | ±2% ±0.03 A |
| **General** | |
| Max. Conductor Size | 23 mm |
| Display | 9999 digit LCD-display with special symbols |
| Range selection | Auto |

**General**

| | |
|---|---|
| Recording | From 1s to 255s. |
| HI/LO Limits | From 0Ω to 1510Ω |
| Sampling Time | 0.5 sec |
| Safety Category | EN61010-1 300V CATIII |
| Protection | IP30 |
| Overload indication | OL |
| Power supply | 9V alkaline battery (LR61) |
| Power consumption | 40mA |
| Dimensions | W=100 H=257 D=47mm. Weight 640g |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

477864

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 1630 | **132-7561** | 834.00 | 808.98 | 784.71 |

## Earth Resistance Meter

New



For measuring the resistance of earthing in electrical equipment and the measurement of ground resistivity.

- Large dual LCD display with backlight
- Test hold function for easy operation
- Zero automatic adjustment
- Sampling rate: 2.5 samples per second
- Low battery indication
- Over range indication
- Audible continuity test
- Safety Category: CATIII 1000V

| Function | Max. Range | Basic Accuracy | Best Resolution |
|---|---|---|---|
| Earth Resistance | 10Ω | ±(2.0%+0.1Ω) | 0.01Ω |
| | 100Ω | ±(2.0%+3d) | 0.1Ω |
| | 1000Ω | ±(2.0%+3d) | 1Ω |
| DC Voltage | 1000V | ±(0.8%+3d) | 1V |
| AC Voltage | 750V | ±(1.2%+10d) | 1V |
| Resistance | 200kΩ | ±(1.0%+2d) | 0.1kΩ |

**Physical Specifications**

| | |
|---|---|
| Power | 6x AA batteries |
| Dimensions (WxHxD) | 92 x 200 x 50mm |
| Weight | 700g |

**Includes:** 6x AA batteries, 4x iron stakes, 4x test lead sets, and shouldr bag carry case.

486294.465634

| | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| | **143-0704** | 63.29 | 54.90 | 47.56 |
| | | | Price Each | |
| **Standard Calibration Charge** | | S C4 | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | 58.75 | |

## Earth Ground Tester

**Fluke 1621**

FLUKE



W=113 H=216 D=54mm. Weight 850g

LATEST PRICING

An easy-to-use earth ground tester featuring basic ground testing methods including 3-pole Fall-of-Potential as well as 2-pole ground resistance tests. Its convenient size, rugged holster, and large, clear LCD display make it an ideal field earth ground tester, for most electrical grounding work environments. With a simple user interface and intuitive functionality, the Fluke 1621 is a handy grounding tool for electrical contractors, utility test engineers, and earth ground specialists.

- 3-pole Fall-of-Potential earth testing for basic measurements
- 2-pole resistance measurements for added versatility
- Easily capture values with single-button operation
- Ensure accurate measurements with automatic "noise" voltage detection
- Hazardous voltage warning offers increased user protection
- Clearly read and record data with a large, backlit display
- Rugged holster and design for tough work environments
- Portable size allows for easy transportation
- Instantly be alerted to measurements outside of your set limit, when you use the adjustable limit setting

**General Specifications**

| | |
|---|---|
| Measuring Rate | 2 measurements/sec |
| Voltages | 250 Veff (between H/C2 and E/C1)<br>250 Veff (between S/P2 and E/C1) |
| Test Voltage | 3.7kV |
| **Resistance Measurement** | |
| O/C Voltage | 23 to 24V ac |
| S/C Current | >50mA |
| Measuring Frequency | 128 Hz |
| Max. Overload | 250 Veff |
| Intrinsic Uncertainty | ±(6.0% + 5d) |
| Operating Uncertainty | ±(18.0% + 5d) |
| Measuring Time | 8 secs |
| **Interference Voltage** | |
| V max | 30 Veff |
| Common Mode Rejection | >80dB |
| Ri | 680kΩ |
| Measuring Uncertainty | <10% for pure AC and DC signals |

**Supplied with:** user manual, 2x 2m measuring leads with alligator clips, 9V battery, CDROM and protective yellow holster.

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

477882.502127

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 1621 | **142-2697** | 343.00 | 332.71 | 322.73 |

## GEO Earth Ground Testers

**1623 and 1625**

FLUKE





W=250 H=133 D=187mm. Weight 1.1kg



- Stakeless testing, makes your earth ground loop resistance testing quicker and easier. No need for a separate earth ground clamp
- 3- and 4-pole Fall of Potential, earth resistance loop testing
- 4-pole Soil Resistivity testing
- Selective earth ground rod testing using 1 clamp
- Stakeless earth ground rod testing using 2 clamps
- IP56 rated for outdoor use
- Rugged carrying case

In addition, the Fluke 1625 offers these advanced features:

- Automatic Frequency Control (AFC) - identifies existing interference and chooses a measurement frequency to minimize its effect, providing more accurate earth ground value
- R* measurement - calculates earth ground impedance at 55 Hz to more accurately reflect the earth ground resistance that a fault-to-earth ground would see
- Adjustable limits - for quicker testing

LATEST PRICING

**Measurements Performed:**

| Measuring Range | Intrinsic Error |
|---|---|
| **3 and 4-pole Ground Resistance Measurements** | |
| 0.001Ω to 19.99kΩ | ±(2% rdg + 3 digits) |
| **3 and 4-pole Selective Ground Resistance Measurements with Current Clamp** | |
| 0.001Ω to 19.99kΩ | ±(7% rdg + 3 digits) |
| **Stakeless Ground Loop Measurements** | |
| 0.001Ω to 199.9Ω | ±(7% rdg + 3 digits) |

| | 1623 | 1625 |
|---|---|---|
| Display | 1999 count backlit LCD | 2999 count backlit LCD |
| Working Temperature | -10°C to 50°C | -10°C to 50°C |
| Temperature Coefficient | ±0.1% / K | ±0.1% / K |
| Measurement Time | Approx. 6 secs. | |
| Protection | IP56 (IP40 for battery door) | |
| Power | 6x AA batteries (up to 6000 measurements) | |

**1623** **Basic GEO Earth Ground Tester**
Includes Tester, Test Leads, Batteries, Manual.

**1623 KIT** **Basic GEO Earth Ground Tester Kit**
1623 Tester plus Clamp Set (EI-1623), 4-Pole Stake Kit (ES-162P4) and a rugged carry case.

**EI-1623** **Selective/Stakeless Clamp Set for 1623**
Contains both the Inducing and Sensing Clamp along with all necessary adaptors.

**EI-1625** **Selective/Stakeless Clamp Set for 1625**
Contains both the Inducing and Sensing Clamp along with all necessary adaptors.

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

## Earth/Ground Testers - continued

### GEO Earth Ground Testers - continued

**1623 and 1625 - continued**

447038

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| 1623 | **127-2823** | 793.00 | 769.21 | 746.13 |
| 1623 KIT | **127-2824** | 1,324.00 | 1,284.28 | 1,245.75 |
| 1625 KIT | **127-2826** | 1,857.00 | 1,801.29 | 1,747.25 |
| **Accessories** | | | | |
| EI-1623 | **127-2827** | 388.00 | 376.36 | 365.07 |
| EI-1625 | **127-2828** | 373.60 | 362.39 | 351.52 |

## Flash / High Potential Testers

### 5kV Insulation Resistance Tester

**MIT510**

Megger



New

- Mains or battery powered
- Large, easy to read, digital/analogue backlit display
- Selectable test voltage from 250 to 5000 V
- Automatic IR test
- Measures to 15 ΩT
- Rugged polypropylene case with ingress protection to IP65

W=360 H=305 D=194mm. Weight 6.75kg

Designed specifically for the testing and maintenance of high voltage electrical equipment. Information displayed includes resistance, voltage, leakage current, capacitance, battery status and time constant. In addition, the elapsed time of the test is displayed constantly removing the need for separate timers. The instrument can test when being powered by the mains or its internal rechargeable battery, a great benefit when site conditions are unknown or long term testing is required. The instrument is fitted with a guard terminal to enhance accuracy. The guard test lead is included as standard with the instrument. To further enhance the flexibility of the instrument the MIT510 has the facility to set the test voltage in steps from 250 V to 5000 V avoiding the expense of several insulation resistance testers to meet your application needs. The instrument measures the voltage at the terminals and if this is above 50 V then the instrument will display the high voltage warning and inhibit testing. At the end of the test the instrument will automatically discharge the energy transferred to the equipment during the test phase.

**Electrical Specifications**

| | |
|---|---|
| Voltage Input Range | 85-265 $V_{rms}$, 50/60Hz, 60VA |
| Test Voltages | 250V, 500V, 1000V, 2500V, 5000V |
| Accuracy (23°C, 5kV) | ±5% @ 1TΩ, ±20% @ 10TΩ |
| Guard | 2% error guarding 500kΩ leakage with 100MΩ load |
| Short Circuit / Charge Current | 3mA @ 5kV |
| Capacitor Charge Time | <3s per µF at 3ma, 5kV |
| Capacitor Discharge Time | <120ms per µF to discharge from 5000V to 50V |
| Capacitance Measurement (>500V) | 10nF to 50µF (dependent on test voltage) |
| Capacitance Measurement Accuracy | ±5% ±5nF |
| Voltage Output Accuracy | +4%, -0% ±10V of nominal test voltage at 1GΩ load |
| Current Measurement Range | 0.01nA to 5mA |
| Current Measurement Accuracy | ±(5% + 0.2nA) at all voltages |
| Interference Rejection | 1$mA_{rms}$ per 250V test voltage up to a maximum of 2mA |
| General Specifications | |
| Battery Life | 6 hours continuous testing at 5kV |
| Protection | IP65 |
| Operating Temperature | -10°C to 50°C |

**Supplied with:** 3m lead set and user guide on CD

493712

| Description | Mftrs. List No. | Order Code | 1+ | Price Each + | + |
|---|---|---|---|---|---|
| Insulation Resistance Tester | MIT510 | **151-1515** | 1,769.00 | – – | – – |
| | | | | **Price Each** | |
| **Standard Calibration Charge** | | S C4 | | 34.10 | |
| **UKAS Calibration Charge** | | N C4 | | 58.75 | |

**FREE global legislation support**

RoHS, REACH, WEEE, EuP, Batteries Directive - we've got it covered at:
**www.global-legislation.com**

### High Voltage Insulation/Continuity Tester

**FLUKE 1550B**

FLUKE

CALIBRATION SERVICES

LATEST PRICING



A rugged high voltage insulation tester capable of testing general circuits including switchgear, transformers, motors, generators and cables.

The FLUKE 1550B is supplied as a complete kit and includes:

- Programmable test voltages from 250 to 5000V in 50V steps
- Measurement stored in 99 memory locations
- Rugged and reliable
- Test Cables and test clips (colour coded)
- DC Charger Lead
- Quicklink™ Software with optical interface
- AC Power Cord
- IR120 Infrared adaptor
- Comprehensive user manual
- Purpose-made soft carry case

Supplied with Dedicated Quicklink™ software which allows test results to be formatted for insertion in printed reports

| | | | |
|---|---|---|---|
| Insulation Voltage | 250V to 5000V | Warning voltage range | up to 1000V AC/DC |
| Measurement range | Up to 1T | Ramp function | 0-5000V |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

248553

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| 1550B | C3 **492-0284** | 2,074.00 | 2,011.78 | 1,951.43 |
| | | | **Price Each** | |
| **Standard Calibration Charge** | S C20 | | 108.78 | |
| **UKAS Calibration charge** | N C20 | | 128.40 | |

### HI POT/Flash Tester

**HAL**

SEAWARD ELECTRONIC LTD.



HAL provides a memory to record up to 6000 results and outputs to produce labels, reports and the proof that your products are safe. The large clear graphics display gives the flexibility for production lines or the sophistication for approval laboratories. The fully floating output gives your operators one of the safest instruments available.

H=300, W=200, D=370, Wt.=12kg

- Fully isolated HT outputs
- Multi-lingual capabilities
- Arc detection
- Windows based VGA GUI
- Regulated output
- Uses patented test codes (unique)
- Stores test data within internal database
- Remote PC control
- Connects directly to printer
- Connects directly to bar code peripheral scanners
- Connects to external, high visibility status beacons
- Allows graphical complex test sequences to be generated
- Rotary encoder for friendly or "natural" feel control of test voltages (unique)
- Field programmable
- Bar graph indication
- Supplied with 5x pairs of HT clip leads, guard plug, mains lead and instruction manual

**Specifications**

| | |
|---|---|
| **AC Flash Test** | |
| Voltage Range | 0.1 - 5.0kV(programmable) |
| Voltage Resolution | 10V/step(settable) |
| Voltage Accuracy | 1% of reading |
| Maximum Output current | 20mA @ 5kV 50/60 Hz Selectable |
| Display Current Range | 0.01 - 20.00mA |
| Current Accuracy | 1% of reading |
| **DC Flash Test** | |
| Voltage Range | 0.100 - 6.000kV (programmable) |
| Voltage Resolution | 10V/step(settable) |
| Voltage Accuracy | 1% of reading |
| Maximum Output current | 10mA @6kV |
| Display Current Range | 0.01 - 10.00mA |
| Current Accuracy | 1% of reading |
| Display Current Resolution | 0.01mA |
| Output Ripple | < 5% @ 6kV |
| **Insulation Resistance** | |
| DC Output Voltage | 250, 500 or 1000V selectable, or fully adjustable from 10-1000V |
| Resistance Ranges Measurement | 0.1MΩ - 100.0MΩ, 100MΩ-1GΩ |
| Accuracy | 0.1M - 700MΩ, 5% of reading 700M - 1GΩ, 10% of reading |
| Arc Current | 10 levels |

232925

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| H101 | **386-2835** | 1,979.25 | 1,923.43 | 1,894.58 |

## Power Consumption

### AC Power Analyser

**3333 Power HiTester**




W=160 H=100 D=227mm. Weight 1.9kg.

Designed for assessing the power consumption of single phase electrical products. Connect the product under test to the rear screw terminal block which ensures a secure safe connection, then just select from six selectable current ranges up to 20A. The lowest range 0 - 50mA is used for monitoring standby power levels, followed by 5 load current ranges up to 20A.The display is split into three sections and the user can select the most appropriate displays from a range of measurement variables that include; voltage, current, active power, apparent power and power factor. Possible multifunctional displays include:

- Voltage, Current & Active Power
- Current, Active Power & Apparent Power
- Active Power, Power Factor, Voltage or Current

The tester is also fitted with an RS232C interface for PC measurement and data management.

**Measurement Ranges**

| | Current | | | | | |
|---|---|---|---|---|---|---|
| Voltage | 50mA | 200mA | 500mA | 2A | 5A | 20A |
| 200V | 10W | 40W | 100W | 400W | 1kW | 4kW |

**Measurement Accuracy**

| Frequency | Voltage, Current & Active Power |
|---|---|
| 45Hz - 66Hz | ±(0.1%rdg + 0.1%f.s.) |
| 66Hz - 1kHz | ±(0.1%rdg + 0.2%f.s.) |
| 1kHz - 5kHz | ±3.0%f.s. |

491736.503440

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 3333 | **150-1062** | 870.23 | 814.88 | 763.63 |

## Power Quality Testers & Analysers

### Voltage Performance Monitor

**61-830**




- Real-time TRMS voltage, frequency and harmonics monitoring
- Logs only those voltage events that affect equipment performance - No need to review unimportant voltage events
- Simple setup - Select standard, choose nominal voltage, set time/date
- Easy, on-screen review of events - No PC, software or cable required
- Logs voltage, sags, swells and impulses
- Easily Measures %THD and logs periods over 3% (line to neutral)
- Selectable thresholds based on the most accepted international standards, defaults to ITIC
- Custom programmable event thresholds
- Invertible display, when it is necessary to plug in upside down
- Saves up to 512 events
- Safety: CAT III 300V
- **Supplied with:** 4 international plug adaptors, carry case and quick reference guide

| | |
|---|---|
| Operating Range | 15 to 265V |
| Memory | 512 events |
| Sampling Method | Continuous (128 samples per cycle) |
| Voltage Accuracy | 512 events |
| Impulse Detection | 6µ, 4kV |
| THD | FFT Calculation |

474066.474004

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 61-830 | **135-5499** | 279.13 | 259.19 | 243.60 |

### Voltage Event Recorder System





- Catches, sage, swells, transients,outages and frequency variations
- VR101S is a starter system consisting off the VR101 event recorder, optical interface cable and software
- Simply plugs into the socket outlook you wish to test
- Stores as many as 4000 events
- Flashing LED tells you when events have been captured
- Capture limit parameters set using software
- Software allows a complete history of events to be recorded with time stamped and duration
- Information transmitted through optical interface cable for additional safety
- Self powered 7 year lithium battery (non replaceable)

| | | |
|---|---|---|
| Operating Voltage | 140V to 270V | 65/65 |
| Sags, Swells, Outage | Hot to Neutral | 65 |
| | Neutral to ground | |
| Transient measurement | Hot to Neutral | 100 to 2500V Peak |
| | Neutral to Ground | 50 to 2500V peak |
| | Phase Angle | 20° to 180°, 200° to 360° |
| Frequency measurement | 50 to 65Hz | |
| Time measurement | Hot to Neutral | ±0.5 cycles |
| | Neutral to ground | ±1 cycles |
| Weight | 4oz | |
| Operating temperature | -40°C to 70°C | |
| Computer requirements | Windows™ 3.1 or Windows 95 | |
| | At least one free RS232 serial port, 2MB hard disk space | |
| | 4MB RAM (8MB for Windows 95) | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

222551

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| VR101S | **493-302** | 546.30 | 518.99 | 505.33 |

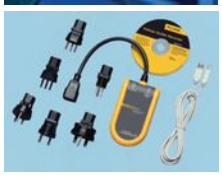
### Single-Phase Voltage Quality Recorder

**VR1710**

**Easy-to-use solution for detecting and recording voltage quality problems**









Applications:

- Voltage recording
- Distortion measurement
- Flicker measurement
- Voltage transients

The Fluke VR1710 is a single-phase, plug-in voltage quality recorder that provides fast and easy recording of voltage trends, dropouts, harmonics and general power quality including dips and surges to help maintenance and facilities management personnel easily pinpoint the root cause of voltage problems. Voltage quality parameters including RMS average, transients, flicker, and harmonics up to the 32nd are recorded using a user-selected average period from 3 seconds to 10 minutes.

- Clear graphical summary of data and quick overview of key power quality parameters
- Get the complete picture with Min, Max, Average RMS values (1/4 cycle) with time stamps
- See the detailed with actual transient display (> 100 µs) with time stamp

# Power Quality Testers & Analysers - continued

## Single-Phase Voltage Quality Recorder - continued

**VR1710 - continued**

- Comprehensive analysis of Individual harmonic and THD values with trends
- Remote access capability via an external modem

| | |
|---|---|
| Operating Voltage: | 70 V to 300 V |
| Resolution | 0.125V |
| Possibe number of recording events: | 175,000 |
| Time resolution | 5 ms |
| Over voltage measurement | Yes |
| Frequency Analysis | Yes |
| Harmonics measurement: | EN 61000-4-7 (up to 32nd harmonic) |
| Flicker measurement | EN 61000-4-15 |
| Recording time | 1 day to 339 days* |
| Transients | Yes (>100us) |
| Frequency range | 50Hz(±1Hz) & 60Hz(±1Hz) |

*Please refer to datasheet

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

501111

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|
| VR1710 | 155-1225 | 486.00 | 471.42 | 457.28 |
| **Standard Calibration Charge** | | S C8 | 45.13 | |
| **UKAS Calibration Charge** | | N C8 | 73.70 | |

## Compact Power Analyser

AMPROBE

**PQ55**



A handheld power analyser for three-phase power system measurements.

- Comprehensive real time monitoring, recording and analysis of three phase power systems
- Multiple function LCD display
- Backlight
- Auto-off
- True-rms voltage and current measurement
- Power Factor and phase angle results
- Power Analysis (apparent, active and reactive power)
- Additional current clamp for neutral line monitoring
- Frequency measurement 45 to 80Hz (for voltage > 80V)
- Internal memory for 99 single measurement storage
- Opto-isolated RS232 interface for further analysis and charting
- 50Hz operation facilities
- Safety CAT III 600V

| | |
|---|---|
| **Voltage** | |
| 3 Input channels with common point "N" | |
| Range | 0 to 600V rms |
| Resolution | 0.1V |
| Accuracy | 1% + 10 |
| **Current** | |
| Input I1, I2, I3 | 0 to 999.9A |
| Input I4 | 0 to 250A |
| Resolution | 0.1A |
| Reduction Ratio of Current Clamp | 0.35mV/A |
| Clamp Opening | 40mm |
| **Active Power** | |
| Display Range | 0 to 999.9kW |
| Resolution | 0.1kW |
| Accuracy | ±(3.5%+20) PF > 0.5 |
| **Apparent Power (S)** | |
| Display Range | 0 to 999.9 kVA |
| Resolution | 0.1 kVA |
| Accuracy | ±(3.5% +20) PF > 0.5 |
| **Phase Angle (f)** | |
| Range | 0 to 90° |
| Resolution | 0.1° |
| Accuracy | ± 4° |

**Energy Management** - Displays the total value of all active power values

| | Range | Resolution | Accuracy |
|---|---|---|---|
| Active Power (kWh) | 3.999 kWh to 119.3 MWh | 0.001 kWh | ±(3.5% v.MW +20D) |
| Apparent Power (kVAh) | 3.999 kVAh to 119.3 MVAh | 0.001 kVAh | ±(3.5% v.MW +20D) |
| Idle Power (kvarh) | 3.999 kvarh to 119.3 Mvarh | 0.001 kvarh | ±(3.5% v.MW +20D) |

488737.503512

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| PQ55A | 146-1584 | 933.00 | 905.01 | 877.86 |

## Power Quality Clamp Meter

FLUKE

LATEST PRICING

**Fluke 345**



W=98 H=300 D=32mm. Weight 820g

A combination power analyser, power quality logger, and clamp meter. Ideal for monitoring electronic loads.

With a bright colour display to analyse the harmonic spectrum, a low-pass filter to remove high frequency noise, and a high EMC immunity design, the Fluke 345 power analyzer is ideal for troubleshooting power quality on switching loads. Additionally, the Hall Effect clamp meter design makes measurement of dc current possible without the need to break the circuit with the power meter. The internal memory of the power analyzer enables long-term power quality logging for analysis of trends or intermittent problems.

- **AC/DC current:** Clamp-on measurement of ac current up to 1400 A rms and dc current up to 2000 A without breaking the circuit
- **Accurate in noisy environments:** Clamp meter performs even with distorted waveforms present on electronic loads with low-pass filter
- **Data logging:** Identify intermittent faults by logging any power quality parameter for minutes, or over a month, including harmonics
- **Verify batteries:** Direct measurement of dc ripple (%) for battery and dc systems
- **Troubleshoot harmonics:** Analyze and log harmonics digitally or graphically
- **Inrush current:** Capture and analyze nuisance tripping, from 3 seconds to 300 seconds
- **Easy to use:** Easily confirm power meter setup with large backlit color display of waveforms and trends
- **3-Phase power:** Built in capability for balanced loads
- **View graphs and generate reports:** Use power analyzer with included Power Log software
- IEC61010 600V CAT IV rated

| Range | Resolution | Best Accuracy |
|---|---|---|
| **Current Measurement** | | |
| 40A, 400A, 2000A, | 0.01A, 0.1A, 1A | ±(1.5% + 5d) |
| **Voltage Measurement** | | |
| 4V, 40V, 400V, 750V | 1mV, 0.01V, 0.1V, 1V | ±(1% + 5d) |
| **Power Measurement (Single or Three Phase)** | | |
| 0 - 1650kW dc (1200kW ac) | 1W, 10W, 100W, 1kW | ±(2.5% + 5d) |
| 0 - 1650kW dc (1200kW ac) | 1VA, 10VA, 100VA, 1kVA | ±(2.5% + 5d) |
| 0 - 1250kVAR | 1VAR, 10VAR, 100VAR, 1kVAR | ±(2.5% + 5d) |
| **Harmonics (Total Harmonic Distortion and Distortion Factor)** | | |
| 1% ≤ THD > 100% | 0.1% | ±(3% + 5d) |
| 100% ≤ THD > 600% | 0.1% | ±(5% + 5d) |
| 1% ≤ DF > 100% | 0.1% | ±(3% + 5d) |
| **Power Factor (Single or Three Phase) - 15Hz to 1kHz** | | |
| 0.3 capactive. | 0.001 | ±3 deg |
| 1.0 to 0.3 inductive. | 0.001 | ±3 deg |
| **KiloWatt hour (kWHr) Measurement** | | |
| 4, 40, 400, 4000, 40000 | 1WHr, 10WHr, 100WHr, 1kWHr, 10kWHr | ±(3% + 5d) |
| **Frequency Measurement** | | |
| 15Hz to 1kHz | 0.1Hz | ±0.5% |
| **Scope Function** | | |
| **Current Measurement** | | |
| 10A to 2000A | 1A to 50A | ±(3.0% + 1pixel) |
| **Voltage Measurement** | | |
| 4V to 1000V | 100mV to 31.25V | ±(2% + 1pixel) |
| Timebase: 2.5ms to 50ms/div | Refresh: 0.5s | Max. Sampling: 15.625kHz |
| **Inrush Current Measurement** | | |
| 40A, 400A and 2000A | 10mA to 1A | ±(5.0% + 1pixel) |
| Capture Time: 1s to 300s | | Max. Sampling: 15.625kHz |
| **Data Logging** | | |
| 10,000 readings internal | | |
| **General Specifications** | | |
| Battery life | 12 hours typical from 6x AA batteries | |

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

460617.460589

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Power Quality Meter | 345 | **132-7559** | 935.00 | 906.95 | 879.74 |

Calibration Available - Contact your local Farnell Sales office for details

## Power Quality Analysers

HIOKI

**3197**



W=128 H=246 D=63mm. Weight 1.2kg.

New

This compact power and energy troubleshooting instrument offers a full range of PQA functions. With a nominal operating range of 0 - 600V AC and a max continuous input voltage of 780V it enables the user to safely monitor & record the following variables:

- Voltage swells, dips, transients & interruptions
- Voltage & current waveform peak values
- Active, reactive and apparent power
- Active & reactive energy
- Energy demand at 15, 30 or 60 minute intervals
- Power factor
- Frequency
- Voltage total harmonic distortion (THD-F)

The unit also display the following Measurements:

- Voltage, current, & power levels up to the 50th harmonic, either in the form of a bar graph or list

The automatic data compression function enables reliable, long-term measurements, recording continuous measurement for up to 125 days. The large backlit 4.7 inch colour screen with a pixel resolution of 320 x 240 offers a crystal clear view of the numerical values, waveforms and graphs. DataView integrated communication and control software enables you to communicate with and control the Power Quality Analyzer via a PC. View voltage time plots and event graphs showing voltage dips, swell & interruptions, along with voltage transients and inrush current. Recorded data can simply be exported to an Excel spread sheet showing over 100 AC variables, all recorded against real time.

The instrument is supplied complete with:

- Extra safe GS38 fused leads supplied with croc-clips & spike probes for easy safe connection.
- Software and USB cable.
- Rugged and durable integral stand and holster
- Carry case with shoulder strap suitable for complete test kit including current clamps
- Rechargeable power pack giving up to 6 hours of use plus mains adapter/charger

The 9661 Kit also includes:

- 3 x Hioki 9661 current clamps with a primary current rating of 500A

The 9667 Kit also includes:

- 3 x Hioki 9667 flexi-clamps with selectable primary current rating of 500A & 5000A

**Measurement Accuracy**

| | |
|---|---|
| **Voltage** | **±(0.3%rdg + 0.2%f.s.)** |
| Current | ±(0.3%rdg + 0.2%f.s.) + clamp sensor accuracy |
| Frequency (45Hz - 66Hz) | ±(0.01Hz + 1d.) |
| Active Power | ±(0.3%rdg + 0.2%f.s.) + clamp sensor accuracy |

491798

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 3197/9661 KIT | **150-1063** | 2,048.98 | 1,902.40 | 1,691.25 |
| 3197/9667 KIT | **150-1064** | 2,557.38 | 2,357.50 | 2,101.25 |


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## Three-Phase Power Quality Analyser

FLUKE

**434**



W=169 H=256 D=64mm. Weight = 2kg

CALIBRATION SERVICES

LATEST PRICING

A complete three-phase troubleshooting tool which measures virtually every power system parameter, including: voltage, current, frequency, power, power consumption (energy), unbalance and flicker, harmonics and inter-harmonics. Captures events like dips and swells, transients, interruptions and rapid voltage changes.

- **AutoTrend:** no time wasted setting up additional trend graphs while every measurement is automatically recorded. Analyses trends using cursors and zoom function, while recording continues in the background.
- **System-Monitor:** gives immediate insight into power system's quality. Checks conformity to limits specified in EN50160 or to own custom limits.
- **Four channels:** simultaneously measures voltage and current on all three phases and neutral.
- **Automatic transient display:** captures up to 40 dips, swells, interruptions or transients automatically.
- Meets the stringent 600V CAT IV, 1000V CAT III safety standard required for measurements at the service entrance.
- Rugged, handheld instrument operates for more than 7 hours on included rechargeable NiMH battery pack.
- Menu-driven interface simplifies operation.
- Extensive data analysis possibilities. Cursors and zoom can be used 'live' while taking the measurements, or 'offline' on stored measurement data. The stored measurements can also be transferred to a PC with the included FlukeView software.
- Complete package includes everything to get started: 4 current clamps, 5 voltages test leads and clips, line adapter/battery charger and hard case.
- Three year warranty.

| | Measurement Range | Accuracy |
|---|---|---|
| **Inputs** | | |
| Number of Inputs | 4 voltage and current (3 Phase and Neutral) | |
| Maximum Input Voltage | 1000V rms (6kV peak) | |
| Maximum Sampling Speed | 200 kS/s on each channel simultaneously | |
| **Volts / Amps / Hertz** | | |
| $V_{rms}$ (AC + DC) | 1 to 1000 V | ±0.5% of $V_{nom}$ |
| $V_{peak}$ | 1 to 1000 V | 5% of $V_{nom}$ |
| Crest Factor | 1.0 to >2.8 | ±5% |
| $A_{rms}$ (AC + DC) | 0 to 20kA | ±1% ± 5 counts |
| $A_{peak}$ | 1 to 400 A | 5% |
| Crest Factor | 1 to 10 | ±5% |
| Hertz (50 Hz nominal) | 42.5 to 57.5 Hz | ±0.1% of $V_{nom}$ |
| **Dips and Swells** | | |
| $V_{rms}$ (AC + DC) | 0% to 100% of $V_{nom}$ | ±1% of $V_{nom}$ |
| $A_{rms}$ (AC + DC) | 0 to 20kA | ±1% ± 5 counts |
| **Harmonics** | | |
| Harmonic (interharmonic) (n) | DC, 1 to 50, (Off, 1 to 49) measured fundamental or to total rms | |
| $V_{rms}$ | 0 to 1000V | ±5% ± 2 counts |
| $A_{rms}$ | 0 to 4000mA x clamp scaling | ±5% ± 5 counts |
| DC Voltage | 0 to 1000V | ±5% ± 10 counts |
| THD | 0 to 100% | ±2.5% |
| Hertz | 0 to 3500Hz | ±1 Hz |
| Phase Angle | -360° to 360° | ±n x 1.5° |
| **Power and Energy** | | |
| Watt, VA, VAR | 1 to 20 MVA | ±1.5% ± 10 counts |
| kWh, kVAh, kVARh | 0 to 200 GVAh | ±1.5% ± 10 counts |
| Power Factor / Cos ϕ / DPF | 0 to 1 | ±0.03 |
| **Flicker** | | |
| Pst (1 min), Pst, Plt, PF5 | 0 to 20 | ±5% |
| **Unbalance** | | |
| Voltage | 0 to 5% | ±0.5% |
| Current | 0 to 20% | ±1% |
| **Transient Capture** | | |
| Voltage | ±6000V | ±2.5% of $V_{rms}$ |
| Minimum Detect Duration | 5µs (200 kS/s sampling) | |
| **Inrush Mode** | | |
| $A_{rms}$ (AC + DC) | 0 to 20kA | ±1% of measurement ± 5 counts |
| Inrush Duration (selectable) | 7.5s to 30 mins | ±20ms ($F_{nom}$=50Hz) |
| **Autotrend Recording** | | |
| Sampling | Up to 100 readings per second continuous sampling per channel | |
| Memory | Up to 3600 min, max and average points for each reading | |
| Recording Time | Up to 450 days | |
| Zoom | Up to 12 x horizontal zoom | |
| **Memory** | | |
| Screens | 50 | |
| Data | 10 | |
| **Measurement Standards:** | IEC61000-4-30 class A; EN50160; IEC61000-4-15; IEC61000-4-7 | |
| **Safety Standards:** | EN61010-1 (2nd Edition); 1000V CAT III; 600V CAT IV | |
| **Case:** | Rugged, shock proof, IP51 drip and dust proof | |
| **Operating Temperature:** | 0°C to +50°C | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

# Power Quality Testers & Analysers - continued

## Three-Phase Power Quality Analyser - continued

### 434 - continued

413348

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| 434 | Power Analyser (UK) | **921-0008** | 3,195.00 | 3,099.15 | 3,006.18 |
| 434/001 | Power Analyser (Euro) | **983-7760** | 3,195.00 | 3,099.15 | 3,006.18 |
| BC430 | Battery Charger | **921-0016** | 78.00 | 75.66 | 73.39 |
| OC4USB | USB Interface | **921-0032** | 103.00 | 99.91 | 96.91 |
| I2000FLEXPQ4 | Current Clamps (4 pk) | **921-0040** | 632.00 | 605.67 | 581.44 |
| WC100 | Coloured Lead Clips | **921-0059** | 23.00 | 22.31 | 21.64 |
| TLS430 | Test Lead Set | **921-0067** | 67.00 | 64.99 | 63.04 |

## Logging Power Quality Analyser

FLUKE

### 435



LATEST PRICING

A complete three-phase trouble-shooting tool which measures virtually every power system parameter, including: voltage, current, frequency, power, power consumption (energy), unbalance and flicker, harmonics and inter-harmonics. Captures events like dips and swells, transients, interruptions and rapid voltage changes.

W=169 H=256 D=64mm. Weight = 1.1kg

- Features 0.1% voltage accuracy making it fully compliant with the IEC 61000-4-30 Class A standard
- **Logger function:** record the detail you need. Detailed, user-configurable long-time recording gives you the MIN, MAX and AVG readings of up to 100 parameters on all 4 phases with selectable averaging time down to 0.5 seconds. Enough memory is available to record 400 parameters with 1 minute resolution for up to a month
- **Four channels:** simultaneously measures voltage and current on all three phases and neutral.
- **AutoScaling:** easier trend analysis with automatic scaling of the vertical axis you will always use the full display to view the waveforms
- **Automatic transient display:** captures up to 40 dips, swells, interruptions or transients automatically.
- Meets the stringent 600V CAT IV, 1000V CAT III safety standard
- Rugged, handheld instrument operates for more than 7 hours on included rechargeable NiMH battery pack.
- Menu-driven interface simplifies operation
- Extensive data analysis possibilities. Cursors and zoom can be used 'live' while taking the measurements, or 'offline' on stored measurement data. The stored measurements can also be transferred to a PC with the included FlukeView software.
- Supplied with Power log software to analyse recorded data and to create reports
- Complete package includes everything to get started: 4 flex clamps, 5 voltage test leads and clips, line adapter/battery charger and hard case.
- Three year warranty.

**Inputs**

| | |
|---|---|
| Number of Inputs | 4 voltage and current (3 Phase and Neutral) |
| Maximum Input Voltage | 1000V rms (6kV peak) |
| Maximum Sampling Speed | 200 kS/s on each channel simultaneously |

| | Measurement Range | Accuracy |
|---|---|---|
| **Volts / Amps / Hertz** | | |
| $V_{rms}$ (AC + DC) | 1 to 600V, 600V to 1000V | ±0.1% of $V_{nom}$ |
| $V_{peak}$ | 1 to 1400$V_{pk}$ | 5% of $V_{nom}$ |
| Crest Factor | 1.0 to >2.8 | ±5% |
| $A_{rms}$ (AC + DC) | 30 to 3000 A | ±1% ± 5 counts |
| $A_{peak}$ | 0 to 5500$A_{pk}$ | 5% |
| Crest Factor | 1 to 10 | ±5% |
| Hertz (50 Hz nominal) | 42.5 to 57.5 Hz | ±0.01Hz |
| **Dips and Swells** | | |
| $V_{rms}$ (AC + DC) | 0% to 200% of $V_{nom}$ | ±0.2% of $V_{nom}$ |
| $A_{rms}$ (AC + DC) | 0 to 20kA | ±1% ± 5 counts |
| **Harmonics** | | |
| Harmonic (interharmonic) (n) | DC, 1 to 50, (Off, 1 to 49) measured fundamental or to total rms | |
| $V_{rms}$ | 0 to 1000V | ±5% ± 2 counts |
| $A_{rms}$ | 0 to 4000mA x clamp scaling | ±5% ± 5 counts |
| DC Voltage | 0 to 1000V | ±0.2% ± 10 counts |
| THD | 0 to 100% | ±2.5% |
| Hertz | 0 to 3500Hz | ±1 Hz |
| Phase Angle | -360° to 360° | ±n x 1.5° |
| **Power and Energy** | | |
| Watt, VA, VAR | 1 to 20 MVA | ±1.0% ± 10 counts |
| kWh, kVAh, kVARh | 0 to 200 GVAh | ±1.5% ± 10 counts |
| Power Factor / Cos ϕ / DPF | 0 to 1 | ±0.03 |
| **Flicker** | | |
| Pst (1 min), Pst, Plt, PF5 | 0 to 20 | ±5% |
| **Unbalance** | | |
| Voltage | 0 to 5% | ±0.15% |
| Current | 0 to 20% | ±1% |
| **Transient Capture** | | |
| Voltage | ±6000V | ±2.5% of $V_{rms}$ |
| Minimum Detect Duration | 5µs (200 kS/s sampling) | |
| **Inrush Mode** | | |
| $A_{rms}$ (AC + DC) | 0 to 20kA | ±1% of measurement ± 5 counts |
| Inrush Duration (selectable) | 7.5s to 30 mins | ±20ms ($F_{nom}$=50Hz) |

**Autotrend Recording**

| | |
|---|---|
| Sampling | Up to 100 readings per second continuous sampling per channel |
| Memory | Up to 3600 min, max and average points for each reading |
| Recording Time | Up to 450 days |
| Zoom | Up to 12 x horizontal zoom |

**Memory**

| | |
|---|---|
| Screens | 50 |
| Data | 10 |
| **Measurement Standards:** | IEC61000-4-30 class A; EN50160; IEC61000-4-15; IEC61000-4-7 |
| **Safety Standards:** | EN61010-1 (2nd Edition); 1000V CAT III; 600V CAT IV |
| **Case:** | Rugged, shock proof, IP51 drip and dust proof |
| **Operating Temperature:** | 0°C to +50°C |

442711

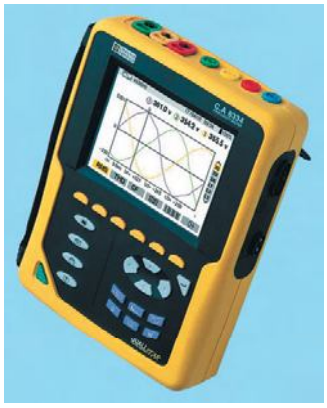
| Mftrs. List No. | Description | Order Code | Price Each 1+ | 2+ | 10+ |
|---|---|---|---|---|---|
| 435 UK | Power Analyser (UK) | **123-0695** | 4,436.00 | 4,302.92 | 4,173.83 |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

## Compact 3-Phase Power Analyser

CHAUVIN ARNOUX

### C.A 8334



- Colour LCD screen for graphic operating
- 3 structured display modes: observation, diagnosis, monitoring
- Complete three-phase analysis: voltages, currents, power / energy, alarm
- Data processing via PC windows software
- Memory 4MB
- Complies with IEC61010-1, 600V CAT III

Designed for verification and maintenance departments in industrial or administrative buildings, the Qualistar C.A 8334 enables the user to obtain an instant picture of the main characteristics of electrical network quality-.Handy and very compact, this instrument also gives numerous calculated values and several processing functions in line with current standards: EN 50160, IEC 61000-4-15, IEC 61000-4-30, IEC 61000-4-7.

**Principal parameters measured:**

- TRMS AC+DC voltage: single voltage up to 480V; phase-phase voltage up to 600V
- TRMS AC, AC+DC current up to 3000A (sensor dependant)
- Peak voltage and current
- Frequency from 40 to 70Hz
- Active, reactive and apparent power per phase and their aggregate
- Active, reactive, consumed and produced energy
- Harminics for voltage, current, or power up to the 50th order

**Principal values computed:**

- Neutral current
- Crest factors for current and voltage
- K factors for current (transformer application)
- Power factor, displacement factor and tangent
- Short-term voltage flicker
- Voltage and current unbalance
- Total harmonic distortion
- Average, min and max values of any computed value

**Additional functions:**

- Graphical data processing
- Alarms, transients
- Recording, dating and characteristics of disturbances (sweels, dips and interruptions, etc.)
- Data storage
- Immediate screen printout to printer
- Screen stirage
- Optical link communication
- Dimensions: 180x240x55mm
- Weight 1.5kg
- Supplied with QualistarView software, DB9F standard optical lead, 4x 3m leads fitted with banana plugs, 4 crocodile clips, mains lead and user instructions
- Ampflex Clamps allow current readings from 10 to 3000A (10Hz to 100Hz) 140mm dia

338560

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| Power Analyser | CA8334INXXGBG | **505-8053** | 2,474.07 | 2,345.47 |
| Ampflex Clamps | A193 SET | **505-8065** | 611.45 | 579.56 |
| | | | | **Price Each** |
| **Standard Calibration Charge** | | **S** C3 | | 34.10 |
| **UKAS Calibration Charge** | | **N** C3 | | 58.75 |

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## Power Logger

**1735**

FLUKE

LATEST PRICING



H=180, W=240, D=110mm Weight = 1.7kg

The Analyst 3P measures all essential power quality parameters in 50 and 60Hz systems: rms values of voltage and current, events, harmonics, voltage, power and line frequency.

- 3 phase power quality analyser and disturbance recorder
- Colour display
- Portable, robust and easy to use
- Ideal for troubleshooting, load profiling and energy optimisation
- Voltage and current up to 40th harmonic
- Power and energy measurement
- Easy to use PQlog view download, analysis and reporting software

| **Measurements** | Range | Resolution |
|---|---|---|
| Voltage Inputs | $U_N$ ranges Y: 57 to 480VAC | 0.1V |
| | $U_N$ ranges D: 100 to 830 VAC | 0.1V |
| Current inputs | LEM flex $I_N$: 15/150/3000A AC (Sinewave) | 0.01A - 1A |
| | Probes: 50/ 500mV AC | |
| Frequency | 46 - 54Hz and 56 - 64Hz | 0.01Hz |
| Power | Max: 2.49MW Typical: 34.50kW | Max: 1kW, Typical: 1W - 10W |
| PF Power Factor | 0.000 to 1.000 | 0.001 |
| **General** | | |
| Data storage | Up to 50 screenshots | |
| Interface | RS232 | |
| Operating temp | 0 to 40°C | |
| Storage temp | -20 to 60°C | |
| Safety | IEC 61010-1, 600V CAT III | |

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

382479

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 1735 | **127-2821** | 1,947.00 | 1,888.59 | 1,831.93 |

## Power Analysers

**Single and Three Phase**

Voltech™




- PM100 single phase power analyser
- PM300 three phase power analyser
- Power factor, peak current measurement
- Harmonics to the 50th
- Power consumption
- Inrush current using PS1000
- Watts to 0.4% accuracy
- Volts and amps to 0.2% accuracy
- Front panel menu driven
- Languages include English, French, German, Italian and Chinese
- Range of plug in interfaces available (please note only one interface can be plugged in at a time)
- 717-1419 RS232 interface card
- 717-1407GP1B IEEE 488 interface card
- 717-1444 ballast current transformer
- External shunt input

| | |
|---|---|
| Measurement Parameters | V, A, W, VA, Var, PF, Apk, Vpk, Acf, Vcf, Freq |
| | Inrush current Fundamentals, Harmonic Analysis |
| V Accuracy | ±0.1% reading ±0.1% range ±0.1%kHz ±10mV |
| A Accuracy | ±0.1% reading ±0.1% range ±0.2%kHz ±1mA |
| W Accuracy | ±0.2% reading ±0.2% range ±0.3%kHz ±5mW |
| Bandwidth | DC to 250kHz |
| Voltage Range | 2Vrms to 1000pK |
| Current Range | 20mA to 20Arms (200Apk) |
| Harmonic (V,A,W) | To the 50th |
| Integrator | W-h, VA-h, VAr-h, A-h, PF, Timer |
| Power | Dual range 90-120V, 195-265V |

222469

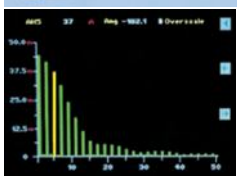
| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| PM300 | **717-1330** | 2,396.29 | 2,359.52 | 2,300.52 |
| PM100 | **717-1328** | 1,013.34 | 972.19 | 947.89 |
| IEEE I/O CARD | **717-1407** | 401.28 | 394.11 | 377.94 |
| RS232 I/O CARD | **717-1419** | 270.74 | 266.58 | 259.91 |
| BALLAST CT | **717-1444** | 198.31 | 195.26 | 190.37 |

## Precision Power Analyzer

Voltech™

**PM1000+**





Harmonic Analysis

- Easo to use.
- 0.1% basic accuracy.
- Special standby power, inrush, and W-hr integration modes.
- Comprehensive high-speed interfacing for automated use.
- Ideal for the design and test of all electrical products.

CALIBRATION SERVICES

New

| **O/P Measurement** | **Range max** |
|---|---|
| Power | 90 kW Direct I/P |
| Voltage | 600 V AC rms & ±1500V Peak direct I/P |
| Current AC/DC max | 20 A rms & ±100A Peak direct I/P |
| Frequency | 10Hz to 1MHz |
| Harmonics | To 50th Harmonic |
| Power Factor | -1.000 to +1.000 |
| THD | 0 to 999% |
| Impedance | 5mΩ to 5MΩ |

The Voltech PM1000+ is the first power analyzer to combine bench instrument accuracy with sophisticated energy consumption features and low-power standby measurements at an affordable price. The PM1000+ measures powerconsumption from milliwatts to megawatts, providing accurate power and harmonic data on products ranging from the tiniest cell phone charger to the latest electric hybrid bus.
Suitable for Energy Star measurements and for low-power measurements in accordance with international directives, e.g. IEC 62301 which also requires crest factor measurements up to 8 and 50 harmonics.

- Direct connection
- Accurate up to crest factors of 20 - no compromise specification on distorted waveforms
- Rugged analog design-stands overloads up to 5kV
- Discrete Fourier Transform provides harmonics more accurately than FFT.
- Voltech proprietary frequency detection avoids problems with zero crossing detection
- Built with low power standby in mind- no special accessories or channels required
- High sample rate captures all the data and avoids aliasing problems
- Full color clear and versatile display
- Great interfacing USB, IEEE 488.2, RS232, Printer port, Aux/Trigger port.

501701

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | + |
|---|---|---|---|---|
| PM1000+ | **155-3887** | 1,470.88 | 1,327.38 | – – |

## Power and Harmonics Analyser

TTi

**HA1600A**



W=357 H=132 D=235mm. Weight 5.5kg

The HA1600A is a fast, easy to use mains and harmonics analyser with a high resolution graphical display. It performs continuous real-time analysis of both voltage and current. Intended primarily as a dedicated harmonics and flicker analyser for compliance quality measurements, it can also be used as a general purpose mains analyser.
**HA-PC Link Plus** software is also supplied that enables results to be displayed, recorded and documented using a PC.

- Compliance quality measurements to EN61000-3-2 and EN61000-3-3
- Measures peak or rms voltage or current, real or apparent power, power factor, phase etc.
- Continuous analysis with real-time graphical update of all values
- Tabular or histogram display of 40 harmonics
- V and I waveform display
- 320x240 high contrast graphical display
- USB, RS232 and Parallel printer interfaces included
- PC control and documentation software supplied
- Connection via standard UK power connector

# Power Quality Testers & Analysers - continued

## Power and Harmonics Analyser - continued

**HA1600A - continued**

**Measurement System**

| | |
|---|---|
| Connection: | Single phase, standard connector |
| Current Rating: | 16A rms continous, or national connector rating if lower (13 A for UK connector) |
| Voltage Ranges: | 230V (±400V pk), 115V (±200V pk) |
| Current Ranges: | ±24mA pk to ±400A pk (15 rangers) |
| Frequency Range: | 45-66 Hz |
| Shunt Resistance: | 3mΩ |
| Sampling Rate: | 300 points per cycle |

**Power Analysis**

| | |
|---|---|
| Basic Accuracy: | <0.2% (voltage and current) |
| Measured Values: | Vrms, Vpk, Arms, Apk, crest factor, THD, W, VA, power factor, frequency, inrush current |
| Monitor Outputs: | Re-constructed V and I signals |

**Harmonic Analysis**

| | |
|---|---|
| Basic Accuracy: | Better than 5% of limit or 0.2% of total load current whichever is the greater |
| Display modes: | numeric readout of parameters. Graphical Display with accumulate and max. Hold facilities and Class D envelope. Tabular and Histogram harmonics analysis with comparison to limits in the standards |

**Flicker Meter (Option)**

| | |
|---|---|
| Measurement: | Voltage fluctuations and flicker severity (Pst and Plt) to EN60686 & EN61000-3-3 |

**General**

| | |
|---|---|
| Display: | 320x 240 pixel backlit LCD |
| Interfaces: | Parallel Printer, RS-232, USB |
| Instrument Supply: | 230V or 115V ±14% 48 to 65Hz |
| Operating Range: | +5°C to 40°C, 20-80% RH |
| Storage Range: | -10°C to +60°C |
| Safety: | Complies with EN61010-1 |
| EMC Compliance: | Complies with EN50081-1 & EN50082-1 |

## Low Distortion 1kW Power Source

**AC 1000**

The AC1000 is an innovative, low cost, low distortion power source designed specificially for use with harmonic analysers such as the TTi HA1600A. It permits compliance quality measurement to EN61000-3-2 in situations where the quality of the AC supply is poor or variable.

- Provides an EN61000-3-2 compliant source
- 1000W power capability at 230V
- Up to 4.4A rms load current and up to 10A peak currents
- Comprehensive overload protection
- Connection via standard UK power connector

| | |
|---|---|
| Input Voltage: | Factory set to 230V, 115V or 100V 50Hz or 60Hz |
| Supply Tolerances: | 198V-235V; 99V -127V; or 90V-110V, 50Hz ±0.5Hz; 60hz ±0.6Hz |
| Output Voltage | Tracks the amplitude of the fundamental of the input voltage. A variable voltage input may be used to adjust the output voltage to within the limits specified by EN6100-3-2 |
| Output distortion: | Dependent on the purity of the input. Input THDs of several percent are reduced to 0.1% at output. Unit is capable of exceeding the requirements of EN6100-3-2 for all but the most extreme input conditions |
| Output Current: | Max. continuous output current 4.4A |
| Output Power: | Max. power = input voltage x 4.4VA |
| Input Connection: | IEC connector; front panel switch |
| Output Connection: | Standard UK power connector |
| Load Power Switch: | Can be set to Director or Corrected for 'A-B' comparisons |
| Protection: | Thermal trio automatically diverts load to a 'direct' connection in the event of thermal overload |
| Operating Range: | 5°C to 35°C at full rated output |
| Safety: | Complies with EN61010-1 |
| EMC: | Complies with EN50081-1 & EN50082-1 |

442708

| Description | Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Harmonics Analyser | HA1600A | **125-2079** | 1,450.00 | 1,406.50 | 1,364.31 |
| Low Distortion Power Source | AC1000A | **125-2080** | 505.00 | 489.85 | 475.15 |

# Cable Locators & Testers

## Metal/Power/Stud Sensor

**72-6792**




- Electronically locates hidden cables gas and water pipes
- Traces hidden ceiling joists and wall studs
- Helps to prevent accidents when drilling or sawing
- Senses presence of mains voltage
- Audible and visual indication

232201

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 72-6792 | **360-6879** | 6.99 | 6.50 | 6.10 |

## Stud / Metal / AC Voltage Detector




- Laser leveling, layout and stud locating on vertical and horizontal surfaces
- Wood, metal and live wire detection - detects wood at depths up to 18mm
- 180° pivoting laser plane with level and plumb vials
- 6m laser line projection onto work surface with 90° squaring
- Two self contained hang pins to mount unit to work surface (vertical or horizontal)
- LCD sensing and mode display with new target graphics
- LED display with continuous live wire detection
- Thumb dial adjustable feet for leveling the laser
- Ergonomically designed for comfort and grip
- Requires a 9V battery
- Dimensions (WxHxD): 67 x 180 x 38mm. Weight 180g

486299.465652

| Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|
| **143-0705** | 21.06 | 19.13 | 17.65 |

## Cable & Pipe Detector

**TEK600**




Used for reliable location of live or dead cables through walls and sub-surfaces including foil-backed plasterboard. Locates cables situated in close proximity to ferrous and non-ferrous metals, frameworks and boxes, a feature not normally available on conventional detectors.

- Pin point accuracy
- Visual and audible indication
- Headphone socket (for use in noisy environments)
- Constructed from robust yellow ABS

| | |
|---|---|
| Power Supply | 9V alkaline battery |
| Indicators | Audible tone and visual indication. |
| Detection depth mm | 0 to 25 depending upon cable type |
| Operating Temp. °C | -5 to +40 |
| Dimensions (LxWxH) | 150x64x30mm |
| Weight | 190gm |

339894.267619

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| TEK600 | **505-7966** | 66.63 | 62.53 | 58.43 |

## Cable Length Meter

**TDR900**




An advanced instrument for measuring cable lengths and finding distance to an open or a short. Measurement range spans from 5m to 3km with a minimum resolution of 50cm and includes testing of 25, 50, 75, 100, 125 or 150Ω (corresponding to power, telephony, CATV and LAN cables).

- Full autoranging for measuring the length of power, telephony, CATV and LAN cables and distance to an open or short
- Extra large high resolution backlit LCD
- Automatic output impedance control of 25, 50, 75, 100, 125, or 150Ω
- User-friendly menu on screen operation
- Cable length calibration function
- Internal library of 39 standard cable types
- Auto power off

H=235, W=100, D=44mm
Weight = 450g

| | |
|---|---|
| Range | 3.7 km @ Velocity Of Propagation (VOP) 99.9<br>3.0 km @ VOP 80.0<br>2.4 km @ VOP 66.0<br>1.9 km @ VOP 50.0 |
| Accuracy | 2% of reading |
| Resolution | 50 cm |
| VOP | Adjustable from 1.0 to 99.9% in 0.1% steps |
| Cable library | 39 standard types |
| Custom cable | 20 custom types |
| Auto power off | After 30 mins (can be disabled) |
| Operating temperature | -18 to 60°C |
| Storage temperature | -20 to 70°C |
| Power | 4x AA (LR6) type batteries (5000 tests) |

383700.381285

| Mftrs. List No. | Order Code | Price Each |
|---|---|---|
| TDR900 | 874-6338 | 345.00 |

## Impulse Reflectometer

AMPROBE

New



The TDR-400 is a handy, light impulse reflectometer, processor controlled, with LCD display for check and locate faults in telecommunication and power cables.

**Measuring principle:**

The measuring pulse fed into the cable will reflected by in homogeneity of the cable impedance (cable faults) and showed on the display. The distance and the kind of the fault can be determined out of the shape and the time setting of the reflection (Practical experience can be obtained by test measurements). If the cable is terminated with a resistance equal to the impedance of the cable, no reflexion occurs when the cable is faultless. In the case of breaks, contact faults in sleeves, short circuits or taps/splitter in the sector to be tested, the distance to the cable beginning can be determined by the pulse echo. If wide pulses are used for the measurement, the echoes are stronger, but faultless taps/splitter cause then strong echoes.

**Propagation factor**

The Propagation factor (nvp-value) declares the velocity of electrical signals in the cable in relation to the speed of light. The propagation factor of the cable under test must always preset before the length measurement. If the propagation factor is unknown, a approximate value is set and the fault is determined from both ends of the cable.

**Features TDR-400**

| | |
|---|---|
| Measuring range | 0 - 2000 m |
| Resolution | 0.25 m, 0.5 m, 1 m, 4 m |
| Accuracy | 0.2 % of the measuring range |
| Propagation factor | 0.25 to 0.999 |
| Storage places | 10 for propagation factor |
| Dynamics | 44 dB |
| Impedance | 75 Ohm |
| Output | F-socket |
| Output pulse | 4 V/5 ns or 100 ns |
| Operating | with 3 keys |
| Display | LCD display, 120 x 32 pixel, illuminated |
| Power supply | NiMH accumulator 6 V/ 700 mAh (5 x R3), |
| Power consumption | 80 mA |

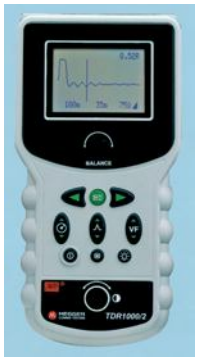
525720

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 5+ |
|---|---|---|---|
| TDR-400 | 167-1221 | 653.00 | 633.41 |

## Time Domain Reflector

Megger

**TDR1000**



The TDR1000 is a hand held, compact unit for locating faults in cable through the pulse echo technique. Digital Signal Processing techniques used in the circuit design enable the unit to offer a level of fault locating capability normally associated with much larger products. Features Tx Null™ Dead Zone elimination, Relection Amplitude Gain Control, and is suitable for types of cables.

- Measurements from 0 to 3000m with cursor tracking autorange
- Locate shorts, opens, water ingress, splices, taps and other faults.
- TxNull™ eliminates transmit pulse for 'close-up' measurement
- Suitable for all cable types including coax, twisted pair and power
- Narrow pulse width for high trace resolution and fault discrimination
- Auto/user adjustable Velocity Factor, cable impedance and Gain.
- Hi-res display with adjustable contrast and user selectable backlight
- Elastomeric keys and ABS case weather protected to IP54
- Supplied complete with test leads and multipurpose test/carry case

231103

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 3+ | Price Each 5+ |
|---|---|---|---|---|
| TDR1000 | 319-6914 | 959.00 | 939.82 | 921.02 |

**Help us to help the environment**

This catalogue has been printed on paper certified from a sustainable source.

**Please recycle after use.**

# Voltage & Continuity Testers

## Short Circuit Tracer



H = 110, W = 80, D = 37 (mm)

A highly efficient test tool for quickly locating short circuits on PCBs. The unit is designed as an aid for finding the most difficult fault on PCBs which is a short across two tracks that travels across a large a part of the board e.g. ICs. The unit emits an audible tone that reduces in frequency as the short is approached and increases in frequency as the probe is moved away.

- Audible tone via built-in buzzer or headphone socket (headphones not supplied)
- Adjustable resistance 0 to 250mΩ
- Battery operated (supplied)

248943

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 10+ |
|---|---|---|---|
| MODEL 1000 | 428-4148 | 59.47 | 59.04 |

## Continuity and Cable Tester

UNITEST

**Testfix**




BEHA

**Key Functions**

- Acoustic continuity test (buzzer)
- Optical continuity indication (lamp)

**General Information**

- Low-resistance continuity tester
- For testing glow lamps, fuses, etc.
- For testing cable connections and cable networks

**Special Features**

- Torch function with continuous illumination

H=130, W=75, D=35mm Weight=180g

| | |
|---|---|
| Continuity Test | 0 to10Ω (optical), 0 to 100Ω (acoustic) |
| Test Current | approx. 200 mA (optical), approx. 40 mA (acoustic) |
| Test Voltage | 4.5V |
| Power Supply | 3 x 1.5 V IEC LR6 |

339457

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 5+ | Price Each 10+ |
|---|---|---|---|---|
| TESTFIX | 501-8535 | 22.77 | 21.22 | 19.61 |

## Voltage Test Screwdriver



An all-weather voltage test screwdriver for voltage, polarity, continuity testing, bulb/fuse testing and microwave leakage detection. Features an integral LED indication and contact/non contact inductive testing.

| | | | |
|---|---|---|---|
| AC Voltage Test | | Polarity Test | 1.5V to 36V DC |
| Contact | 70 to 250V AC | Continuity Check | 0 to 50MΩ |
| Non-Contact | 70 to 600V AC | Microwave Leakage Detection | ≥5mW/cm² |
| DC Voltage Test | Up to 250V DC | | |

248981

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 10+ |
|---|---|---|---|
| Voltage Test Screwdriver | 428-4331 | 2.87 | 2.55 |

## Non-Contact Voltage Detector

AMPROBE

New

- Quickly check for the presence of AC voltages, with no electrical contact
- Safe non-contact detection of voltages from 70 V to 440 V AC
- Both visible and audible indicators
- Detector emits loud audible chirping
- Bright flashing LED
- On/Off button beep confirms

525678

| Mftrs. List No. | Order Code | Price Each 1+ | Price Each 5+ |
|---|---|---|---|
| VT201A | 167-1205 | 7.00 | 6.79 |

Over 480,000 products online GO

## Voltage & Continuity Testers - continued

### Type K single input thermometer

AMPROBE

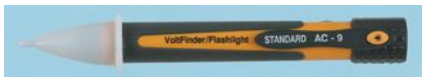
New

- Ideal for HVAC/R contractor, plant maintenance, commercial building service
- Unique, mini-stick design thermometer
- Small, go-anywhere size
- Type K thermocouple compatible
- °C/°F and 1°/0.1° selectable
- Data and max hold
- Type K probe and carrying case included

525679

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| TM45A | **167-1206** | 77.00 | 74.69 |

### Voltage Detector - Non-Contact




L=176 ∅=26mm. Weight 48g

New

- Non-contact detection of AC voltage from 100Vac to 600Vac
- Rugged, double moulded case
- Suitable for outlets or against wire insulation testing
- Flashing red LED light indicator
- Build-in bright flashlight with ON/OFF button
- Pocket size with clip
- Outer surfaces are non-conductive
- For use on 50/60Hz circuits
- Double molded plastic housing
- IEC1010: 1000V CAT III

414750.403923

| Description | Order Code | Price Each 1+ | 10+ | 50+ |
|---|---|---|---|---|
| Voltage Detector | **100-3035** | 7.15 | 5.93 | 5.36 |

### Volt Stick Voltage Tester

Ex




H=145, W=20, D=18mm Weight = 35g

- Locate breaks in cables
- Detect blown fuses inside plugs of fuse holders
- Distinguishes between live and neutral in single and three-phase supplies
- Identifies voltage-carrying cables injunction boxes
- Identifies faulty in-line switches
- Locates faulty lamps in series connections
- Red light in the tip to indicate voltage
- Fully insulated for safe use

The Volt Stick is an instrument for quick testing the presence of AC voltage, without metallic contact. It can be used for testing cables, sockets, switches etc. By simply touching the area with the tip, the Volt Stick indicates voltage presence by its glowing tip. Intrinsically safe ATEX versions for use in hazardous areas such as chemical plants, oil refineries and off shore rigs are also available.

| | |
|---|---|
| Voltage range | 220 - 230 Volts AC, or 90-1000V for IN02470 |
| Sensitivity | Indicator will illuminate at 4mm distance of a 2.5mm² conductor carrying 220V |
| Altitude | <2000m |
| RH | 80% @ 30°C, 50% @ 40°C |
| Operating temp | -20 to +50°C |
| Response time | Instantaneous |
| Battery type | 2x 1.5V AAA (supplied) |

381017.267944

| Description | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Black 230V | **838-8598** | 11.90 | 10.87 |
| Yellow 230V | **838-8601** | 11.90 | 10.87 |
| ATEX blue 230V | **838-8610** | 19.92 | 18.54 |
| ATEX blue 110V | **838-8628** | 19.92 | 18.54 |

### Volt Stick Pro Voltage Tester




H=146, ∅=18mm Weight = 40g

- Unique forked tip gives unsurpassed selectivity and reduces the risk of spurious indications
- Live cables can easily be detected in equipment cabinets, fuse boxes etc
- Cables and connections can be checked simply in low voltage equipment too
- Extremely safe when measuring in junction boxes
- With the supplied field strength amplifier, anti-tamper, earthed outlets can be checked
- Powerful red light in the tip to indicate voltage
- Fully insulated for safe use

The Volt Stick PRO, with its unique forked tip, has an unsurpassed voltage range and increased selectivity. This is because the maximum sensitivity is between the two prongs of the fork. Outside the fork the sensitivity is low, so external interference fields have small effect.

| | |
|---|---|
| Voltage range | 12-600V AC (838-8636)<br>230V AC (838-8644) |
| Altitude | <2000m |
| RH | 80% @ 30°C, 50% @ 40°C |
| Operating temp | -10 to + 50°C |
| Power | 2x AAA alkaline batteries (supplied) |

381098.345077

| Description | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Volt Stick 12-600V AC | **838-8636** | 21.68 | 20.08 |
| Volt Stick 230V AC | **838-8644** | 21.68 | 20.08 |

### Volt Stick Voltage Tester with Sound




H=145, W=18, D=20mm Weight = 40g

The Volt Stick SOUND is an instrument for safely checking the presence of an AC voltage in cables, wall sockets, fuses junction boxes etc. No current flow is needed for correct operation. Voltage indication with both sound and light signal. Low battery indicator.

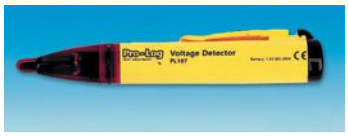
- Locates breaks in cables
- Detects blown fuses inside plugs or fuse holders
- Distinguish between live and neutral wires in both single and three-phase supplies
- Identifies voltage-carrying cables in junction boxes
- Identifies faulty in-line switches
- Locates defective in-series light bulbs
- Both light and sound voltage indicators
- Low battery indicator

| | |
|---|---|
| Voltage range | 230 VAC |
| Altitude | <2000m |
| RH | 80% @ 30°C, 50% @ 40°C |
| Operating temp | -10° to +50°C |
| Power supply | 2 x AAA batteries (included) |

381099.345078

| Order Code | Price Each 1+ | 10+ |
|---|---|---|
| **838-8652** | 12.52 | 11.64 |

### Voltage Detector




H = 150, W = 25, D = 21 (mm)

A high quality voltage detector with a useful On/Off switch to stop unwanted and annoying activation due to static charges generated when handling.

- Contact-free, clear and audible indication of voltage between 50 and 500V
- Quick and accurate detection of breaks in open ended cables
- Detects microwave leakage
- Phase detection in sockets
- 50 to 500Hz frequency range
- Powered by 2x AAA type batteries (supplied)

248986

| | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Voltage Detector | **428-4343** | 10.51 | 9.45 |

**FREE global legislation support**

RoHS, REACH, WEEE, EuP, Batteries Directive - we've got it covered at: **www.global-legislation.com**

**Technical information at your fingertips**

Over **352,000** technical datasheets available online.

Visit **www.farnell.co.uk** and look for the **Tech Info** heading in your search results.

## Voltage Detector

**1AC-II VoltAlert**

FLUKE



LATEST PRICING

Senses the steady state electrostatic field produced by AC voltage through insulation without requiring contact to the bare conductor. A red glow at the tip and a beeping noise (if not switched OFF) indicates the presence of voltage.

DURACELL Ultra M3 AAA

- Voltbeat™ technology and continuous self-test — so you always know it's working
- Upon detection, tip glows and beeper sounds
- Compact design fits easily into pocket
- Easy to use - just touch the tip to an outlet or cable
- Operating range 200 V to 1000 V AC
- **EN61010-1 CAT IV 1000 V** for added protection
- Agency approvals: CE, CSA, C-tick, TUV/GS
- Rugged casing protected to IP40 standard
- Two-year warranty

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

416579.429123

| | | Price Each | | |
|---|---|---|---|---|
| Type | Order Code | 1+ | 3+ | 10+ |
| 1AC-II Volt Alert | **101-8356** | 17.00 | 16.49 | 16.00 |

## Voltage Detector with Light

**Fluke LVD2**

FLUKE



LATEST PRICING

Non-contact AC voltage detector and LED flashlight combined into one easy to use pen-style design.

- Ultra-Bright White LED light with 100,000 hour life
- Detects from 90 to 600 V AC
- Rated to CAT IV 600 V
- Dual Levels of Detection, Blue indicates proximity to AC Voltage source, Red indicates you're at the source
- AAA battery included

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

460637.460630

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| LVD2 | **132-7563** | 19.00 | 18.43 | 17.88 |

## Non-Contact Voltage & Current Detector

**DVA30**

EXTECH INSTRUMENTS




W=192 H=31 D=24mm. Weight 60g

New

- Non-Contact AC voltage detection from 12V to 600VAC
- Non-Contact AC current detection from 200mA to 1000A
- Sensitivity adjustments to increase or reduce sensor trigger threshold
- Loud audible and bright visible sense detect indicators
- Current sensor detects current flow through shielded wires, conduit and metal circuit breaker/junction boxes
- Pocket size with clip
- Supplied with four LR44 batteries

| | |
|---|---|
| Voltage Range | 12V to 600Vac |
| Current Range | 200mA to 1000A |

446743.437826

| | Price Each | | |
|---|---|---|---|
| Order Code | 1+ | 5+ | 10+ |
| **127-1504** | 28.13 | 25.37 | 20.05 |

## Magnet Stick




H=152, ∅=17mm
Weight = 40g

The Magnet Stick is an instrument for testing the presence of magnetic fields. By simply holding the tip of the instrument near the test area, it indicates a magnetic field by glowing. The test lamp responds to all kinds of magnetic fields, from alternating current to direct current and permanent magnets. An ATEX approved model for use in explosive environments is also available.

- Detects the presence of a magnetic field
- Works with permanent magnets and electro-magnets / coils
- Powerful red light in the tip to indicate presence of a magnetic field
- Easy to use
- Solenoid valves in pneumatic and hydraulic control equipment can easily be tested
- Test relays with coils and electrically controlled solenoid valves in all types of vehicles and machines
- Test solenoid valves when servicing oil burners

| | | | |
|---|---|---|---|
| Sensitivity | 300 Gauss, (0,3 mT) | RH | 80% @ 30°C, 50% @ 40°C |
| Power supply | 2x AAA batteries (supplied) | Operating temp | -10 to +50°C |
| Altitude | <2000m | Functional check | Test magnet included |

381100.345079

| | | Price Each | |
|---|---|---|---|
| Description | Order Code | 1+ | 10+ |
| Magnet Stick | **838-8660** | 14.23 | 13.12 |
| Magnet Stick ATEX | **838-8679** | 23.29 | 21.62 |

## Voltage Tester with Magnetic Field Indication

**MAGNO-VOLTFIX**

UNITEST



H=140, W=24, D=20mm Weight=50g

- Contact-free, optic and acoustic detection of AC voltages
- Swift and exact detection of line interruptions in accessible cables, e.g. cable reels
- Detection of magnetic fields, e.g. in magnetic coils or permanent magnets
- Compact, handy construction, fits in any pocket
- Large application area for trade and industry

| | | | |
|---|---|---|---|
| Display | 2 LEDs | Measurement category | CAT III / 600 V |
| Voltage Range | 50 to 600 V AC | Pollution Degree | 2 |
| Frequency Range | 50 to 500Hz | Safety complying with | IEC 61010, EN 61010 |
| Operation time | continuous | Power Supply | 2 x 1.5 V LR03 batteries |

339447

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| MAGNO-VOLTFIX | **501-8390** | 31.00 | 28.46 | 26.57 |

## Non Contact Voltage & Magnetic Pole Indicator

**TEK200**

MARTINDALE ELECTRIC



The TEK200 detects the presence and polarity of magnetic fields produced by indicators, relays, solenoids and transformers. The integral self test activates the sensor in the tip of the tester at 50Hz as well as checking the battery and LED. This proves that the unit is fully functional and avoids the need for a separate proving unit.

| | |
|---|---|
| Voltage Range | 100 - 600V, 50Hz to 50kHz |
| Sensitivity | Registers at 3mm for 100V / 50Hz, 23mm for 240V / 50Hz |
| Indication | Red LED plus 3kHz tone |
| Magnetic Field Range | ±10mT, 0 - 50kHz |
| Magnetic Indication | North Pole: Red LED, South Pole: Green LED |
| Operating Temperature | -5°C to 40°C |
| Case Material | Flame Retardent ABS |

339541

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| TEK200 | **505-7802** | 35.36 | 32.80 | 30.75 |

## Universal Voltage Tester 6-400V

**72-6793**

TENMA



- A simple low cost voltage tester designed to detect voltages between 6 and 400V AC/DC
- Integral finger guard for added safety
- LED visual indication
- Polarity display
- Indicated voltages: ±6V with polarity display
- 12, 24, 50, 120, 220, 400V AC/DC

## Voltage & Continuity Testers - continued

### Universal Voltage Tester 6-400V - continued

**72-6793 - continued**

- **GS/TUV/CE** safety approved

232194

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 72-6793 | **360-6880** | 13.39 | 12.72 | 12.41 |

### Combicheck 1.3 Voltage Tester

Weidmüller



- High ohm 2-pole voltage tester
- Large range of voltage from 6-690 V and the peak current resistance of 6 kV makes sure any tests on the supply network can be made
- Tester is truly safe and very easy to use
- Integral torch function
- Tested and approved in accordance with **EN61243-3** and **VDE 0682 Part 401**

| | | | |
|---|---|---|---|
| Voltage range | 6-690V AC/DC | Frequency range | 0-100Hz (AC >2Hz) |
| Voltage Indication | LED display | Battery type | 2 x 1.5V AAA |
| Input resistance | 265K Ohm | Input current | <2.5 Ma @ 690V |
| Continuity testing | <500K Ohm (With audible buzzer for continuity and voltage) | Battery capacity | 1500 operations |
| Peak current resistance | 6KV | IP rating | **IP50** |
| Single phase test | >90V ac | Operating temperature | -10 to +50°C |

234425

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| COMBI CHECK 1.2 | **369-5815** | 35.86 | 34.91 | 34.07 |

### Mastercheck 3.2 Voltage Tester

Weidmüller



- PTC controlled, especially suitable for safe working when doing 2-pole voltage testing
- The individual LEDs display the voltage in increments of: 6, 12, 24, 50, 120, 230 and 400 V
- Tested and approved in accordance with **EN61243-3** and **VDE 0682 Part 401**

| | | | |
|---|---|---|---|
| Voltage range | 6-400V AC/DC | Battery type | 2 x 1.5V AAA |
| Voltage Indication | LED display | Input current | <2.5 Ma @ 400V |
| Input resistance | 265K Ohm | Battery capacity | 1500 operations |
| Continuity testing | <500K Ohm | IP rating | **IP50** |
| Peak current resistance | 6KV | Operating temperature | -10 to +55°C |
| Frequency range | 0-100Hz (AC >2Hz) | | |

234428

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 114510 | **369-5827** | 21.32 | 20.91 | 20.27 |

### Electrical Tester




- 1999 counts LCD display
- Voltage and Continuity tester
- Automatically turns on when in contact with a complete circuit
- Automatically selelcts Vac, Vdc or continuity test
- Auto power on/off
- High input impedance
- Non-contact voltage detection
- Low battery indication
- IEC1010: CAT III 600V

| | Range | Accuracy |
|---|---|---|
| AC Voltage | 600V | ±(1.5% + 2) |
| DC Voltage | 600V | ±(3.0% + 3) |
| Input impedance | 400kΩ | |

W=72 H=215 D=37mm. Weight 235g

414909.403929

| Description | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Electrical Tester | **100-3034** | 16.36 | 14.75 |
| | | **Price Each** | |
| **Standard Calibration Charge** | S C4 | 34.10 | |
| **UKAS Calibration Charge** | N C4 | 58.75 | |

### Voltage Tester

New



A multifunction voltage tester with LED indicators plus measurement via a LCD display.

- LED 12, 24, 50, 120, 230, 400, and 690V indicators
- LCD measurement display
- Automatic range selection
- Polarity detection and display
- Continuity test and buzzer
- Integral torch
- Low battery warning
- Supplied with 9V battery and user manual

AC / DC Voltage
Continuity Test
Frequency Range
Safety
Dimensions (WxHxD)
Weight

510043.509506

| Description | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| Voltage Tester | **156-3724** | 20.25 | 18.05 |

### Voltage and Continuity Testers

**Combivolt Series**

Di-log

New




- Three-in-one testers with a rugged, ergonomically formed housing for perfect handling.
- Voltage test - range from 12 up to 690V AC/DC
- Continuity test function - with optical and acoustical indication
- Three-phase rotation detection system - "no third hand required"
- IP65 - water-jet and dust-tight protection for outdoor use
- Electrical torch function - for working in dark environments
- Probe-tip protection - for reducing the danger of injuries
- Automatic Voltage Detection
- Polarity Detection
- Fully operational voltage indication even when batteries are discharged or when no batteries are fitted
- Integrated single pole test for phase detection
- Short response time (<0,1s) for fast voltage tests
- Fully compliant with GS38

| | **DL6780 Combivolt 1** | **DL6790 Combivolt 2** |
|---|---|---|
| **Voltage** | | |
| Display | 12 - 690 V ac/dc | 6 - 690 V ac/dc |
| LED Resolution | 12, 24, 50, 120, 230, 400, 690 | 12, 24, 50, 120, 230, 400, 690 |
| LCD Resolution | | 1V ±(3% +8d) |
| Response time | LED <0.1 s | LED <0.1s, LCD <2s |
| Frequency Range | 0 - 400 Hz | 0 - 400 Hz |
| **Single Pole Voltage Indication** | | |
| Voltage Range | 100 - 690 V ac | 100 - 690 V ac |
| Frequency Range | 50 - 400 Hz | 50 - 400 Hz |
| **Continuity** | | |
| Measuring Range | 0 - 400kΩ | 0 - 400kΩ |

| | | |
|---|---|---|
| **Phase Rotation Test** | | |
| Voltage Range | 100 - 690 V | 100 - 690 V |
| Frequency Range | 45 - 65 Hz | 45 - 65 Hz |
| Over Voltage Protection | 690V ac/dc | 690V ac/dc |
| **General Specifications** | | |
| Power Supply | 2x LR03 batteries | |
| Dimensions (WxHxD) | 70 x 255 x 28mm | |
| Weight | 200g | |

492534.502119

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| DL6780 | Tester | **150-6450** | 37.26 | 33.64 | 31.05 |
| DL6790 | Tester | **150-6451** | 60.03 | 55.89 | 50.72 |
| CP1190 | Carry Case | **150-6452** | 13.40 | 12.42 | 11.90 |
| **Standard Calibration Charge** | | **S** C4 | | 34.10 | |
| **UKAS Calibration Charge** | | **N** C4 | | 58.75 | |

## Voltage / Continuity Tester

**GT-85E**

GREENLEE



- Display if AC and Dc voltage
- LCD display with backlight
- True resistance measurement up to 2kΩ
- Bipolar rotary field testing
- Unipolar phase testing with acoustic and optical indication
- Continuity testing with acoustic and optical indication
- Diode test
- Polarity display with loud beeper
- Measuring point illumination for working in poor light conditions
- IP64 - splashproof and dust-tight

| | |
|---|---|
| Voltage Measurement | 6 to 690V AC/DC |
| Resistance | 0 to 2000Ω |
| Frequency | 0 - 65Hz |
| Safety Category | CAT IV 600V, CAT III 1000V |

450724

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|---|
| GT-85E | Voltage Tester | **129-9494** | 68.67 | 65.21 | 61.07 |

## Voltage and Continuity Tester

**T50**

FLUKE



- Voltage test
- Optical and acoustical continuity test
- Display: 10 LED's
- Single pole test for phase detection
- Indication of polarity
- The voltage display also functions when using discharged - or no batteries
- All inputs protected to **EN61010-1 CAT III 600V**

LATEST PRICING

| | | | |
|---|---|---|---|
| Voltage AC/DC | 12 - 690 V | Frequency | 45 - 65 Hz |
| Continuity | 0 - 200 kR | Response Time | <0.1s |

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

W=40 H=210 D=22mm.
Weight 130g

416564.429122

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|---|
| Tester (UK) | T50 | **101-8355** | 23.00 | 22.31 | 21.64 |
| Tester | T50 | **101-8355** | 23.00 | 22.31 | 21.64 |


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## Voltage and Continuity Testers

**T100 Series**

FLUKE



W=240 H=56 D=34mm. Weight 180g

LATEST PRICING

Ideal for site conditions, the 3 models of the T100 Series 2-pole testers have a rugged construction and ergonomically formed housing for perfect handling. All models offer a patented three-phase rotation detection system providing quick phase rotation indication. Moreover they have a special electrical torch function for working in low light level environments and have an ingress protection rating of IP65. The T100 Series are compliant with EN 61010-1 and EN61243-3 requirements.

**T100:**
- 12 LED display
- Voltage test
- Optical and acoustical continuity test
- Rotary field indication
- Single pole test for phase detection
- Indication of polarity
- Torch function

**T120:**
All features as T100 plus:
- 3.5 digit LCD display
- LED Bargraph

**T140:**
All features as T120 plus:
- Resistance Measurement
- Backlight

| | |
|---|---|
| **Measuring Ranges** | |
| Voltage AC/DC | 12 - 690 V |
| Continuity | 0 - 400 kΩ |
| Frequency | 0 - 400 Hz |
| Phase rotation | 100 to 690 V |
| Resistance measurement (T140 only) | Up to 1999 Ω |
| Response time | <0.1 s |
| **General, Safety and Environmental Specifications** | |
| Operating Temperature | -10°C to 55°C |
| Safety Rating | EN 61010-I Cat. IV 600 V |

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

413490.411571

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| T100/UK | Tester | **921-0113** | 39.00 | 37.83 | 36.70 |
| T120/UK | Tester | **921-0121** | 64.00 | 62.08 | 60.22 |
| T140/UK | Tester | **921-0130** | 79.00 | 76.63 | 74.33 |
| **Euro Versions** | | | | | |
| T100 VDE | Tester | **921-0148** | 39.00 | 37.83 | 36.70 |
| T120 VDE | Tester | **921-0156** | 64.00 | 62.08 | 60.22 |
| T140 VDE | Tester | **921-0164** | 79.00 | 76.63 | 74.33 |
| C33 | Carry Case | **428-3612** | 15.00 | 14.55 | – – |
| **Standard Calibration Charge** | | **S** C4 | | 34.10 | |
| **UKAS Calibration Charge** | | **N** C4 | | 58.75 | |

## Electrical Testers

**T5 Series**

FLUKE





- Integral test leads and probes
- Automatic selection
- Continuity and bleeper function
- T5 electrical testers for continuity/ohms and current measurements
- 2 versions available T5-600 rated to 600 volts ac/dc
- T5-1000 rated to 1000 volts ac/dc

## Voltage & Continuity Testers - continued

### Electrical Testers - continued

**T5-H5-1AC Tester Kit contains:**
- T5-1000 Electrical tester
- H5 holster
- 1AC VoltAlert voltage detector

**1AC VoltAlert voltage detector**
- Pocket size voltage detector
- 200-600 Volts ac
- All outer surfaces are non conductive
- Detects voltage without metallic contact
- EN61010-1 CAT III 600V

- continued

- New open jaw technology for fast current measurement up to 100 amps ac, with 0.1 amp resolution
- Continuity and bleeper function
- Sleep mode when not in use

**ACC-T5-KIT T5 Series Accessory Kit:**
A complete accessory kit for use with the Fluke T5 Series Electrical testers.
- TP220 SureGrip™ Test probe Set
- AC285 SureGrip™ Large Jaw Alligator Clip Set
- C33 Soft Meter Case

LATEST PRICING

**T5-H5-1AC Tester Kit contains:**
- T5-1000 Electrical tester
- H5 holster
- 1AC VoltAlert voltage detector

**1AC VoltAlert voltage detector**
- Pocket size voltage detector
- 200-600 Volts ac
- All outer surfaces are non conductive
- Detects voltage without metallic contact
- EN61010-1 CAT III 600V

| | T5-600 | T5-1000 |
|---|---|---|
| Volts ac max | 600V | 1000VV |
| Volts dc max | 600V | 1000VV |
| Current ac max. | 100A | 100A |
| Max resistance Ohms | 1000R | 1000R |
| Cat III rating | 2 | 2 |

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

385804

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| T5-600 | **184-342** | 99.00 | 96.03 | 93.15 |
| T5-1000 | **184-354** | 109.00 | 105.73 | 102.56 |
| Holster | **874-164** | 17.00 | 16.49 | 16.00 |
| ACC-T5-KIT | **491-7273** | 28.00 | 27.16 | 26.35 |
| T5-H5-1AC KIT | **835-3662** | 126.00 | 122.22 | 118.55 |
| C101 Carry Case | **947-9783** | 34.00 | 32.98 | 31.99 |

| | | Price Each |
|---|---|---|
| **Standard calibration charge** | S C4 | 34.10 |
| **UKAS calibration charge** | N C4 | 58.75 |

### Electrical Test Kit

FLUKE

LATEST PRICING




**Fluke 62/T5-600/1AC**
IR Thermometer, Electrical Tester and Voltage Detector Kit.

Kit includes:
- Fluke 62 mini IR Thermometer
- Fluke T5-600 Voltage, Continuity and Current Tester
- Fluke 1AC-II Voltage Detector
- Nylon carrying case

Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

460645.460643

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Electrical test kit | T5-600/62/1AC | **132-7565** | 160.00 | 155.20 | 150.54 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C4 | 34.10 |
| **UKAS Calibration Charge** | N C4 | 58.75 |

### Digi Check 5

Weidmüller

**Voltage Tester**



- Tested and approved in accordance with **DIN VDE 61010/part 1**

| | |
|---|---|
| Voltage range | 5 - 690 V AC/DC |
| Voltage indication | digital/4 digits and LED |
| Input resistance | 300KΩ approx, 2.5kOhm/"LOAD" |
| Resistance/Continuity | 0-2 kOhm (buzzer) |
| Frequency range | 0-2000Hz (in 1 Hz increments) |
| Capacity | 1-50µF |
| Rotary field display | by arrows |
| Peak current resistance | 5kVos |
| Display range of current | 5-24V (in 0.1V incr.)<br>24-240V (in 1V incr.)<br>240-450V (in 2V incr.)<br>450-690V (in 5V incr.) |
| Display range of resistance | 0-200 Ohm (in 1 Ohm incr.)<br>200- 1kOhm (in 5 Ohm incr.)<br>1-2kOhm (in10 Ohm incr.) |
| Display range of frequency | 0-200Hz (In 1 Hz incr.) |
| Display range of capacity | 1-50µF (in 0.1µF incr.) |
| IP rating | **IP50** |
| Operating temperature | -10 to +50°C |

234430

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 114114 | **369-5840** | 68.24 | 66.88 | 65.52 |

## Portable Appliance (PAT) Testers

### Microwave Leak Detector

MARTINDALE ELECTRIC

**TEK500**



Detects and indicates the level of leakage from domestic and industrial microwave appliances. Designed to comply with national and international standards governing permitted exposure levels of microwave radiation.
- Visual & audible leakage warning
- Self test feature
- Constructed from yellow ABS

Supplied with full instructions, certificate of conformity, thermometer, water load beaker and carry case.

| | | | |
|---|---|---|---|
| Supply | 9V alkaline battery | Overload capacity | 50mW cm$^2$ |
| Operating Frequency | 2450MHz ±25MHz | Operating Temp. °C | -5 to +40 |
| Power Density Range | ±1dB for plane wave of all polarizations | Dimensions | 150x64x30mm |
| Response of step output | 2 to 3 seconds | Weight | 170gm |

339892.267624

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| TEK500 | **505-7991** | 128.13 | 112.75 | 104.55 |

### Microwave Oven Test Kit

CELTEK



- Provides rapid and accurate measurement of microwave emission
- Single range 10mW/cm$^3$
- Instrument failure indicator
- Complete with thermometer two 500ml plastic containers and case to carry out power measurement test on microwave ovens
- Supplied with full instructions and batteries
- Approved with leading microwave oven manufacturers

228227

| | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| A100 | **908-186** | 183.26 | 181.94 | 179.09 |

## Handheld PAT Tester

**Primetest 50**



An easy to use, portable appliance checker offering the same lightness and portability as its bigger brothers, but with a much simplified range of tests. Simply choose the test you require; earthed appliance, double insulated appliance, or mains cord testing. The simple display shows whether it's a pass or fail. With the optional PATGuard Workabout software (**121-2660**) you can record the latest test result information into a PDA. The rugged outer casing will stand up to anything a normal working environment has to offer. A great choice for those needing a reliable, easy to use, portable safety tester.

W=100 H=260 D=55mm.
Weight 800g

**Earth Continuity**
Test current ±200mA DC
Pass / Fail Threshold 0.2Ω

**Insulation resistance**
Test voltage 500V DC
Pass value 2MΩ

**IEC Lead Test**
Tests Performed Earth Continuity
Insulation resistance
Live, Neutral Continuity and Polarity

**Power Socket Test**
Input Voltage Range 230V +10%,-15% AC
Voltage indications Phase to earth, Phase to neutral
Neutral to earth potential

**Physical**
Power 6x AA batteries (supplied)

440476.436826

| Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| **UK Version** | | | | |
| Primetest 50 | **121-2650** | 354.24 | 317.23 | 303.63 |
| **Euro Version (Schuko)** | | | | |
| Primetest 50 | **128-2684** | 354.24 | 317.23 | 303.63 |

## Handheld PAT Tester

**Primetest 100**



W=100 H=260 D=55mm. Weight 800g

An ideal choice for those looking for an easy to use, comprehensive unit. Simply pushing a button will give you the option of PAT Test mode, Class I and II, IEC Lead test mode or Power Socket mode. To further add to its easy operation, a bright display shows the test results values as well as a PASS or FAIL indication. It is battery powered to help users be quicker and more efficient in their work. With the optional PATGuard Workabout software (**121-2660**), asset information can be recorded on-site for storage in a PAT test record database.

- Easy to use
- Compact, rugged enclosure
- Simple push button test action
- Test Class I and II equipment including IT and business equipment
- Differential Leakage test
- Extension and IEC lead tests
- Power socket polarity
- LCD display giving clear pass/fail indication
- Supplied with test lead, IEC lead, instruction manual and deluxe carry case with shoulder strap

**Earth Continuity**
Test current ±200mA DC
Display Range 0Ω - 19.99Ω
Pass Value 0.2Ω

**Insulation Resistance**
Test voltage 500V DC
Display Range 0.2MΩ - 19.99MΩ
Pass value 2MΩ

**IEC Lead Test**
Tests Performed Earth Continuity
Insulation resistance
Live, Neutral Continuity and Polarity

**Equivalent Leakage Class I**
Test voltage 40V AC Nominal
Display Range 0.1mA - 19.99mA
Pass value 0.75mA

**Equivalent Leakage Class I**
Test voltage 40V AC Nominal
Display Range 0.1mA - 19.99mA
Pass value 0.25mA

**Power Socket Test**
Input Voltage Range 230V +10%,-15% AC
Voltage indications Phase to earth, Phase to neutral
Neutral to earth potential

**Physical**
Power 6x AA batteries (supplied)

440477.436829

| Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| **UK Version** | | | | |
| Primetest 100 | **121-2651** | 476.04 | 426.30 | 408.03 |

## Electrical Safety Multi-Tester

**PrimeTest 200**



- Rotary switch test selection
- Single Test button action
- All Portable Appliance Tests including 10A load tests
- Tests Class I and II equipment including IT and business equipment
- Extension and IEC Lead tests
- Insulation, Continuity, Socket polarity, and RCD tests
- Loop resistance indication without RCD trip
- Voltage (AC and DC) and Continuity measurements
- Type K Temperature Measurement (with optional accessory probe)
- LCD display with analogue bargraph and back light
- Battery life indicator
- Lead compensation up to 10Ω for Earth continuity & low resistance measurement
- Continuity buzzer
- Lock to hold a measurement on the display
- Auto power off when not in use
- Supplied with Batteries, lead set, IEC lead, instruction Manual and Carry case with shoulder strap
- Dimensions: 110x55x270mm
- Weight: 0.8kg

Combine the testing requirements of a PAT tester, Installation tester and DMM and you have the PrimeTest 200. The ergonomically designed hand-held unit, with integral rubber bumpers, gives you the ability to perform 10 tests including temperature via an optional temperature probe, and is capable of testing all portable electrical appliances and IT equipment after service and/or repair.

339052.344002

| Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| PrimeTest 200 | **505-4035** | 557.24 | 499.02 | 477.63 |
| Thermocouple Adaptor | **505-4047** | 55.71 | 51.40 | 49.98 |

## Handheld PAT Tester

**Primetest 220**



Compact and full of great features. First of all there is no need to continuously plug and unplug cables because it is battery powered, giving you the freedom to move quickly from job to job. Next up is the large LCD display that offers easy layout. Add to that a comprehensive test list that features Class I and Class II testing, IT equipment testing and circuit testing.

- Hand-Held - Highly Portable
- Battery Powered
- Comprehensive Testing
- Large LCD display

W=100 H=260 D=55mm. Weight 800g

**Earth Continuity**
Test Current ±200mA DC
Display Range 0Ω - 19.99Ω
Pass Value 0.2Ω

**Insulation Resistance**
Test Voltage 500V DC
Display Range 0.01MΩ - 199MΩ
Pass Value 2MΩ

**Protective Conductor Current**
Test Voltage 230 V
Display Range 0mA - 19.99mA
Pass Value 0.75mA

**Touch Current**
Test Voltage 230 V
Display Range 0.1mA - 3.5mA
Pass Value 0.25mA

**IEC Lead Test**
Tests Performed Earth Continuity
Insulation resistance
Live, Neutral Continuity and Polarity

**RCD Trip Time**
Test Current 30mA
Test Current Phase 0° / 180° auto switched
Display Range 0ms - 500ms

# Portable Appliance (PAT) Testers - continued

## Handheld PAT Tester - continued

### Primetest 220 - continued

**Earth Loop Resistance**
Test Current: Non-Tripping for > 30mA RCD
Display Range: 0Ω - 199Ω

**Power Socket Test**
Input Voltage: 230V +10%,-15% AC
Voltage indications: Phase to earth, Phase to neutral

**Physical**
Power: 6x AA NiMH rechargeable batteries (supplied)

440478.436832

| Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| Primetest 220 | **121-2652** | 536.94 | 480.84 | 460.23 |

## Handheld Wireless PAT Tester

SEAWARD ELECTRONIC LTD.

### PrimeTest 300



The high speed PAT testing solution. The PrimeTest 300 is battery powered and connects to all your accessories via a Bluetooth wireless connection. This means that you don't spend time plugging and unplugging the tester and accessories between tests and so spend more time testing, This fully portable handheld tester gives you the flexibility to test when and where it is right for you.

- Wireless data transfer system using Bluetooth technology
- Battery driven for mains free working
- Intuitive and fast user interface
- Manual and automatic test modes
- User definable and configurable test sequences
- Graphic display
- Full keypad
- Large memory for storing results and test programs
- Download / Upload to software
- Insert your own logo and details on the tag
- Brain cell capability

**Includes:** Deluxe carry case, PATS Lite, Reference Guide, Test Lead, Mains Lead, 110V socket adaptor, Bluetooth / USB adaptor, Rechargeable Batteries and Charger, Instruction Manual CD.

**Earth Continuity**
Measuring range: 0.01Ω to 19.99Ω
Resolution: 0.01Ω
Accuracy: ±(5% + 2 digits)

**Insulation Test**
Test Voltage: 500Vdc at 1mA
Measuring range: 0.1MΩ to 40MΩ
Resolution: 0.01MΩ
Accuracy: ±(5% + 2 digits)

**Differential Leakage**
Test Voltage: 230V +10%, -15%
Maximum Load Current: 13 A rms
Measuring range: 0.25mA to 19.99mA
Resolution: 0.01mA
Accuracy: ±(5% + 2 digits)

**Touch Leakage**
Test Voltage: 230V +10%, -15%
Maximum Load Current: 13 A rms
Measuring range: 0.1mA to 3.5mA
Resolution: 0.01mA
Accuracy: ±(10% + 2 digits)

**RCD Test**
Test Voltage: 230V +10%, -15%
Maximum Load Current: 30mA rms sinusoidal, +10%, -0%
Measuring range: 10ms to 2000ms
Resolution: 1ms
Accuracy: ±10%

**Earth Loop Resistance Test**
Test Voltage: 230V +10%, -15%
Measuring range: 1W to 199W
Resolution: 0.1W
Accuracy: ±(10% + 2 digits)

**Lead Test**
Test Voltage: 9Vdc
Test Duration: 2 seconds
Test: Live / Neutral checks for o/c, s/c and crossed

**Power Socket Test**
Test Voltage: 230V +10%, -15% AC
Indicators: Phase to Earth Voltage / Phase to Neutral Voltage / Neutral to Earth

417302.428751

| Description | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| **UK Version** | | | | |
| PrimeTest 300 | **102-3300** | 1,009.93 | 989.85 | 947.43 |

## PAT Tester

SEAWARD ELECTRONIC LTD.

### EUROPA PAC Plus




W=210, H=80, D=310mm. Weight 3.5kg

An enhanced manual portable appliance tester that is ideal for those wishing to conduct simplified testing without the need to electronically store or download results. the PAT tester is truly portable and provides a simple means of performing electrical safety tests in line with the *Electricity at Work Regulations* and is capable of testing Class I, Class II and Information Technology equipment. Supplied with Earth bond test lead, mains cable, 230/110V adaptor and carry case.

- Easy to use rotary test and rage selection switch
- Large, easy view display
- Test include Earth Bond, Insulation, Touch Leakage, Differential Leakage, Sub Leakage and Lead test
- Accurate Earth Bond and leakage measurement, even with multiple earths
- Digital reading of test results giving the the actual recorded values to allow informed decisions on safety
- Memory to store test results
- Print test results to give on the spot test records (requires an additional printer)
- Ideal for on site testing or for the workbench

**Earth bond**
Output currents: 10A AC
Test voltage: 6V rms o/c
Ranges: 0.01 to 20 Ohms
Accuracy: ±5% of reading ±2 digits
Resolution: 0.01 Ohms
Misc: 4 wire measurement, floating earth, aux earth bond socket

**Earth continuity**
Test voltage: 100mV nominal (no load)
Test current: 100mA (into s/c load)
Ranges: 40mΩ - 19.99Ω
Resolution: 0.01 Ohms
Accuracy: ±5% of reading ±2 digits up to 5Ω
Pass levels: Selectable
Misc: 4 wire measurement, floating earth

**Insulation test**
Measuring range: 100k - 100MΩ
Test voltage: 250V DC@2mA, 500VDC @ 1mA
O/C voltage: <750v
Accuracy: ±5% of reading ±2 digits
Resolution: 0.01 M Ohms

**Substitute leakage**
Measuring range: 0.01-19.99mA
O/C voltage: 25 to 50V
Resolution: 0.01mA
Acuracy: 10% of reading ±2 digits

**Differential earth leakage**
Measuring range: 0.1 - 9.9mA
Test voltage: Supply voltage
Pass level: Selectable
Resolution: 0.01mA
Accuracy: ±5% of reading ±2 digits

**Touch leakage**
Range: 0 - 3.5mA
Test voltage: Supply voltage
Pass level: Selectable
Resolution: 0.01mA
Accuracy: ±10% of reading ±2 digits

**External leakage (clamp)**
Range: 0 - 19.9mA
Pass level: Selectable
Resolution: 0.01mA
Accuracy: ±10% of reading ±2 digits

**Load**
Measuring range: 0 - 4kVA

**Operating voltage**
Voltage range: 207V - 253V

248932

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ |
|---|---|---|---|
| **UK Version** | | | |
| EUROPA PAC PLUS | **121-2653** | 671.83 | 631.43 |

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## PAT Tester

SEAWARD ELECTRONIC LTD.

### EUROPA PLUS



W=210, H=80, D=310mm. Weight 3.5kg

A very compact, microprocessor controlled, dual voltage portable appliance tester also capable of testing IT and sensitive business equipment. The Europa Plus has the ability to accurately test earth bond and earth leakage, even when multiple earths exist. The Seward Super System (SSS), a radical development in PAT firmware. Rapid boot up is complete in less than 2 seconds and an easy to follow menu structure and fast keys allows the user to program and execute tests faster. Downloading of the results is also much faster than many existing testers thus saving time and money.
Tests performed: Earth Continuity, 250V, 500V Insulation Test, Substitute Leakage Test, Load Test and IEC Test.

- Truly Portable
- Large VGA, LCD display with backlight (9320x240 pixels)
- IrDA compatible
- 2400 memory locations
- Integral, full rubber alphanumeric keypad
- Dual voltage test capability
- Selectable pass ranges
- Tests sensitive IT technology
- Real time clock and non-volatile memory
- Supplied with luxury carry case for tester and accessories
- In-Line Earth Bond and Touch Leakage tests while the equipment is powered up to reduce test times
- Earth cable length calculator
- QWERTY keyboard
- Results comparison software to indicate degredation and potential future fails
- Single screen visual tests
- Automatic generation of appliance ID's
- 2x serial ports allowing a barcode scanner and printer to be used at the same time
- PATSLite downloader software

**Earth continuity**

| | |
|---|---|
| Output currents: | 25A, 10A, 4A, AC into S/C |
| Test voltage | 6V rms o/c |
| Ranges: | 0.01 - 20 ohms |
| Accuracy | ±5% of reading ±2 digits |
| Resolution: | 0.01 Ohms |
| Pass Range: | Selectable |
| Misc: | 4 wire measurement, floating earth, aux earth band socket |

Test voltages/currents are nominal at 230V supply

**Earth Screen Test:**

| | |
|---|---|
| Test voltage | 100mV nominal (no load) |
| Test current | 100mA (into s/c load) |
| Range | 40mΩ - 19.99Ω |
| Resolution | 0.01Ω |
| Accuracy | ±5% of reading, ±2 digits up to 5Ω |
| Pass levels | Selectable |
| Misc | 4-wire measurement, floating earth |

**DC Earth Bond Test:**

| | |
|---|---|
| Test voltage | 4V nominal (no load) |
| Test current | -200mA, +200mA selectable (into s/c load) |
| Range | 40mΩ - 19.99Ω |
| Resolution | 0.1Ω |
| Accuracy | ±5% of reading, ±2 digits |
| Pass levels | Selectable |
| Misc | 4-wire measurement, floating earth |

**Insulation Test**

| | |
|---|---|
| Measuring Range: | 100k - 100MΩ |
| Test voltage | 250V, 500V DC |
| Accuracy: | ±5% of reading ±2 digits |
| Resolution: | 0.01 M Ohms |
| Pass Range: | Selectable |

**Substitute Leakage**

| | |
|---|---|
| Measuring Range: | 0.1 - 19.99mA |
| O/C Voltage: | 25-50V |
| Resolution | 0.01mA |
| Accuracy: | ±10% of reading ±2 digits above IMA |
| Pass Range: | Selectable |

**Load Test**

| | |
|---|---|
| Load: | 0-4.2kVA |

**Leakage:**

| | |
|---|---|
| Range | 0.1-10mA |
| Resolution: | 0.01mA |
| Accuracy: | ±5% of reading ±2 digits |
| Pass Range: | Selectable |

**Touch Leakage**

| | |
|---|---|
| Range: | 0.1 - 2mA |
| Resolution: | 0.01mA |
| Accuracy: | ±10% of reading ±2 digits |
| Pass Range: | Selectable |

**Polarity**

| | |
|---|---|
| Test performed: | L/N continuity and polarity |

**Operating voltage**

| | |
|---|---|
| Voltage range: | 207V - 253V |

**Interfaces**

| | |
|---|---|
| User interface: | |
| Keyboard: | QWERTY |
| Display | Graphic LCD to 1/4 VGA (320 x 240 pixels) Backlight |

248935

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ |
|---|---|---|---|
| **UK Versions** | | | |
| EUROPA PLUS | **121-2654** | 942.50 | 886.23 |

## Portable Appliance Tester

SEAWARD ELECTRONIC LTD.

### Supernova PLUS



W=320, H=160, D=400mm. Weight 9.5kg

A comprehensive PAT tester with full graphics display and a fold up design for easy carriage. The unit has a range of innovative features to aid the user to easily test and document a wide variety of portable equipment.

The Supernova Plus is a dual voltage tester, with Flash Test capability, that is capable of testing IT equipment. The features of this enhanced model ensure that the Supernova Plus unit allows you to test any appliance, with any supply, giving you absolute flexibility in your testing procedure.

To enable test operators to determine progressive deterioration or potential faults in the equipment under test, the Supernova Plus incorporates specially developed software that compares successive test results taken on the same item of electrical equipment.
Ideal for those looking for a comprehensive dual voltage tester, which offers true dual voltage testing to test any load from any power source.

- Accurate Earth Bond and Leakage Measurements even when multiple Earth Paths exist
- Multi Voltage In/Multi Voltage Out
- Up to 5000 Memory Locations containing appliances sites, locations, user, test status and date
- Polarity Lead Test Capability
- Tests Information Technology equipment
- Real time clock and non-volatile memory
- Capable of printing barcode labels in conjunction with a thermal printer
- Connects to PC, barcode reader, Brain Cells Scanner and printer
- Auto test code generation
- User defined help screens
- Superfast download up to 10 times quicker than existing testers
- Modem capability
- Two serial ports (plus parallel port) to use bar code scanner and printer together
- Earth limit calculator
- Automatic generation of appliance IDs
- Single screen visual test

Supernova is supplied complete with: Earth bond test lead, Flash probe and 230/110V adaptor.
**TIS Kit: The Supernova Plus is also available with TIS Kit that includes:**

- Patguard Plus software
- Test 'n' Tag kit
- Patguard Plus support contact
- Guide to PAT testing

**Insulation Test**

| | |
|---|---|
| Test voltage | 250V, 500V DC |
| Measuring range | 100k -100MΩ |
| Resolution | 0.01MΩ |
| Accuracy | ±5% of reading ± 2 digits (100kΩ - 20MΩ) |
| Pass Levels | Selectable |

**Substitute Leakage Test**

| | |
|---|---|
| Test Voltage | 40V ac o/c |
| Display Range | 0.1 - 20.0 mA ac |
| Resolution | 0.01mA |
| Accuracy | ±10% of reading ±2 digits 1.00 - 20mA |
| Pass Levels | Selectable |
| Leakage Range | 0.1mA - 10.0mA |
| Resolution | 0.01mA |
| Accuracy | ±5% of reading ± 2 digits |

**Touch Leakage**

| | |
|---|---|
| Range | 0.1mA - 2.0mA |
| Resolution | 0.01mA |
| Accuracy | ±10% of reading ± 2 digits |
| Pass levels | Selectable |

222562

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| **UK Version** | | | | |
| Supernova Plus | **121-2656** | 1,251.83 | 1,177.10 | 1,126.65 |
| SUPERNOVA+ TIS KIT | **505-4060** | 2,173.66 | 2,108.77 | 2,018.40 |

## PAT Software

SEAWARD ELECTRONIC LTD.






**PATGuard Lite**
This is an entry level software package facilitating the quick and effective downloading of test information and certificate printing. It's ideal for those requiring quick, basic testing. PATGuard Lite provides records and documentation to support PAT testing and enables the user to quickly and effectively download test results, even if they only have limited training. The low cost software package uses Windows-based management of information so it;s easy to learn

# Portable Appliance (PAT) Testers - continued

## PAT Software - continued

and you can hook your tester to your PC to download directly into PATGuard.
- Automatic record generation
- Icon style display
- Most PAT downloads accepted (all Seaward)
- Database compatibility across the range
- Compatible with PATGuard WorkAbout

**PATGuard Pro**

This is a comprehensive software package and is ideal if you require detailed asset management information. It enables you to capture more information from the PAT tester as well as storing more information on the appliance history. The vast range of reports and clear identification of items in need of re-testing allow you to access more information on your test record, quickly. One of its key features is its fast download as the tester can be hooked to your PC for direct downloading. PATGuard Pro uses Windows-based management of information so it's easy to learn how to use it.
Includes all the faures of PATGuard Lite plus:
- Excel & Acrobat reports
- Network enabled
- Automatic re-location of assets
- Full test history
- Asset tracking

**PATGuard Elite**

A top of the line software package that is ideal for companies that PAT test on a regular basis. It provides you with quick and easy, complete management of the PAT testing process. One program provides the total solution from the first test, through downloading test results, certificates, planning re-tests and uploading. It's simple to use extensive features include clear re-test identification, optional email alerts for re-testing, and an extensive range of reports that help to increase the speed of your business. It connects directly to your tester and is fast to upload and download. PATGuard Elite uses Windows-based management of information so it is easy to learn how to use it.
Includes all the faures of PATGuard Pro plus:
- Drag & Drop for asy re-location
- PATGuard viewer program generator
- Full Seaward PAT upload capabilities
- Automatic re-test scheduler
- Customised email safety alerts
- Full range of printed reports

**PATGuard Workabout**

Testers can quickly and easily record results via their PDA with this specifically designed software package. It offers simple and easy test recording and can record results from any tester directly into a PDA to store for later use. The remote off-site working gives you the freedom and flexibility to work smarter during the actual testing. It uses familiar Pocket PC interfaces combined with PATGuard's Windows-based test record management so its easy to learn in minutes. PDA and mobile technology will enable you to email PAT test records before the test and also the results after the test.
- Direct Input of assets, tests and inspections
- Use easily transfered files
- Displays PATGuard records on a PDA
- Direct download and upload to tester
- Allows mobile working
- Fully compatible with all PATGuard software

440482.436842

| Mfrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| PATGuard Lite | **121-2657** | 159.50 | 149.98 | 143.55 |
| PATGuard Pro | **121-2658** | 414.70 | 389.94 | 373.23 |
| PATGuard Elite | **121-2659** | 550.03 | 517.19 | 495.03 |
| PATGuard Workabout | **121-2660** | 188.50 | 177.25 | 169.65 |

## PAT Labelling System

SEAWARD ELECTRONIC LTD.

**Test 'n' Tag**



**Printer Features**
- Compact thermal transfer printer
- Portable and lightweight
- Size: 150 x 90 x 100mm

**Label Features**
- Waterproof
- Don't tear
- Don't fade
- Available in two sizes: panel mounting or cable wrap

When used in conjunction with a Seaward PAT tester* the Test n Tag Kit fully automates the PAT testing process. Whenever an appliance is tested then a durable, waterproof label is automatically printed containing all the test information along with your company's logo, tag line and contact details.
**Kit includes:** label printer, label cartridge, barcode scanner, software CD (PC required) and carry case.
* Supernova or Europe range but not Europa PAC Plus

**Benefits**
- Fast and fully automatic PAT labelling
- Security and accuracy of information is assured as test details are direct from the tester's memory
- Promote your company - you can insert your own company logo, company name and contact details
- Label design includes a barcode, asset number, test date and next test date, tester's name and test status
- Professional appearence of label as opposed to handwritten label

339034.344005

| Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| Label Printer | **505-3894** | 279.13 | 278.67 | 266.73 |
| Label Printer Kit | **505-3900** | 506.49 | 497.35 | 491.98 |
| Label Cartridge, Yellow | **505-3912** | 29.44 | 28.93 | 28.42 |
| Label Cartridge, White | **102-3306** | 31.30 | 30.06 | 29.53 |

## PAT Accessories

SEAWARD ELECTRONIC LTD.




H=22, W=58mm

**Appliance Labels**
- Quality laminated labels with a heavy duty adhesive
- For providing a durable Serial Number marking on electrical appliances
- Allow appliance serial numbers to be rapidly scanned into Seaward PATs
- Supplied as a reel of 250 labels (each with unique serial)
- Coding type: type 39

**Pass Labels**

Durable plastic labels for visual identification of tested appliances.
- Durable plastic label
- Strong adhesive
- Test date and re-test date recorded
- Appliance number field

383405.428723

| Description | Mftrs. List No. | Order Code | Price Per Reel 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| **Label Reels** | | | | | |
| Appliance Labels (250) | 194A307 | **467-145** | 37.56 | 37.12 | 36.04 |
| Pass Labels (500) | 91B038 | **109-6634** | 37.56 | 37.12 | 36.04 |
| Test Code Labels (240) | 194A308 | **116-6690** | 37.56 | 37.12 | 36.04 |

## PAT Tester, Handheld

MARTINDALE ELECTRIC

New




The HPAT600 is a battery powered portable Appliance Tester with the following features:-
**Dual Insulation Test Voltage -** The insulation measurement test voltage can be set to either 500V or 250V.
**User Selectable Pass Levels -** Appliance test pass levels maybe user defined.
**Easy or Fast Operating Modes -** The HPAT600 can be operated in either of two modes. In manual mode, aimed at the newcomer to PAT testing, a connection diagram for the selected test type is shown on the display. Each step of a test requires user confirmation by a press of the OK button.
In the Auto mode, for the experienced operator, the HPAT600 will automatically run through a selected test sequence without any further user interaction unless a failure is encountered.
**IEC Lead Test -** The HPAT600 can also be used to check IEC leads for earth continuity, insulation, and polarity.
**Test Data Memory Storage -** The HPAT600 is able to store test data for up to 200 appliances into memory.

**Earth Continuity**

| | |
|---|---|
| Test voltage: | 4V DC (into open circuit) |
| Test current: | 200mA DC (into short circuit) |
| Range: | 0 - 19.99Ω |
| Resolution: | 0.01Ω |

**Earth Continuity**

| | |
|---|---|
| Accuracy: | ± (5% reading + 2 digits) |
| Default pass levels: | **Class I:** 0.1 ±. **Lead:** 0.1 Ω |
| User selectable pass levels: | 0.1Ω to 0.9Ω in 0.1Ω steps |

General

| | |
|---|---|
| Overload protection: | 300V AC/DC |
| Protection class: | IP20 |
| Safety: | Complies to BS EN 61010-1:2001 |
| Temperature Range: | -10 to 40°C, non-condensing |
| Power supply: | 6 x 1.2V AA NiMH rechargeable batteries 1800mAh, or greater |
| Dimensions: | 90 x 210 x 54mm |
| Weight: | Approx 700g (including batteries and leads) |

525475

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| HPAT600 | **167-0752** | 469.45 | 445.88 |

## Coming soon

Register your interest for items that are 'Coming Soon' at **www.farnell.co.uk** and we'll email you to let you know that they're in stock.

## PAT Tester

MARTINDALE ELECTRIC

### EasyPAT 1600




W=330 H=144 D=263mm. Weight 4kg

The EasyPAT 1600 is a legal minimum tester suitable for high speed low cost testing.

- Does both mandatory tests and has a built in fuse test
- 25A, 8A and 100mA (for computers, etc) earth bond tests selectable with a simple rocker switch
- Incorporates an extension lead tester to test IEC leads

**Earth Continuity Test (8A & 25A)**
Test Voltage 6V AC nominal with no load
Display Range 0 - 1.99Ω
Accuracy ±(10%rdg+2d)

**Earth Continuity Test (100mA)**
Test Voltage 130mV DC nominal open circuit
Display Range 0 - 1.99Ω
Accuracy ±(10%rdg+2d)

**Insulation Test**
Test Voltage 500V DC, -0% +20% at 500kΩ
Short Circuit Current 1.5mA DC nominal
Display Range 0 - 19.9MΩ
Accuracy ±(5%rdg+1d)

**Fuse Test**
Test Voltage 6V AC nominal
Over range threshold 10kΩ nominal
Zero range threshold 800kΩ nominal

449938.460923

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 10+ |
|---|---|---|---|---|
| EPAT1600 | **979-8560** | 425.38 | 404.88 | 384.38 |
| **Standard Calibration Charge** | | **S** C8 | Price Each 45.13 | |
| **UKAS Calibration Charge** | | **N** C8 | 73.70 | |

## PAT Tester

MARTINDALE ELECTRIC

### EasyPAT 2100




W=330 H=144 D=263mm. Weight 4.6kg

A high speed, fully specified dual voltage PAT tester which is ideal for contractors and workshops. Simple push-button test selection maximises productivity.

- Test either 110V or 230V dependent on the supply voltage
- Supports all five PAT tests
- Supplied complete with built-in extension lead tester

**Earth Continuity Test (8A & 25A)**
Test Voltage 6V AC nominal with no load
Display Range 0 - 1.99Ω
Accuracy ±(10%rdg+2d)

**Earth Continuity Test (100mA)**
Test Voltage 130mV DC nominal open circuit
Display Range 0 - 1.99Ω
Accuracy ±(10%rdg+2d)

**Insulation Test**
Test Voltage 500V DC, -0% +20% at 500kΩ
Short Circuit Current 1.5mA DC nominal
Display Range 0 - 19.9MΩ
Accuracy ±(5%rdg+1d)

**Run Current Test**
Range 0 - 19.9A
Accuracy ±(10%rdg+1d)

**Earth Leakage Test**
Range 0 - 19.9mA
Accuracy ±(10%rdg+1d)

**Flash Test**
Test Voltage 1.5kV AC Class I / 3.0kV AC Class II
Range 0 - 19.9mA AC
Accuracy ±(5%rdg+1d)

449952

| Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 10+ |
|---|---|---|---|---|
| EPAT2100 | **979-8579** | 640.63 | 613.98 | 574.00 |
| **Standard Calibration Charge** | | **S** C8 | Price Each 45.13 | |
| **UKAS Calibration Charge** | | **N** C8 | 73.70 | |

## PAT32 PAT Tester

Megger

### Dual Voltage, IT Compatible




- Performs circuit test, fuse check, earth continuity, earth bond (10A and 25A) and insulation test
- 100mA test as required by the EEA for IT equipment
- Easy to use marked pass bands
- Large LCD showing analogue and digitalreadings
- Optional extension lead test available

CALIBRATION SERVICES

3 WARRANTY YEARS

The PAT32 is a dual voltage (240/110V) instrument designed to check the electrical safety of earthed appliances (BS and IEC safety class I) and double insulated appliances (BS and IEC safety class II).
The unit is a robust, reliable instrument with carrying handle, detachable lid and pouch for the leads. Tests are made via a 13A **(BS1363)** socket for 240V appliances and a **(BS4343/CEE17)** socket for industrial appliances.
Typical applications include periodic tests of appliances used in factories, offices, schools, colleges, hospitals, etc (as advised by the Health and Safety Executive) and routine safety tests before and after hiring electrical equipment or following the repair of any electrical appliance.
The ELT1 is an optional accessory for testing both 110V and 240V extension leads as well as earth bond and polarity.
Supplied with operating instructions, PVC accessory pouch and an earth bond test lead with crocodile clips.

**Circuit Test**
Meter reading range 0 to 9.9kΩ
Open circuit voltage 4.5V dc
Short circuit current 1mAdc
Accuracy ±2.5%
**Fuse Check** 5V dc, 0.5mA typical

**Earth Continuity Test**
Meter reading range 0 to 9990mΩ
Open circuit voltage 100mV dc
Constant current 100mA dc (≃1Ω)
Accuracy ±2.5%

**Earth Bond Test**
Meter reading range 0 to 1990mΩ
Pass band limit 100 and 500mΩ
10A test current 10A into 100mΩ. 14A into s/c
25A test current 25A into 100mΩ. 38A into s/c
Open circuit voltage 10A range: 3V dc, 50Hz
25A range: 6V dc, 50Hz
Accuracy ±2.5%

**Insulation Test**
Meter reading range 0 to 99M
Pass band limit 2M and 7MΩ
Open circuit voltage <680V dc (500V dc into 2MR)
Short circuit current 2mA dc
Accuracy ±2.5% up to 10MΩ

**General**
Weight (Pat 32) 3.75kg
Weight (ELT1) 350g
Safety Meet the requirements of **IEC 1010-1 (1990)** **Safety class I, Installation Category II,** Pollution Degree 2, Altitude up to 2000m

# Portable Appliance (PAT) Testers - continued

## PAT32 PAT Tester - continued

**Dual Voltage, IT Compatible - continued**

222378

| Mftrs. List No. | Order Code | 1+ | Price Each 2+ | 5+ |
|---|---|---|---|---|
| TypePAT32 | **467-844** | 689.00 | 675.22 | 661.72 |
| ELT1 | **479-639** | 128.67 | 126.08 | 123.58 |

| | | Price Each |
|---|---|---|
| **Standard Calibration Charge** | S C 8 | 45.13 |
| **UKAS Calibration Charge** | N C 8 | 73.70 |

## PAT Tester

GOSSEN METRAWATT

**IT5**




Designed to safelt test all portable appliances. The Metrapat IT5 uses low current earth continuity test principle. This enables safe testing of sensitive electronic equipment such as computers, VDUs and printers.

- Safety check of mains power socket
- Earth continuity test
- Insulation test
- Equivalent leakage test
- Residual earth leakage test
- Touch leakage test
- Mains voltage measurement
- Load current test

| Test type | Range | Accuracy | Test Volage | Test Current |
|---|---|---|---|---|
| Earth continuity | 0 to 19.99Ω | ±2.5% of reading ±2 digits | >20 V dc | <200 mA dc |
| Insulation | 0 to 19.99MΩ | ±2.5% of reading ±2 digits | 500 V dc | >1mA dc |
| Equivalent leakage | 0 to 19.99 mA | ±2.5% of reading ±2 digits | 28 V ac | |
| Touch leakage | 0 to 1.999 mA | ±2.5% of reading ±2 digits | | |
| Residual earth leakage | 0 to 19.99 mA | ±4% of reading ±5 digits | | |

380952.381284

| Description | Mftrs. List No. | Order Code | 1+ | Price Each 3+ | 5+ |
|---|---|---|---|---|---|
| UK Version | METRAPAT IT5 | **842-1323** | 479.00 | 464.63 | 450.69 |
| Euro Version | METRATESTER 5 | **842-1331** | 479.00 | 464.63 | 450.69 |

## PAT Testers

FLUKE

**6000 Series**





W=275 H=200 D=100mm. Weight 3 kg

The small, light, one-touch solution. The Fluke 6200 and 6500 PAT testers have auto test capabilities to help increase the number of portable appliance tests performed per day. They're designed to enable you to work faster without compromising safety. They are lightweight and easy to carry around when working on-site. The hard carrying case (supplied) not only offers protection during transit but also includes extra storage space for accessories and other tools. They're also extremely compact, and have Fluke's traditional ruggedness to be able to withstand working in the field. Packed with all the features you need for testing portable appliances, a Fluke PAT tester is a complete all-in-one solution.

**Includes:** test lead, test probe, crocodile clip and mains lead.

**Accessories:**

**EXTL100-02 Extension Lead (948-7425):** extension lead test adaptor

**SP-SCAN-15 Scanner (492-0466):** intelligent barcode reader

**Power PATPlus Software (492-0387):** Professional PAT data management

**Fluke 6500 Special PAT kit (948-7417)** includes:

- 6500 PAT Tester
- SPScan15 Barcode Scanner
- Fluke PAT Software
- Appliance Pass Labels
- Barcode Labels




LATEST PRICING

CALIBRATION SERVICES

**Fluke 6200**

- "One Touch Testing" with a dedicated key for each test
- Save time with preset pass and fail levels
- Large backlit display for easy reading
- EN61010-1 300V CAT II
- Two years warranty

**Fluke 6500**

As 6200 plus:

- Integral QWERTY keyboard for rapid data entry
- Compact Flash memory card slot for data backup and transfer to PC
- Preset auto-test sequences for user convenience

| Measurement Functions | 6200 | 6500 |
|---|---|---|
| L N Mains Volts | ● | ● |
| Outside Limits Indicators | ● | ● |
| Null out facility for earth bond lead | ● | ● |
| Protective Earth Resistance $R_{PE}$ (200mA) | ● | ● |
| Protective Earth Resistance $R_{PE}$ (10mA) | ● | ● |
| Insulation (500V DC) | ● | ● |
| Protective Earth Conductor Current | ● | ● |
| Touch Current | ● | ● |
| Substitute Leakage Current | ● | ● |
| Appliance Power kVA | ● | ● |
| Appliance Load Current | ● | ● |
| Seven segment custom LCD | ● | |
| Graphical LCD | | ● |
| Backlight | ● | ● |
| Compact Flash card slot | | ● |
| Serial Port - Printing / Downloading | ● | ● |
| External Printer Output | ● | ● |
| Front panel QWERTY keyboard | | ● |
| IEC Test Lead | ● | ● |
| Auto-Testing | | ● |
| Programmable Pass/Fail Level Meters | | ● |
| Data Storage | | ● |
| Limited Data Storage | ● | ● |
| Polarity Checks | ● | ● |
| Graphical Help Menu on-line | | ● |
| Programme Mode | | ● |
| Real-time Clock | | ● |
| Front panel results management | | ● |
| 230V Schuko Test Socket | ● | ● |

**Power-on Test**
Indicates reversed L - N, missing PE, and measures the mains voltage and frequency

| | |
|---|---|
| Display Range | 90V to 264V |
| Accuracy at 50Hz | ±(2% + 3 counts) |
| Resolution | 0.1V (1V for model 6200) |
| Input Impedance | >1MΩ // 2.2µF |
| Maximum input mains voltage | 300V |

**Earth Bond Test $R_{pe}$**

| | |
|---|---|
| Display Range | 0 to 19.99Ω |
| Accuracy (after bond test zeroing) | ±(2.5% + 2 counts) |
| Resolution | 0.01Ω |
| Test Current | 200mA ac +40% into 1.99Ω<br>25A ac ±20% into 25mΩ at 230V |
| Open Circuit Voltage | >4V ac, <24V ac |
| Bond Test Zeroing | can subtract up to 1.99Ω |

**Insulation Test $R_{iso}$**

| | |
|---|---|
| Display Range | 0 to 299Ω |
| Accuracy | ±(5% + 2 counts) from 0.1 - 300MΩ |
| Resolution | 0.01MΩ (0 - 19.99MΩ)<br>0.1MΩ (20 - 199.9MΩ)<br>1MΩ (200 - 299MΩ) |
| Test Voltage | 500V dc +10% at 500kΩ load |
| Test Current | >1mA at 500kΩ load, <15mA at 0Ω |
| Auto Discharge Time | <0.5s for 1µF |
| Max. Capacitive Load | operational up to 1µF |

**Touch Current Test**

| | |
|---|---|
| Display Range | 0 to 1.99mA ac |
| Accuracy | ±(4% + 2 counts) |
| Resolution | 0.01mA |
| Internal Resistance (via probe) | 2kΩ |
| Measuring Method | Probe |

The appliance under test is energised at mains potential

**Substitute Leakage Current Test**

| | |
|---|---|
| Display Range | 0 to 19.99mA ac |
| Accuracy | ±(2.5% + 3 counts) |
| Resolution | 0.01mA |
| Test Voltage | 35V ac ±20% |

**Load / Leakage Test: Load Current**

| | |
|---|---|
| Display Range | 0 to 13A |
| Accuracy | ±(4% + 2 counts) |
| Resolution | 0.1A |

The appliance under test is energised at mains potential

**Load / Leakage Test: Load Power**

| | |
|---|---|
| Display Range | 0 to 999VA / 1.0kVA to 3.2kVA |
| Accuracy | ±(5% + 3 counts) |
| Resolution | 1VA (0 to 999VA) / 0.1kVA (1.0kVA to 3.2kVA) |

The appliance under test is energised at mains potential

**Load / Leakage Test: Leakage Current**

| | |
|---|---|
| Display Range | 0 to 19.99mA |
| Accuracy | ±(4% + 2 counts) |
| Resolution | 0.01mA |

The appliance under test is energised at mains potential

**PELV Test**

| | |
|---|---|
| Accuracy at 50Hz | ±(2% + 3 counts) |
| Overload Protection | $300V_{rms}$ |
| Warning Threshold | $25V_{rms}$ |

The accuracy specification for the display range is defined as ±(%reading + digit counts) at 23°C ± 5°C,≥75% RH. Between 0°C and 18°C and between 28°C and 40°C, accuracy specifications may de-grade by 0.1 x (accuracy specification) per °C.
The measurement range meets the service operating errors specified in EN61557-1: 1997, EN61557-2: 1997, EN61557-4: 1997.
Prices where indicated by a ⇵ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

415570.428872

| Description | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| **UK Versions** | | | | |
| 6200 PAT Tester | **948-7395** | 769.00 | 745.93 | 723.55 |
| 6500 PAT Tester | **948-7409** | 1,099.00 | 1,066.03 | 1,034.05 |
| 6500KIT | **948-7417** | 1,799.00 | 1,745.03 | 1,692.68 |
| **Euro Versions** | | | | |
| 6500-05 PAT Tester (Euro) | **983-7787** | 1,099.00 | 1,066.03 | 1,034.05 |
| **Accessories** | | | | |
| TA700 110V Adaptor | **948-7433** | 23.00 | 22.31 | 21.64 |
| SP1000 Mini Printer | **416-5172** | 357.00 | 346.29 | 335.90 |
| PASS 560R Pass Labels (504 labels) | **948-7441** | 25.00 | 24.25 | 23.52 |
| PASS 500S Pass Labels | **948-7450** | 20.00 | 19.40 | 18.82 |
| APP1000 Barcode Labels, 0-1000 | **107-9604** | 76.00 | 73.72 | 71.51 |
| IRP1 Register / Log Book | **492-0569** | 7.00 | 6.79 | 6.59 |
| FLUKE PATplus Software | **116-8888** | 459.20 | 445.42 | 432.06 |
| | | | | **Price Each** |
| **Standard Calibration Charge** | | S C16 | | 68.51 |
| **UKAS Calibration Charge** | | N C16 | | 95.81 |

## Snap-tags



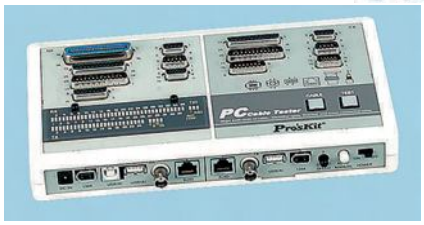
Fast and convenient way of identifying cables particularly portable appliance testing details. The snaptags completely enclose the label enabling it to be kept in good condition until it is replaced. They also have the added benefit of being reusable.
Label Area: 42x26mm. Overall Dimensions: 75x35mm
Sold in packs of 50.
BDST1 - lugged for use with 1.5mm$^2$ cables with the facility for also securing with a cable tie
BDST2 - non lugged for fixing with cable ties

232355

| Mftrs. List No. | Order Code | Price Per Pack (50) 1+ | 2+ | 5+ |
|---|---|---|---|---|
| BD ST1 | **370-5869** | 43.00 | 41.71 | 40.46 |
| BD ST2 | **370-5870** | 43.00 | 41.71 | 40.46 |

# Data Networks & Telecommunications

## PC Cable Tester



H = 35, W = 290, D = 130 (mm)

A useful, stand-alone cable wiring configuration tester to identify and test most common PC connection leads. The tester includes a comprehensive rage of connector types and is ideal for testing data cables, network cables, printer cables, monitor cables, modem cables, mouse cables, game cables, modem cables, USB cables etc.

- Tests each pin connection to allow the user to identify open circuits, short circuits, cross-wires, miss-wires and pin-pin connectivity
- 4, 9, 15 and 25 pin tests
- Tests each pin and displays connection
- Test Sheidling
- Automatic and manual scan test progression
- Test progression speed and reset to pin1
- 2x 36RX pins and 2x 24 TX pins LEDs indicate connection results for each pin test
- Numbers pins
- Battery low indicator
- Requires a PP3 type battery or a 9V DC, 150mA power adaptor - not supplied

**Connector Support:**
**TX Side:**
D Type: 9-way (F + M), 15-way (M), 25-way (M + F)
HD D Type: 25-way (M)
BNC: (F)
RJ45: (F)
USB: A (F), B (F)
IEEE1394 Firewire: (F)
**RX Side:**
Centronics: 36-way (F)
D Type: 9-way (F+ M), 15-way (F), 25-way (M + F)
HD D Type: 25-way (F)
BNC: (F)
RJ45: (F)
USB: A (F), B (F)
IEEE1394 Firewire: (F)

248557

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 3PK-NT013 | **428-3284** | 73.13 | 67.96 |

## PC Cable Checker

**1577 PC Cable Check Pro**



W=169 H=279 D=41mm. Weight 770g

This powerful troubleshooting tool maps cables and detects good connections and any opens, shorts, and crosses in the cable including PC, Mac, video, network and coaxial cable assemblies.

**Advantages:**
- Universal tester for all computer cables
- Quickly & easily troubleshoot cables to eliminate the cable as the source of the problem
- True cable mapping
- Easy to read and understand with LED indicator lights
- New rugged case with built-in handle for easy transport
- Auto scan or manual scan modes

**Features & Benefits:**
- Rubber feet grip to desk or bench to prevent slipping
- Power shuts off after 30 seconds of non-use to extend battery life
- Tests over 20 types of patch cables up to 300m in length

Tests cables with the following terminations:
- **Modular plugs:** RJ45, RJ11, RJ12 shielded and unshielded (UTP/STP)
- **Coaxial:** BNCs and CATV 'F's (BNC-to-F adapter required; not included)
- **D-Sub:** 9-, 15- and 25-pin
- **HD-Sub:** 15-pin
- **USB:** A, B and mini 5-pin
- **1394 firewire:** 4- and 6-pin
- **Mini-DIN:** 4- and 6-pin
- **Centronics:** 36-pin printer

423047.474246

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| 1577 | **111-4770** | 115.71 | 101.50 |

## Visual Fault Locator

**VisiFault™**



W=52 H=157
D=37mm. Weight 180g

Diagnose and repair simple fibre link problems. The laser-powered VisiFault Visual Fault Locator (VFL) traces fibers, verifies continuity and polarity, and helps find breaks in cables, connectors and splices. The unit emits a bright beam of red light easily visible from a distance. Connecting the unit to one end of a fibre and then easily locate that fiber at the other end. VisiFault can quickly illuminate fibre breaks, damaged connectors, defective splices and tight fibre bends in and around equipment racks.

- Bright red visible laser light source, features continuous and flashing modes for easier identification
- Accelerates end-to-end fibre continuity checks
- Speeds fibre tracing and identification
- Aids in location of fibre faults including tight bends, breaks and bad connectors
- Connects to 2.5mm standard and 1.25mm SFF connectors
- Rugged body survives drops, impacts and vibrations
- >80 hours continuous operation from 2x AA batteries (supplied)
- Supplied with lanyard attachment and soft carry case

**Optical Specifications**

| | |
|---|---|
| Fibre Compatibility | multimode and singlemode |
| Wavelength | 650 nm |
| Laser Safety Rating | Class II |
| Output Power | 1.0mW |
| Output Modes | continuous and flashing (2-3Hz pulsed) |
| Range | 3km multimode, 4km singlemode |

**General Specifications**

| | |
|---|---|
| Operating Temperature | 0 – 40°C |
| Safety | CSA C22.2 No. 1010.1, EN61010-1, CE |

416165.428986

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| VisiFault | **980-9007** | 203.00 | 198.94 |

## Fibre Optic Visual Fault Finder



- Useful over a distance of 5km (3 miles)
- Two AA batteries provide over 30 hours of continuous use
- Slim, pocket-sized tool in rugged metal housing
- Nylon carrying case with belt loop included

## Data Networks & Telecommunications - continued

### Fibre Optic Visual Fault Finder - continued

333709.277257

| Order Code | Price Each |
|---|---|
| 470-5210 | 171.24 |

### FiberInspector Mini Video Microscope

**FT500**



The FiberInspector Mini video microscope enables inspection of end-faces on all types of installed fibre. End-face contamination has been found to be the leading cause of fibre failures. By inspecting end-faces before mating, this common problem can be prevented. The portable video microscopes project a crisp, clear image of microscopic debris and end-face damage on both patch cords and inside ports. Quickly determine whether fibre connectors on a hardware device are clean and in good condition without disassembling the device. The FiberInspector Mini is exceptionally convenient with a rugged boot and a wide array of adaptor tips available.

- Inspect all types of installed fibre to prevent the number one cause of fibre failure
- Quickly determines whether fibre connectors on a hardware device are clean and in good condition without disassembling the device.
- Contains high-magnification optics that provide crisp, clear images of microscopic debris and end-face damage.
- The exceptionally convenient FiberInspector Mini uses a 200x magnification probe sufficient for inspecting both multimode and singlemode fibre

488980.503174

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Fibre Optic Inspector | FT500 | 146-7434 | 1,010.00 | 989.80 | 970.00 |
| Accessory Tip Set | NFM110 | 146-7435 | 145.00 | 142.10 | 139.26 |

### Fibre Optic Cleaning Kit



Contaminated end-faces are the number one cause of fibre link failure. This precision fibre optic cleaning kit allows effective removal of all contaminants from end-faces on both patch cords and inside ports. By using the specially formulated solvent, all contaminants are dissolved, static charge is neutralised and particles are lifted without scratching the end-face. The customised wipers and swabs are used to deliver the solvent to the end-face, entrap microscopic debris and absorb dissolved contaminants.

- A range of wipes and swabs enable cleaning of all styles of fibre optic connections
- Housed in a rugged carrying case

Contents: Cleaning cube with wipes, 10 cards with sealed cleaning zones, solvent pen, 1.25mm and 2.5mm port cleaning swabs

489203.503167

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| NFC-KIT-CASE | 146-7436 | 118.00 | 115.64 | 113.33 |

### Fibre Verification Testers

**SimpliFiber**



W=84 H=153 D=32mm. Weight 180 g

An affordable optical source and power meter kit that accurately measures and stores the loss of multimode and singlemode fiber. Rugged, hand-held and PC-compatible the source and meter set feature textured, impact-resistant covers and an ergonomic shape for a comfortable and secure grip. An integrated cover protects the fiber ports and long battery-life assures hours of trouble-free operation. The automatic wavelength-sensing feature of the meter identifies the source wavelength and sets itself appropriately. The simplified multi-wavelength tests prevent costly measurement errors.

- Tests singlemode and multimode fibres
- Measures optical power and loss at 850nm and 1300nm using the 850/1300 LED source and meter
- Measures optical power and loss at 1310nm or 1550nm using the 1310 or 1550 laser source options
- Auto senses source wavelength
- Saves 100 test results
- Linkware software documents, reports and manages all test data

**Optical Power Meter**

| | |
|---|---|
| Power Measurement Accuracy | ±0.25 dB at 23°C |
| Connector | Interchangeable Connector Adaptor (ST, SC, FC, universal) |
| Detector Type | Germanium |
| Calibrated Wavelengths | 850nm, 1300nm, 1310nm, 1550nm |
| Power Measurement Range | +3 to -55 dB |
| Resolution | 0.01 dB |
| Battery Life | 250 hours typical |
| PC Connectivity | Serial Port, RS232, DB9 |

**SimpliFiber ST Kit includes:**
LED sources at 850 and 1300nm, ST adaptors, meter with interchangeable connector adaptor
**SimpliFiber SC Kit includes:**
LED sources at 850 and 1300nm, SC adaptors, meter with interchangeable connector adaptor
**Accessories:**

- **SimpliFiber 1310 Source ST:** 1310nm laser source and ST adaptor
- **SimpliFiber 1310 Source SC:** 1310nm laser source and SC adaptor
- **SimpliFiber 1550 Source ST:** 1550nm laser source and ST adaptor
- **SimpliFiber 1550 Source SC:** 1550nm laser source and SC adaptor

415921.428982

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| SimpliFiber ST Kit | 980-8680 | 1,047.00 | 1,026.06 |
| SimpliFiber SC Kit | 980-8698 | 1,046.00 | 1,025.08 |
| Fibre Optic Meter | 980-8701 | 587.00 | 575.26 |
| ST Source, 1310nm | 980-8710 | 718.00 | 703.64 |
| SC Source, 1310nm | 980-8728 | 718.00 | 703.64 |
| ST Source, 1550nm | 980-8736 | 1,112.00 | 1,089.76 |
| ST Adaptor | 980-8752 | 57.00 | 55.86 |
| SC Adaptor | 980-8760 | 57.00 | 55.86 |

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Over 480,000 products online GO

## Fibre Test Kits

**FTK-150, 300 and 400**







**FTK150 Basic Fibre Verification Kit**
A great starter kit for contractors and network technicians who install and maintain fibre links with multimode optical fibre. Verify optical loss and power levels at 850nm, 1300nm with SimpliFiber Optical Loss Test Set. Add single-mode sources, microscope, and VFL options as needed.
**Kit contains:** SimpliFiber Power Meter, 850/1300 (multimode) SimpliFiber light Sources, Carrying Case, Linkware results download and management software, download cable, and user manuals.

**FTK300 Multimode Fibre Verification Kit**
The FTK300 Kit is for contractors and network technicians who install and maintain multimode premise networks. Verify optical loss and power levels at 850nm, 1300nm with SimpliFiber Optical Loss Test Set. Inspect fibre endfaces at 200X power with Fluke Networks' hand held Fibre Viewer optical microscope, and visually locate cable faults, connector problems and polarity issues with VisiFault Visual Fault Locator.
**Everything required to test power loss in multimode fibre installations, in one case:** SimpliFiber Power Meter, 850/1300 (multimode) SimpliFiber light Sources, VisiFault Visual Fault Locator, FT120 200x magnifying Fibre Viewer, Carrying Case, Linkware results download and management software, download cable, and user manuals.

**FTK400 Complete Fiber Verification Kit**
The FTK400 Kit is for contractors and network technicians who install and maintain premises networks with both multimode and singlemode optical fibre. Verify optical loss and power levels at 850nm, 1300nm, 1310nm and 1550nm with SimpliFiber Optical Loss Test Set. Inspect fibre endfaces at 200X power with Fluke Networks' hand held Fibre Viewer optical microscope, and visually locate cable faults, connector problems and polarity issues with VisiFault Visual Fault Locator.
**Everything required to test power loss in both single and multimode fibre installations, in one case:** SimpliFiber Power Meter, 850/1300 (multimode) and 1310 and 1550nm (single-mode) SimpliFiber light Sources, VisiFault Visual Fault Locator, FT120 200x magnifying Fiber Viewer, Carrying Case, Linkware results download and management software, download cable, and user manuals.

450145.460930

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| FTK-150 | **130-0493** | 1,145.00 | 1,122.10 | 1,099.66 |
| FTK-300 | **130-0494** | 1,554.00 | 1,522.92 | 1,492.46 |
| FTK-400 | **130-0495** | 3,378.00 | 3,310.44 | 3,244.23 |

## Line Tester



H=133, W=15, D=10.

- A low cost line tester which gives indication, with LEDs, of correct line voltage, presence of dial tone and line polarity reversal
- Requires no batteries and is housed in a vivid yellow case.
- More sophisticated devices such as modems, facsimile machines andcomputer equipment now beingconnected to the telephone networkare more critical to line conditions and especially to line reversal
- Invaluable installation or test tool which should always be used prior to connection of any equipment.

206925

| Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|
| **106-306** | 16.69 | 14.93 | 12.84 | 11.12 |

## Multi-Network Cable Tester



A quick network cable tester to verify the correct wiring, continuity and polarisation of BNC Ethernet coaxial cables and 10-Base-T(UTP/STP), EIA/TIA-568B, 356A and Token ring modular RJ45 network cables. By using the remote terminator, the unit allows cables to be tested before and after installation. Powered by 1x 9V PP3 type battery – not supplied.

- Tests BNC Ethernet cabling
- Tests 10-Base-T(UTP/STP), EIA/TIA-568B, 258A and Token ring cabling
- Test ground shielding
- LEDs indicate the status and connections of the cables
- Supplied with soft carry case

447504.267470

| Description | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Multi-Network Cable Tester | **127-7678** | 20.09 | 18.16 |

## Enhanced Network Cable Tester



A quick network cable tester to verify the correct wiring, continuity and polarisation of 10-Base-T (UTP/STP), EIA/TIA-568B, 356A and Token ring modular RJ45 network cables. By using the remote terminator, the unit allows cables to be tested before and after installation.
Powered by 1x PP3 type battery - not supplied

- Test 10-Base-T(UTP/STP), EIA/TIA-568B, 356A and Token ring cabling
- LEDs indicate the status and connections of the cables
- Tests shielding
- Supplied with soft carry case

249558

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 3PK-NT008 | **433-8856** | 36.87 | 34.36 |

## LAN Cable Tester



W=116 H=68 D=28mm. Weight 230g

Verify cable integrity of Datacom, Telecom and Coaxial cables, with an easy-to-read LED display.

- Instantly indicates cable type and tests for faults
- Button-free operation, just plug cable in and read results
- Checks datacom/network, voice/telecom, crossover and shielded cables
- Battery low indicator
- Powered from 9V alkaline battery
- RJ45 jack, accepts RJ45 & RJ11 plugs

414697.403887

| Description | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| LAN Cable Tester | **100-3017** | 33.71 | 29.97 | 25.53 |

## Remote Cable Sniffer



A network tester for USOC4/6/8, Ethernet 10-BaseT/ 10Base2, EIA/TIA-568A/B, A&T 258A, Token ring, telephone, Appletalk, PhoneNet cabling systems. Ideal for testing cable before and after installation. Supplied with carry case

- Open/Short wiring test
- Connected wires displayed
- No connection/termination display
- One step operation
- Automatic deactivation
- Seperable 10Base2 terminator value detection
- RJ45, RJ11,BNC and 3-pin Mini DIN connections
- LED indicators
- Powered by 1x9V PP3 battery - not supplied

# Data Networks & Telecommunications - continued

## Remote Cable Sniffer - continued

248560

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 3PK-NT001 | **428-3296** | 56.38 | 50.23 |

## Modular Wiring Tester

**UTP and STP Cable Testing**



H=144, W=60, D=41.5

The SLT3-S consists of a master and remote unit for separate end-to-end continuity testing of shielded twisted pair cables. Each unit has a shielded socket to accept USOC, 258A and 258B type modular connectors. The tester will test 2, 4, 6 and 8 wire circuitry for shorts, opens and miswires. The master and remote halves snap together when not in use.

The master unit requires a 9V PP3 style battery as supplied.

222516

| Order Code | Price Each 1+ | 5+ |
|---|---|---|
| **648-930** | 82.75 | 78.62 |

## LAN Pro Navigator

**Network Data and Coaxial Cable Tester**



- Two piece tester includes mains unit and remote with test results at both ends
- Traces wires with audio tones and remote lights
- Quick fault analysis on coax and data cables
- CAT-5 or CAT-6 (UTP / STP) cable testing
- Detects opens, shorts, crossed wires and split pairs
- One Button **Pass/Fail Test**
- 9V battery with auto off function for longer battery life

238282

| | Mftrs. List No. | Order Code | Price Each |
|---|---|---|---|
| LAN Pro Navigator | 1543 | **396-5776** | 86.28 |

## Lan Cable Tester LED Display



- Test pin configuration for:10/100 base -T cable 10 base-2 cable, RJ45 modular cables, AT&T 258A cable, EIA / TIA 568A/568B cables, Token Ring Cable
- Verify the cable wiring for continuity, opens, shorts or incorrect wiring
- Test installed cable on wall plate or the patch panels by using the Remote Termination module
- Perform Loopback Test or Remote Test
- Buzzer sound warning for error condition in cable
- Two sets of LED lights for Source and Test indication
- Maximum line length: > 300 meters
- Connector types: RJ45, BNC
- Unit ships with Remote Terminator, 1 ea RJ45 to female BNC cable, 1 ea RJ45 to male BNC cable, 1 ea 1 RJ45 to RJ45 cable, 1 ea female BNC to female BNC connector, 9 volt battery and Users Manual

525731

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| LAN-1 | **167-1227** | 55.00 | 53.35 |

## Network Cable Analyser

**Atlas IT**



The amazing Peak Atlas IT represents a revolution in network cable testing in terms of speed, size, ease of use and features.

Simply connect one end of your network cable to the Atlas IT and the other end to the Atlas Terminator and press the test button. Within seconds, the display verifies the cable and identifies it as either a Straight Through (PC-Hub type) or a Cross-Over (PC-PC type).

Additionally, the Atlas IT detects problems such as missing, shorted or wrongly wired connections, clearly highlighting this on its scrollable display.

The Atlas IT can even be used as a quick reference guide: wiring instructions can be displayed on-screen when not testing cables, and battery life is extended with its automatic switch-off feature, if not used for more than 30 seconds.

- Automatic identification os Straight-Through patch cables
- Automatic identification of Cross-Over cables
- Automatic analysis of above cable types
- Analyses all 8 lines of cable
- Fault identification and highlighting for the following faults
  - —Short Lines
  - —Open Lines
  - —Swapped Lines
- Display of cable-making instructions when not testing cables
- Can test plug-plug, plug-socket and socket-socket
- Support for up to 150m (500ft) of cable
- Miniature Atlas Terminator, ideal for use in tight spaces
- Clear and user-friendly scrollable display
- Spare battery and spare Atlas Terminator supplied

232307

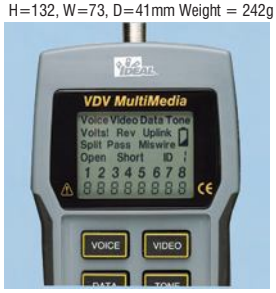
| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Cable Analyser | ATLAS IT | **388-2937** | 76.88 | 66.66 | 63.80 |
| Carry Case | ATC55 | **521-5511** | 12.96 | 11.51 | 11.02 |

## Multimedia Cable Tester

**33-856**



H=132, W=73, D=41mm Weight = 242g





The VDV (Voice, Data and Video) Multimedia Cable Tester is an easy-to-use cable testing and verification device that can quickly test all wiring requirements found throughout todays residential and commercial environments.

- Comprehensive testing for Voice, Data and Video (VDV) applications
- Supports RJ11/12, RJ45, and coax F-connector cabling and interfaces
- Easy to read LCD display with PASS/Miswire indicators, wiremap display and troubleshooting modes
- Multi-tone support for cable tracing and fault isolation
- Convenient internal storage for remote
- Can support additional remotes. Seven additional remotes, #2 to #8 are available separately **(LA-4235)**

| | |
|---|---|
| Cable types | Phone cable (3 pair USOC and 6 position RJ11/12)<br>Data cable shielded or unshielded CAT 3,4,5, 5E, 6<br>Coax cable 100 ohms max DC resistance |
| Minimum cable length for testing | 1 meter |
| Battery | 9V alkaline |
| Operating temperature | 0 to 50°C |
| Storage temperature | -10 to 60°C |
| Humidity | 10% to 90%, non-condensing |

381617.381843

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|---|
| Cable tester | VDV | **851-9730** | 70.57 | 67.50 |
| RJ45 & RJ 11 Remotes | LA-4235 | **851-9749** | 71.61 | 69.54 |

## Cable Performance Tester

**SIGNALTEK**




- Qualify, Store, Print
- Gigabit Performance Qualification- Test to IEEE 802.3 standards
- Selectable Performance Testing- qualify performance of Data, Voice over IP, and IP Video applications
- Performs Gigabit Ethernet link establishment test in 10 seconds
- Data monitoring to detect intermittant network problems
- Internal and USB Data Storage - 20,000 tests internally or unlimited on USB Device
- Prints Easy-to-Read Pass/Fail Qualification Reports

**High Performance Gigabit Testing**

A cost-effective Gigabit Ethernet cable performance tester that tests the link's ability to support applications by transmitting Ethernet packets on the link and measuring performance according to the IEEE 802.3ab Gigabit Ethernet standard, the ultimate performance indicatorfor any network.

- Provides comprehensive cable testing for voice, data, and video applications
- Performs complete wiremap and length tests of: 1, 3, and 4 pair UTP/STP, and series 6/59 coaxial cable to TIA-568 A/B and TIA-570 standards
- Performs a full IEEE 802.3ab compliant Gigabit Ethernet packet test in about 35 seconds with 97% performance certainty
- Includes a TDR (Time Domain Reflectometer) for accurate length measurements and to aid in locating cabling faults by providing distance to short/open information

**Network Monitoring**

In addition to cable performance qualification, SIGNALTEK can be configured to run for several minutes or hours at a time. While stress testing critical network links, it transmits hundreds of Gigabits of information across the network while looking for dropped packets. This monitoring mode allows the tester to be used to isolate intermittent network problems that are difficult to detect.

- Offers service detection to verify true 10/100/1000Mbps Ethernet operations
- Provides Bit Error Rate test for VoIP, data, and videoover-IP applications
- User-defined data logging and network monitoring to detect problems that may cause network outages
- Selectable test modes to qualify cabling support of Data, Voice over IP, and IP Video transmissions

**IP Device Testing**

SIGNALTEK leverages its tri-speed (10/100/1000) Ethernet processor to provide performance and activity testing of any addressable IPdevice in the network.

- IP pinging can be used to verify the communication of many devices including IP cameras, home automation, and A/V control panels
- Offers network diagnostic tools such as link establishment, port LED blink, and ping
- Supports static and dynamic (DHCP) IP configuration
- Allows multiple target IP and web addresses for pinging several network devices and confirming operation of network switchesand routers

**Supplied with:** Near-end and remote-end handsets, Black Nylon carrying case, 2x 30cm RJ11 cables, 2x 60cm RJ45-to-F patch leads, 2x 30cm RJ45 shielded patch leads, 2x 30cm RJ45-twin alligator clip leads, 8x AA alkaline batteries, USB cable, Quickstart guide, CD-ROM User Manual.

**Cable Types**

| | |
|---|---|
| Voice/Phone Cable | USOC / RJ11 / RJ12 interface |
| Data Cable | (STP / UTP) RJ45 for CAT 3/5e/6/6a/7 cabling |
| Coax Cable | via RJ45-to-F patch lead, series 58, 59, 6 cabling (75Ω) |

**Ports / Connections**

RJ45 Test Interface, Mini USB-A device port, standard USB-B host port, DC power input

**Battery Life**

| | |
|---|---|
| Standby | 90 days |
| Cable Testing | 30 hours |
| Network Monitoring | 4 hours |

**Physical Dimensions**

| | |
|---|---|
| Display Handset (WxHxD) | 91 x 201 x 38mm. Weight 354g |
| Remote Handset (WxHxD) | 89 x 173 x 38mm. Weight 255g |

450678.460934

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| 33-974 | **129-6369** | 908.43 | 862.75 | 810.99 |

## Coming soon

Register your interest for items that are 'Coming Soon' at **www.farnell.co.uk** and we'll email you to let you know that they're in stock.

## Multimedia Qualification Testers

**SIGNALTEK FO**




- Full IEEE 802.3ab compliant Gigabit Ethernet testing on copper and fibre
- BERT testing for VoIP, data, and video-over-IP applications
- Supports DHCP and IP Ping
- BERT testing adds assurance that fibre optic links can actually support high-speed data in accordance with IEEE 802.3ab standards
- Logs Multimedia Gigabit Qualification - multimode and singlemode capability
- Available in 850nm and 1300nm wavelength configurations
- Measure cable attenuation with a dynamic range of up to 20dB
- Guarantee link operation at 1GBbps within IEEE error tolerances
- Interchangeable Small form-Factor Pluggable port with duplex LC connector for fibre-optic testing
- Storage and Reporting for Thousands of Reports - store and print reports for copper and fibre jobs using internal memory or USB flash drives
- Fibre activity LED's - red when transmitter is active - green when signal is detected
- Logs RJ-45 port for copper testing
- Comprehensive wire-mapping capabilities including TDR
- Measure cable Customisable test reports
- Intuitive graphical user interface
- Expandable data storage

**All models supplied with:** Near-end and remote-end handsets, carry case, copper cable interface kit with interfaces for RJ45, RJ11, Coax F Type cables and alligator cllips; fibre optic accessory kit with 2x 2m duplex LC-SC 50/125µm cables, 2x 2m duplex LC-SC 62.5/125µm cable, duplex SC adaptor; 8x AA alkaline batteries, 2x AC power adpators with international plugs, USB cable, CD-ROM User Manual and Training DVD.

**Models**

**33-984:** SIGNALTEK FO with 2x 850nm SFP modules **33-986:** SIGNALTEK FO with 2x 850nm & 2x 13x0nm SFP modules

**Cable Types**

| | |
|---|---|
| Voice/Phone Cable | USOC / RJ11 / RJ12 interface |
| Data Cable | (STP / UTP) RJ45 for CAT 3/5e/6/6a/7 |
| Coax Cable | via RJ45-to-F patch lead, series 58, 59, 6 cabling (75Ω) |

**Fibre Types**

Single mode and multi mode
Available in 800nm and 1350nm configurations

**Ports / Connections**

Shielded RJ45 Port - supports 10/100/1000Mbps
USB A/B, DC Power Input
SFP Module Interface

**Measurements**

| | |
|---|---|
| TDR Length Measurement | 1-4 pair cables to 140m (not fibre) |
| BERT Error Rate (tested to IEEE802.3ab) | Copper: 10/100/1000Mbps<br>Fibre: 1000Mbps |

**SFP-850: 850nm Module**

| | |
|---|---|
| Compatible Fibre Types | 50/125µm or 62.5/125µm graded index multimode fibre |
| Power Output | -9.5dBm to -3dBm |
| Receiver Power Range | 0dBm to -20dBm |
| Max Link Length | 550m on 50/125µm<br>300m on 62.5/125µm |
| Operating Temperature | -10°C to 85°C, 85% RH |

**SFP-13X0: 1300nm Module**

| | |
|---|---|
| Compatible Fibre Types | 50/125µm or 62.5/125µm graded index multimode fibre<br>9/125µm step index single mode fibre |
| Power Output | -9dBm to -2.5dBm |
| Receiver Power Range | 0dBm to -22dBm |
| Max Link Length | 550m on 50/125µm<br>300m on 62.5/125µm<br>10km on 9/125µm fibre |
| Operating Temperature | -10°C to 85°C, 85% RH |

474067.474006

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| SIGNALTEK FO 33-984 | **135-5500** | 1,196.28 | 1,116.50 | 1,099.75 |
| SIGNALTEK FO 33-986 | **135-5502** | 1,852.38 | 1,587.75 | 1,481.90 |

## 2 in 1 LAN Tester & Multimeter



A practical multimeter that is also capable of testing network cables. It can easily check the pin configuration and also detect cable faults such as open-circuits, short-circuits and cross-overs on the following cable types:

- 10 Base-T Cat 5 Cable
- Coax
- RJ45/RJ11 Modular Cable
- 356A Cable
- TIA-568A/B Token Ring Cable

W=75 H=162 D=44mm. Weight 308g

## Data Networks & Telecommunications - continued

### 2 in 1 LAN Tester & Multimeter - continued

**Kit includes:**
Remote terminator for testing remote patch panels etc., cable adaptors, multimeter test leads, batteries and instruction manual.

| | Max. Range | Accuracy |
|---|---|---|
| AC Voltage | 600V | ±1.0% |
| DC Voltage | 600V | ±0.5% |
| AC Current | 200mA | ±1.8% |
| DC Current | 200mA | ±1.5% |
| Resistance | 20MΩ | ±0.8% |
| **General** | | |
| Continuity Buzzer | <150Ω | |
| Safety Category | CAT III 600V | |
| Power | 9V and 2x AAA (supplied) | |

446882.430809

| Order Code | Price Each 1+ | 5+ |
|---|---|---|
| 127-0534 | 31.62 | 25.86 |

### Amplifier Probe and Tone Generator

ProsKit



Amplifier and Tone generator set to quickly and accurately trace and identify wires or cables, even when in a bundle.

**Amplifier Probe**
- Compatible with all tone generators
- Adjustable volume level (1-9)
- Allows use of headphones via 3.5mm jack plug
- 9V battery 100hrs of use
- Signal LED

**Tone Generator**
- Red and black testing leads
- 3-position mode (Off, Cont and Tone)
- Single solid tone or dual alternating tone output
- RJ-11 (6 position, 4 contact) standard modular jack
- 3 LED displays (Cont, Tone and Low battery)

414718.403885

| Description | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| Amplifier Probe / Tone Generator | 100-3018 | 43.53 | 37.87 | 34.96 |

### LAN Wiremap Checker

**MicroMapper™**

FLUKE networks



A compact, handheld cable tester and toner designed for network professionals. Quickly and easily verifies the integrity of an Ethernet twisted-pair cabling installation giving you visibility of opens, shorts, crossed, reversed and split pairs. Just push the TEST button and MicroMapper will automatically scan all wire pairs for any existing faults in your cable. MicroMapper's built-in tone generator works with the IntelliTone Probe or any other analog probe, allowing you to trace cable through walls, floors, and ceilings. The MicroMapper also includes a remote unit that allows one person to test installed cabling or patch cords.

- Gain new vision into verifying basic Ethernet cabling integrity-quickly and easily
- Tests twisted-pair cables automatically for continuity and all major miswires
- Speeds troubleshooting with easy-to-read pair-based LED fault indicators
- Identifies hidden cables clearly with powerful inductive tone generator
- Enables one-person testing of installed cables with separate remote unit

**MicroMapper includes:**
MicroMapper and MicroMapper Remote, RJ45 patch cable, owners CD and quick start guide, 4x AAA alkaline batteries.

415906.428980

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| MicroMapper | 980-8639 | 87.00 | 85.26 |

## Troubleshooting tips

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

### Tone Generator and Probe

**540DK**

WAVETEK



A low cost cable identification and connector tracer used in moves, adds and changes to telephone, LAN, Security and alarm systems, CCTV, coax runs etc. The 541TG is a tone generator/sender and the 542SP is an inductive/sensing speaker probe.

- Traces End-to-End connections, locate and identify cables and connectors
- Probe's unique rubber tip will not break or crack
- LED provides visual indication of correct wire
- Volume adjustment control
- Industrial standard compatibility allows items to be used with similar devices that send or sense tones
- 541TG sends an alternating 900Hz/100Hz "warble"
- The tone generator includes both an RJ11 and a pair of alligator clips for quick attachment
- Both are powered by a 9V battery supplied

222542

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 540DK | 493-259 | 68.85 | 61.95 | 57.83 |

### 701 KIT Classic Tone and Probe Kit

Tempo



The 701Kit is recognised by technicians around the world as the indusry standard for cable and wire identification. The kit can be used to identify single conductors or cables within a bundle, at a cross connect pointer on any conductive material.

The Kit Includes: 77HP high power tone generator, 200EP Inductive amplifier and sturdy polyester carry case.

- Amplifier can be used with any tone generator
- Polarity testing
- Continuity testing
- Talk battery supply
- Selectable warble tone
- 3-colour LED (identifies AC ring voltage)
- Weather resistant design

449998.267524

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|
| 701K | 129-9484 | 61.07 | 56.93 | 56.93 |

### LAN Toner Kit

**AT8LK**

Tempo



Designed for network installation and maintenance.

- Trace wires and perform basic testing on Local Area Network cabling
- Blink Hub, Switch Port and PC activity lights for fast identification
- Detect active hubs and switches
- LAN circuitry, tone generator, line checker and modular breakout adapter combined in a single unit
- Send tone, check continuity and test polarity on any pair
- Adjustable volume probe with visual-signal indicator
- Special probe tip protects against damage to sensitive electronics

The Kit Includes: AT8L LAN Toner and 200GX Inductive Amplifier in a rugged, woven nylon carry case.

**AT8L LAN Toner**
- Blinks HUB, Switch Port, and PC activity lights for fast identification
- Selectable tone outputs for identifying multiple cable runs
- Polarity Indication
- Continuity Testing
- 8-position modular breakout tabs
- Multiple connection options
- Low Battery Indication
- Automatic Shut-off

**200GX Inductive Amplifier**
- New rugged, ergonomically-designed housing
- Powerful 2" speaker
- One-Button operation
- Adjustable Volume Control
- LED for visual signal strength indication
- Recessed tabs for telephone test or headset connection
- Speaker bypass when using telephone test sets
- Improved tip design for better reception and lower risk of shorting terminals
- Battery operated (9V not included)

450702.460932

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|---|
| Tone & Probe Kit | AT8LK | **129-9486** | 102.88 | 98.33 | 98.33 |
| Inductive Probe | 200GX | **129-9488** | 39.85 | 38.30 | 38.30 |
| LAN Toner | AT8L | **129-9489** | 50.51 | 48.65 | 48.65 |

## LAN Tester



A two piece LAN tester with 10/100/1000MB/s speed and duplex display.

- Speed measured 10, 100 or 1000MB/s
- Duplex full or half indicated by LED
- Tests single sided or inline device
- Verifies whether device appears as a hub (switch) or PC and whether pulses are data or link
- Tone gererator/probe to trace cable pairs through complex wiring systems
- Single sided cable pair testing - Verify what pairs are terminated in the hub, switch or PC
- Two sided cable pair testing - Display what pairs are wired; whether cable is straight through or crossover; and whether cable has pair reversals

**TVR10/100/1000K**

The unit answers the 12 most common questions that occur
- Is my hub/switch or PC ON and transmitting?
- Do I require a straight through or crossover patch cable?
- Is my LAN speed 10, 100 or 1000MB/s and is it half or full duplex?
- Is the hub/switch and PC link negotiating a slower speed and duplex than expected?
- Do my hub or PC appear as a hub or PC?
- Is a hub or PC connected to my cable?
- Does my hub or PC require 2 or 4 pair cables?
- What pairs are terminated in my cable?
- Where is my cable in the wiring closet?
- What hub port is my PC using?
- Is my cabling straight through or crossover?
- Does my cable have inverted pair or other faults?

414657.406423

| Description | Order Code | Price Each 1+ | + |
|---|---|---|---|
| LAN Tester | **945-3288** | 181.13 | – – |

## Toners and Probes

**Intellitone™ Series**



**IntelliTone™ 100 Kit:**
- Finds the cables others can't
- Smart digital signal processing rejects noise and false signals
- Audible, visual signal indication simplifies cable location in noisy environments
- Tones safely and clearly on active networks
- Diagnoses essential cable information with polarity, continuity, and talk battery
- Identifies and diagnoses POTS with Line 1 service and polarity
- Powerful talk battery capability tests telecom circuits
- Essential diagnostics include continuity and polarity tests
- Auto power off and low battery indicator

Breakthrough digital signal processing technology finds cables other toners/probes can't. Advanced sensing modes accurately find the correct cable bundle, and then rapidly isolate the exact cable from within that bundle. Two controlled audible songs and LED signal strength indicators simplify cable location, even in noisy environments. Digital signal processing rejects noise and safely tones active networks. Identifies and troubleshoots telecom POTS/services.

**IntelliTone 100 Kit includes:**
IntelliTone 100 Toner and 100 Probe, coax F connector adapter, RJ11 and RJ45 patch cables, test leads with alligator clips, lanyards, owners CD and quick start guide, two 9 volt batteries.

415830.428978

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| Intellitone 100 Kit | **980-8302** | 98.00 | 96.04 |

## MicroScanner² Cable Verifier





Next generation MicroScanner streamlines voice/data/video cable and service testing. Revolutionary user interface makes testing fast, easy, and crystal clear. Everything cable technicians need to know, including available services (10/100/1000 Ethernet, POTS, PoE voltage), cable length, wiremap, cable ID, and distance to fault all are displayed on one o"versized" backlit screen. Replace multiple tools by testing all RJ11, RJ45, and Coax (F) media with no adaptors. Built-in IntelliTone digital and analogue toning precisely locates virtually any cable or wire pair - even on active networks. Ergonomic design features sleek rubber over mould to enhance grip and ruggedness. Includes carry case.
- Displays cable length, wiremap, cable ID, and distance to fault on one screen
- Detects today's media services, including 10/100/1000 Ethernet, POTS, and PoE
- Locates virtually any cable or wire pair with IntelliTone digital and analogue toning
- Tests all common media types, including RJ11, RJ45, Coax, with no adaptors
- Rubber over mould enhances grip and increases ruggedness
- "Oversized" backlit LCD makes results crystal clear in any work environment
- Detail mode gives additional test status information
- Intuitive icons shows what's at the far end of any cable (10/100/1000 switch, POTS service, short, cable ID)

488974.502076

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Microscanner 2 | MICROSCANNER 2 | **146-7430** | 303.00 | 296.94 | 291.00 |
| Microscanner 2 Kit | MICROSCANNER 2 KIT | **146-7431** | 506.00 | 495.88 | 485.96 |
| Remote Identifier Kit 2-7 | MS2-IDK27 | **146-7432** | 168.00 | 164.64 | 161.35 |
| Pouch | MS2-POUCH | **146-7433** | 14.00 | 13.72 | 13.45 |

## Network Multimeter

**LinkRunner™**





W=70 H=95 D=32mm. Weight 128 g

Quickly verify and troubleshoot network drops with this essential personal networking tool. LinkRunner is so easy to use, even the most inexperienced technician can be up to speed and using it in a matter of minutes. This affordable, pocket-sized tool allows front-line network technicians to quickly determine if a problem is on the network or the PC NIC.
- Quickly troubleshoot network drops
- View Link, Length, Ping for each drop
- **Link:** check PC drops for connectivity, speed, duplex settings and service type. Identifies: 10/100/Gigabit Ethernet, Token Ring, Telco, Cable ID, un-powered PC or hub, Auto-MDIX ports and Auto-Negotiation or strapped ports.
- **Length:** checks cable configurations (wiremap, crossed, straight-through), finds faults (opens, shorts, splits) and length
- **Ping:** verifies connectivity to key network resources and PC NIC response
- 20 hours of typical use from 2x AA alkaline batteries (supplied)

The **LinkRunner Kit** comes bundled with **WhatsUp Key Device Watch Software** which:
- Discovers devices automatically

## Data Networks & Telecommunications - continued

### Network Multimeter - continued

**LinkRunner™ - continued**

- Monitors 10 key devices 24x7
- Notifies troubleshooter with problem location and type
- Speeds-up the troubleshooting process
- Provides trend analysis of network diagnostics

**LinkRunner Kit includes:**
LinkRunner Network Multimeter, Key Device Software and all the accessories below
**Accessories:**
- **RJ45 Adaptor:** RJ45 coupler to connect to network cable
- **Wire Mapper:** Wiremap Adaptor

416045.428985

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| LinkRunner | **980-8922** | 351.00 | 343.98 |
| LinkRunner Kit | **980-8930** | 675.00 | 661.50 |
| RJ45 Adaptor | **980-8957** | 6.00 | 5.85 |
| Wire Mapper | **980-8973** | 18.00 | 17.55 |

### LinkRunner™ Pro Network Multimeter

FLUKE networks








LinkRunner Pro enables technicians to resolve a broader range of today's connectivity problems. Unlike traditional 10/100 link testers, LinkRunner Pro verifies Gigabit link - increasingly important for today's high-performance networks. It also pings up to 10 key devices, detects Power over Ethernet (PoE), resolves 802.1X security conflicts, verifies cable wiremap, and identifies the nearest switch port with Cisco, Extreme and IEEE Link Layer Discovery Protocols (CDP/EDP/LLDP). Built-in IntelliTone digital toning precisely locates cables at patch panels and switches. Link status reports can be uploaded from USB port and routed with trouble tickets to expedite problem resolution.

- Link at 10/100/Gig - Identify device capabilities and confirm actual speed/duplex status
- Ping key devices - Measure response of DHCP, router, DNS, and other devices or URLs
- Verify 802.1X settings - Authenticate with EAP type, user name, certificates, and password
- Detect PoE service - Verify voltage level, and pairs to IEEE 802.3af specifications
- Test cable wiremap - Measure length; detect miswires, shorts, split pairs or opens
- Locate and ID cable - Use IntelliTone or optional IDs to locate cables at patch panels
- Document results - Upload link status reports with USB port for faster problem resolution

**LINKRUNNER PRO KIT** - Iincludes Wireview 2-6 wiremap adapters, Intellitone probe, carry case, CLIP-SET, and adaptors to standard LRPRO-1000
**CIQ-GSV** - Adds a CableIQ-100 Cable Qualifier to the LRPRO-KIT, for full Gigabit cable and network connectivity testing capabiliy

489271.503166

| Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|
| LINKRUNNER PRO | **146-7437** | 675.00 | 661.50 | 648.27 |
| LINKRUNNER PRO KIT | **146-7439** | 1,013.00 | 992.74 | 972.89 |
| CIQ-GSV | **146-7441** | 1,686.00 | 1,652.28 | 1,619.23 |

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**www.global-legislation.com**

### Inline Network Testers

**NetTool ™ Range**

FLUKE networks




Solve PC-to-network connectivity problems faster. See inline between the PC and network to quickly verify connection speed, duplex, utilisation, link configuration, health information and network resources. View services offered, name, IP address and subnet, problem log alerts, duplicate IPs, unanswered DNS queries, TCP/IP connection failures and more. NetTool combines cable, network and PC configuration in one palm-sized tool, so you'll have everything you need to quickly resolve even the toughest network connectivity problem.

- Quickly solve PC-to-network connectivity problems
- Verify network drops; link connectivity, speed, duplex settings, finds faults and cable length
- Identify PC network configuration devices used and problems
- Identify available network resources and services offered

W=78 H=125 D=43mm. Weight 210 g

**NetTool:**
An economical choice for single ended testing of network drops or PCs.

**NetTool Pro:**
Use this model to troubleshoot PC and network connections. Can be connected inline between a PC and the network to compare actual and advertised duplex settings, speed and link configuration.
- **Reporting:** view the full PC to network conversation
- **Ping:** verify connectivity to other network devices

**NetTool VoIP:**
See into VoIP calls by connecting between the IP phone and network and solve many problems without the need of a protocol analyzer. Diagnose phone boot-up problems, call control and measure key call quality metrics. NetTool is compatible with IP phones employing either SIP or SCCP call control protocols.
- **Boot Log:** displays key boot events and supports complete troubleshooting of the IP phone boot process
- **VoIP Log:** displays call control events, QoS configuration, and call quality metrics
- **VoIP Monitor:** tracks call quality in progress by measuring the RTP stream and RTCP endpoint information. Statistics are available for both the phone side and the network side while a call is in progress

**All NetTool models include:**
NetTool tester, serial cable, four AA batteries, wiremap adapter, quick reference guide, WhatsUp Key Device Watch Software mini-CD and CD with users manual and NetTool Blaster update utility software.

All NetTool models feature **WhatsUp Key Device Watch Software** which:
- Discovers devices automatically
- Monitors 10 key devices 24x7
- Notifies troubleshooter with problem location and type
- Speeds-up the troubleshooting process
- Provides trend analysis of network diagnostics

415985.428984

| Description | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| NetTool | **980-8850** | 710.00 | 695.80 |
| NetTool Pro | **980-8868** | 1,017.00 | 996.66 |
| NetTool VoIP | **980-8876** | 1,272.00 | 1,240.20 |

### NetTool™ Series II Inline Network Tester

FLUKE networks




Isolate and document network device and application connectivity issues in seconds. See connectivity to key network devices and services with NetProve™ diagnostics - the fastest way to isolate the source of the problem - whether the cause is the LAN, WAN, firewall, server or application. Get inline visibility into 10/100/Gig links to see actual traffic between switches, PCs, IP phones and other devices. Quickly diagnose IP phone problems and measure key call quality metrics. Verify the readiness of PoE systems and troubleshoot PoE device problems. Speed cable and fault location on active networks with IntelliTone™ digital technology. Create comprehensive reports of your network.

- NetProve™ diagnostics - isolate device and application connectivity issues in seconds
- Quickly resolve and document network problems with powerful inline visibility into 10/100/Gig links between switches, PCs, IP phones and other devices
- Connect inline for visibility into VoIP calls to quickly di-

agnose IP phone boot-up and call control problems and to measure key call quality metrics **(NETTOOL II VOIP)**
- Verify readiness of PoE systems and troubleshoot PoE device problems
- IntelliTone™ digital cable location and isolation technology speeds cable troubleshooting

Supplied with interface cable, batteries (4 x AA), wiremap adaptor, user guide and resource CD with user manual and companion utility software

**NETTOOL II PRO** - 10/100/1000 Inline testing, NetProve, PoE, IntelliTone toning, reporter
**NETTOOL II VOIP** - 10/100/1000 Inline testing, VoIP application, NetProve, PoE, IntelliTone toning, reporter
**Powerpack** - AC Adaptor and a set of 4 rechargeable NiMH batteries
**Wiremap Adaptors 2-6** - Remote adaptors enhance cable test results

488946

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Network Tester | NETTOOL II PRO | **146-7425** | 1,686.00 | 1,652.28 | 1,619.23 |
| Network Tester, VOIP | NETTOOL II VOIP | **146-7427** | 2,024.00 | 1,983.52 | 1,943.85 |
| Powerpack | NTS2-POWERPACK | **146-7428** | 40.00 | 39.20 | 38.42 |
| Wiremap Adaptors 2-6 | WIREVIEW2-6 | **146-7429** | 235.00 | 230.30 | 225.69 |

## LAN Qualification Tester

**CableIQ™**





**Supported Tests:**
- wiremap
- cable length
- cable signal performance
- digital toner
- Ethernet port detection and identification
- analogue telephone detection
- blink port light
- continuity
- speaker test
- cable fault finding
- video signal detection

W=89 H=178 D=45mm.
Weight 550 g

- Sees if your existing cabling can support voice, VoIP, 10/100/Gigabit Ethernet, 1394b S100, Telco, Wiremap only, Coax
- Troubleshoots why existing cabling plant can't support the desired network bandwidth: measures crosstalk and impedance and compares against qualification standards, detects location of large point sources and distributed sources in the cabling.
- Discovers what's at the end of any cable and displays device configuration (speed/duplex/pairing)
- Frees-up switch ports and identifies unused links
- Graphically maps wiring configuration and shows distance to faults with Intelligent Wiremap including Multimap mode which supports seven remote office identifiers, draws proportional wire length to breaks and detects split pairs.
- Tests all copper cabling media: UTP, STP, FTP, SSTP, RG6, RG59, twisted-pair, coax, audio and security cabling
- Locates and traces cable with IntelliTone digital signaling technology
- Can store up to 250 test results
- 20 hours of typical use from 4x AA alkaline batteries (supplied)

CableIQ is the first qualification tool designed for network technicians who need to troubleshoot connectivity problems and qualify cabling bandwidth. It gives network techs the vision to see whether an existing cabling link is qualified to support 10/100, VoIP or Gigabit Ethernet, quickly isolate cabling from network problems and discover what is at the far end of any cable. It detects speed and duplex settings of attached switches and PCs. Intelligent wiremap graphically shows distance to faults (e.g., pin 1 break at 11m). Lightweight, rugged, reliable unit tests all copper cabling. Its ease and power can help you close trouble tickets faster and ensure smooth upgrades to higher network speeds.

**Cable IQ Tester includes:**
CableIQ Tester with remote adapter, soft carrying case and four AA batteries.
**Cable IQ Tester Kit includes:**
CableIQ with remote adapter, IntelliTone 200 Probe, six remote office IDs, rugged carrying case and four AA batteries.

**Cable IQ Service Kit includes:**
CableIQ Qualification Tester, six CableIQ Remote Identifiers, CableIQ Reporter software CD, RJ45-RJ45 shielded patch cords (2), USB cable, coax "F" push-on cable, RJ45/RJ11 universal coupler, LinkRunner Network Multimeter, LinkRunner main wiremap adapter, IntelliTone Digital Probe 200, test accessory soft pouch, owners CD and quick start guide, packaged in a rugged carrying case; one (1) 9V and six (6) AA batteries included

**Cable IQ Gigabit Service Kit includes:**
CableIQ Qualification Tester, LinkRunner Pro Network Multimeter, IntelliTone Pro 200 Probe, CableIQ Remote Identifiers #1-7, WireView Cable ID #1, CableIQ Reporter software CD, RJ45-RJ45 shielded patch cords (2), USB cable, coax "F" push-on cable, RJ45/RJ11 universal coupler, USB cable, test accessory soft pouch, CableIQ Getting Started Guide, LinkRunner Pro Getting Started Guide, IntelliTone Pro Getting Started Guide, eight (8) AA batteries, one 9V battery, packaged in a deluxe Fluke Networks carry case

415964.428983

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| CableIQ Tester | CABLEIQ | **980-8779** | 740.00 | 725.20 |
| CableIQ Tester Kit | CABLEIQ KIT | **980-8787** | 1,118.00 | 1,095.64 |
| CableIQ Service Kit | CIQ-SVC | **146-7442** | 1,416.00 | 1,387.68 |
| CableIQ Gb Service Kit | CIQ-GSV | **146-7441** | 1,686.00 | 1,652.28 |

## LAN Tester and Certifier

**RWC 1000K**



A certifier that identifies your cable as 3, 5, 5E and 6 as well as performing all standard cable tests (length, open, shorts, split pairs etc). A visual graph can be viewed while testing the cable as well as storing up to 250 tests for viewing later.

- Speed tests (10, 100, 1000MB (Gigabit))
- Real world cert level 1 (projected)
- Real world cert level 2 (confirmed)
- Digital cable typing (CAT 3,5,5E,6)
- Displays port speed, duplex, data levels of all pairs
- Inline port mode (negotiated results)
- Port beacon (locate port)
- Cable length (real 1 nanosecond TDR)
- Opens, shorts
- Split pairs, splits distance
- Next, Next (far)
- Skew, propagation delay
- Attenuation, hot splits
- Multi-pair toner/probe
- Stores 250 tests for printing (requires PC with Excel)

414658.406430

| Description | Order Code | Price Each 1+ | + |
|---|---|---|---|
| LAN Tester & Certifier | **945-3300** | 412.97 | – – |

## Compact DSP Telephone Test Set



A low cost, compact test set, featuring the unique "Digital Services Protection" design feature which allows the tester to be used safely in a mixed analogue and digital services network.
- Low cost, fully featured test set
- 'DSP' protection against dropping a digital line
- Main cross protection
- Rugged drop proof design
- Over current protection
- Auto power off
- Rugged belt clip

248948

| Mftrs. List No. | Description | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|---|
| M0452/100 | Compact DSP | **428-4173** | 64.79 | 62.99 |
| M0459/01 | BT Lead Set | **428-4185** | 5.25 | 5.12 |

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## Data Networks & Telecommunications - continued

### Test Telephone

**Alert 340**



A highly specified, fully waterproof test telephone for the monitoring and testing of telephone lines or for use as a normal phone in remote locations. The unit features a high impact case, chemical resistant, wrap around rubber boot and a belt clip. Gives clear transmission without crackle or noise.

**Alert 340**

Includes an in-built loudspeaker for monitoring

- Data and digital safe monitor
- Large keypad, wide spacing on the outside of the handset
- Talk, monitor and on-hook modes
- Quick-change line cord
- Super high impedance monitor (>300kΩ)
- Tone and Pulse dialling
- 10 memory, 24 digits
- Polarity test LEDs
- Timed-Break-Recall (100msec) for PABX use
- Mute function
- Last number redial
- Battery installed
- Full operation at 15mA
- Separation cord compartment
- Maximum line length: >2.5kΩ
- Waterproof to IP64, floats in water

248949

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ | + |
|---|---|---|---|---|
| ALERT 340 | **506-3152** | 98.84 | 96.10 | – – |

### Test Telephone

**PE830**



The Tele-Mate™ Pro Telephone Test Set will help you deal with the increasing complexity of telecom installation and maintenance. A complete butt-in test set, the PE830 adds useful features like loudspeaker monitor, caller ID, speed dial, callback, intercom and line voltage/current/frequency meter. The Tele-Mate™ Pro not only works in handset mode, but can be used with the standard headset included and with the amplified loudspeaker line monitor. You can use the premium telco-type test leads and clips or the integral modular jack for line connection.

- Complete telephone set with ringer
- Phone-to-phone intercom
- Modular or alligator clip connection
- LCD Display in English, Spanish or French
- Caller ID with name display
- Call waiting Caller ID
- Missed call indication
- Line voltage and current display
- High voltage detect and lockout
- High current detect and lockout
- Amplified loudspeaker line monitor
- Headset or handset operation
- Tone and pulse dialing
- Large 10-location speed dialing memory
- Multi-memory redial
- Bellcore and ETSI Caller ID compatible
- TIA/EIA RS-470-B telephone performance
- High voltage alert 120 VDC
- High current alert 125 mA

339559

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| PE830 | **506-3206** | 146.35 | 142.28 |

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### Starter Telephone Test Kit

**TS-19**



Specifically designed for in-house telecom technicians, the TS-19 Test Set combines all the basic test set features at a value price - plus it provides DataSafe protection to prevent accidental disruption of data service in monitor mode.

- High-impedance DataSafe operation in monitor mode
- Tone (DTMF) and pulse operation
- Last number redial
- Polarity indication in talk mode

The Fluke Networks TS19 Test Set combines all the essential test set features at a value price. This test set was specifically designed for in-house telecom technicians. Its high-impedance monitor prevents accidental disruption of service from clipping onto a data linewhile in monitor mode, thus ensuring the integrity of critical data lines. Features such as tone (DTMF) or pulse operation, talk/monitor capabilities, polarity test button and last number redial make this test set the perfect combination of features and price.

450136.460925

| Description | Mfrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Test Telephone | TS19 | **130-0481** | 69.00 | 67.62 | 66.27 |

### Weatherproof Telephone Test Kit

**TS-120**



- High-impedance monitor mode
- Tone and pulse operation
- Last number redial in tone and pulse modes
- RainSafe test set for use in extreme weather conditions
- Hook flash button
- Fully functional with either line polarity
- Audible electronic ringer for call backs
- High current and over voltage protection
- High-impact polycarbonate case
- Field replaceable spring-loaded belt clip
- Hearing aid compatible receiver
- Transmitter mute switch
- Talk and monitor modes
- Ergonomic design
- Lightweight unit is easily transported

This durable test set provides superior rugged quality at an affordable price. In addition to its DropSafe reliability and RainSafe protection, the TS120 offers DataSafe data protection in monitor mode.

450138.460926

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Test Telephone | TS120 | **130-0482** | 114.00 | 111.72 | 109.49 |

### Telephone Test Kit with Caller ID

**TS-25D**



User friendly with an oversized LCD display and intuitive, common sense menus.

- Caller ID
- Data lockout and data lockout override
- DSL/POTS filtering technology lets you safely draw dial tone from a pair that is carrying voice and ADSL without downing the ADSL service
- Built-in analogue tone generator for tracing and identifying wires with a probe
- DTMF digit grabbing capability
- Talk battery to supply power to non-powered (dry) pairs to carry voice conversation
- Row/column tones for single tone dialing
- High voltage lockout, low voltage lockout
- Continual data detection in monitor mode
- Over voltage and over current protection
- Amplified speaker for hands-free monitoring
- Programmable phonebook stored in non-volatile memory
- Speed dial (10 memories, 23 digits each)
- Selectable flash and pause duration
- Battery level indicator

This feature-rich test set is a necessity for a variety of installs. The TS25D Test Set features data lockout and lockout override, making you completely safe in talk or monitor mode. The DSL/POTS filtering technology allows you to safely draw dial tone without downing DSL. A built-in analogue tone generator simplifies wire identification with a probe. An amplified speaker makes monitoring the line hands-free, so you can keep working. The talk battery function provides voltage to carry voice conversation on non-powered pairs. All in a compact unit with an oversized robust LCD display that makes the intuitive, common-sense menus easy to read and use.

450140.460927

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|---|
| Test Telephone | TS25D | **130-0483** | 152.00 | 148.96 | 145.98 |

## Modular Adaptors

Tempo



A range of modular breakout adaptors to make modular connections easy to access by alligator clips.

**428-3363:** RJ11 type plug to 6x bare copper test points
**428-3375:** BT 631A type plug to 6x bare copper tet points
**428-3387:** RJ45 type plug to 8x copper test points

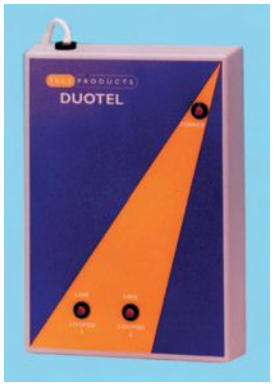
248607

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| M0008/09A | **428-3363** | 7.33 | 7.17 |
| M0008/00A/B | **428-3375** | 7.33 | 7.17 |
| M0110/01A | **428-3387** | 9.03 | 8.84 |

## Telephone Exchange Simulators

TELEPRODUCTS

**DOUTEL**




Exchange simulator which allows calls to be established between two ports. The unit provides a cost effective and simple means of testing products that connect to a telephone line, without the need to tie up any PBX extensions or external lines. The compact design of the unit makes it convenient to transport and is ideal for demonstrations, training and sales presentations.

- 2 ports
- Each port has its own unique number which can be dialled from the other ports to produce a ring signal.
- Unique number for each port
- Line looped indication for each port
- Tone dialling
- Dual dial tones
- Produces dial, busy and ring tones
- Mains powered
- Supplied with BT to RJ socket converters

339912.267822

| Order Code | Price Each |
|---|---|
| **498-9790** | 173.88 |

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# Audio/Video & Security

## Audio Cable Tester

**AudioJog Pro**





L=197, W=110, D=50mm

**Connectors:**
- 3 Pole XLR Male and Female
- 6.35mm Jack, stereo or mono
- Single or Twin 4.4mm Bantam, stereo or mono
- 3.5mm Jack, stereo or mono
- 4 Pole Speakon
- DIN 180o 3 & 5 Pole
- RCA Phono
- BNC

**Memory option:**
- 3 LEDs indicate the state of the MEMORY option
- If the MEMORY LED is on, then AudioJoG Pro automatically scans all the connections
- MEMORY works in both test modes

**Test modes:**
- DOUBLE ENDED - both ends of the cable under test are plugged into AudioJoG Pro
- SINGLE ENDED - one end of the cable under test is plugged into AudioJoG Pro the other into another AudioJoG Pro or the 19 inch rack mount AudioJoG Rack

A device for finding short, open and crossed circuits. There are 2 rows of 6 LEDs corresponding to each of the possible connector pins and one for the screen (or ground) connection. As each pin is activated, the LEDs indicate all connections associated with that pin, so that short, open and crossed circuits can be easily found. The LEDs also show the possibility of high resistance or leakage connections.

| | Open ended | Single ended |
|---|---|---|
| Continuity and Short Circuits | <255kΩ | <75kΩ |
| Open Circuits (end to end and between connected pins) | >255kΩ | >75kΩ |
| Test time | <2 seconds | <5 seconds |
| Power | 9V PP3 Battery (not supplied) | |

347641

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| AUDIOJOG PRO | **506-3097** | 120.88 |

## Cable Tester, AudioJog Pro 8

CableJoG®



New

There are 2 rows of 9 LED's corresponding to each of the possible connector pins and one for the screen (or ground) connection. As each pin is activated, the LED's indicate all connections associated with that pin, so that short, open and crossed circuits can be easily found. The LED's also show the possibility of high resistance or leakage connections. 2 LED's indicate a good digital network connection, either Straight through, or Crossed over.

**Memory option:**
- There are 4 LED's indicating the state of the memory option.
- If the memory LED is on, then AudioJoG Pro 8 automatically scans all the connections and compares against information held with just one press of the test button.
- Memory works in both test modes.

**Test modes:**
- Double ended - both ends of the cable under test are plugged into AudioJoGPro 8
- Single ended - each end of the cable under test is plugged into a AudioJoG Pro 8

**Local Connectors:**
- 3, 4 & 5 Pole XLR Male
- 6.35mm Jack, stereo or mono
- Single or Twin 4.4mm Bantam, stereo or mono
- 3.5mm Jack, stereo or mono
- 4 & 8 Pole Speakon
- DIN 3, 5 (180°) & 8 Pole
- RCA Phono
- BNC
- RJ45
- USB A

**Remote Connectors:**
- 3, 4 & 5 Pole XLR Female
- 6.35mm Jack, stereo or mono
- Single or Twin 4.4mm Bantam, stereo or mono
- 3.5mm Jack, stereo or mono
- 4 & 8 Pole Speakon
- DIN 3, 5 (180°) & 8 Pole
- RCA Phono
- BNC
- RJ45
- USB B

525195

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| AUDIOJOG PRO 8 | **166-4794** | 144.20 |

## Audio/Video & Security - continued

### Cable Tester, AudioJog Rack 8

CableJoG®



New

There are 2 rows of 9 LED's corresponding to each of the possible connector pins and one for the screen (or ground) connection. As each pin is activated, the LED's indicate all connections associated with that pin, so that short, open and crossed circuits can be easily found. The LED's also show the possibility of high resistance or leakage connections. 2 LED's indicate a good digital network connection, either Straight through, or Crossed over.

**Memory option:**
- There are 6 LED's indicating the state of the Memory option.
- If the Memory LED is on, then AudioJoG Rack 8 automatically scans all the connections and compares against information held with just one press of the test button.
- Memory works in both test modes.

**Test modes:**
- Double ended - both ends of the cable under test are plugged into AudioJoG Rack 8
- Single ended - one end of the cable under test is plugged into AudioJoG Rack 8 the other into another AudioJoG Rack 8 or the small hand held AudioJoG Pro 8.

**Local Connectors:**
- 3, 4 & 5 Pole XLR Male
- 6.35mm Jack, stereo or mono
- Single or Twin 4.4mm Bantam, stereo or mono
- 3.5mm Jack, stereo or mono
- 2, 4 & 8 Pole Speakon
- DIN 3, 5 (180°) & 8 Pole
- MINI DIN 4 Pole
- RCA Phono
- BNC
- RJ45, EtherCon
- USB A
- 4mm (x2)

**Remote Connectors:**
- 3, 4 & 5 Pole XLR Female
- 6.35mm Jack, stereo or mono
- Single or Twin 4.4mm Bantam, stereo or mono
- 3.5mm Jack, stereo or mono
- 2, 4 & 8 Pole Speakon
- DIN 3, 5 (180o) & 8 Pole
- MINI DIN 4 Pole
- RCA Phono
- BNC
- RJ45, EtherCon
- USB B
- 4mm (x2)

525196

| Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|
| AUDIOJOG RACK 8 | **166-4795** | 317.95 |

### Digital Satellite Meter

HORIZON

**HDSM USB**




New

HDSM USB enables the user to quickly and accurately perform satellite installations saving you time, money and reducing expensive call backs. Up to 64 satellite selections can be stored by creating your own preferred list directly from the Horizon web site. Up to date downloads from the web site ensure that your meter has the latest settings and you can request custom files for VSAT installations (free of charge).

- 128 x 64 pixel high brightness backlit LCD
- Full Speed USB 2 interface with automatic driver download
- Full backwards compatibility with existing HDSM downloads
- Nylon F connectors for maximum durability
- Fast processor with recall of last selection used
- L-Band, C-Band, Ku-Band and Ka-Band capability
- Frequency range 950 to 2150MHz
- LNB Pass / Fail test function
- LNB short circuit protection
- Satellite cable integrity test
- Upgradeable firmware
- Free product support via phone and email
- Input dynamic range -65 dBm ~ -25dBm
- **Includes:** mains charger cable, in car charger and USB lead for data transfer.

486333.472600

| Order Code | Price Each |
|---|---|
| **143-0715** | 284.63 |

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### HDTM Digital Terrestrial Meter

HORIZON




New

- Displays signal strength (RF level) and Pre and Post BER together
- Fast and accurate Pre BER real time measurement
- Built in COFDM signal quality indicator
- Up to 32 stored transmitters (via website download)
- Audible signal indicator
- Back lit LCD display
- VHF (Band III) and UHF bands
- RF input range 167-862 MHz
- Input dynamic range -72dBm to -20dBm
- Input connector BNC. Input impedance 75Ω
- Built in universal charger 100 - 240 V AC
- Intelligent charger with fast charge and trickle charge modes
- Minimum of 5 hours from 2.4 mAh Ni-MH battery (fully charged)
- Supplied with leather case, mains lead, programming lead and in car charger
- IEC to BNC adapter and 10dB attenuators included

**Supplied with:** leather case, mains lead, programming lead, car lead, IEC to BNC adaptor and 2x 10dB attenuators.

486371.469079

| Order Code | Price Each |
|---|---|
| **143-0716** | 309.47 |

### Terrestrial Meter

ROVER

**T-2 Scout**



New

TV Analogue & Digital COFDM Analyser for D.T.H. community SMATV distribution systems. Automatic A/D Selection in TV Channel Navigation (47-870 MHz) (30-120 dBμV). Level Accuracy 1 dB.
- Demodulated COFDM, SFN and MFN operation
- Easy to use, in channel navigation, automatically selects the analog or digital TV modulation
- Network identification function (network name, bouquet and encryption system)
- Up to 99 navigation memory plans
- AUTOSCAN: automatically recorded by the meter
- Modulation, Plan, Program Number, program name, Channel, Frequency selectable and storable from the keyboard or through PC
- AUTOSCAN auto-search and auto-memory function C/N, SNR, MER, BER, measurements
- Automatic Quality Analysis: FAIL- MARG-PASS and Noise Margin measurements
- Accurate spectrum analysis with max hold (peak) features, with variable SPAN: from 2 MHz to full band with automatic and adjustable reference level
- USB PC interface

486387.473792

| Order Code | Price Each |
|---|---|
| **143-0717** | 496.80 |

### Hand Held Audio Generator

TENMA™

**72-505**




- Wide frequency range
- Sine and square wave output
- Sync output
- Variable amplitude
- Output attenuator (-20 dB)
- 600Ω output impedance
- Low battery indicator
- Supplied with user instructions, 9V PP3 battery and test leads

| | |
|---|---|
| Generator Frequency | 20Hz to 150KHz in 46 steps, ±0.5dB |
| Sine Wave Output | 1.2V RMS (no load) |
| Distortion | ≤0.05% (200Hz - 15Khz) |
| | ≤0.01% (50Hz - 30Khz) |
| | ≤0.3% (20Hz - 100Khz) |
| Square Wave Output | 8V p-p max. (no load) |
| Rise/fall time | ≤0.5μsec |
| Overshoot | <2% |
| Dimensions (WxHxD) | 96x153x26mm |

337122

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| 72-505 | **490-8338** | 39.78 | 31.19 |

## Analogue Audio Signal Generator

**Minirator MR2**




New

A powerful audio generator, offering a full range of useful analogue test signals for calibration, maintenance and repair of professional audio equipment. The rotary settings wheel combined with surrounding fast access function keys enables instant and intuitive operation without compromising fine adjustment capabilities. Instrument operation is further enhanced with a backlit LCD, illuminated mute button, safety hand strap, jack for external DC power supply and an USB interface for firmware updates.

- Sine Wave, Sweeps, Noise & more
- Frequency Resolution to 0.01 Hz
- External Power & USB Connector
- Backlight for LCD & Mute Key
- +8 dBu Max. Output Level
- THD+N < -90 dB (0.003%)

W=74 H=147 D=41mm

The following waveforms are supported:

- **Sine Waves** - pure sine waveforms with freely selectable frequencies and Sweep capability
- **Pink Noise / White Noise** - synthesised with high spectral density, normal amplitude distribution and infiniate cycle duration
- **Polarity & Delay Test Signals** - for measuring speaker or cable polarity and delays

| | | | |
|---|---|---|---|
| **Outputs** | Balanced XLR, Unbalanced Phono. Output Impedance: 200Ω | | |
| **Inputs** | DC power supply, USB (for firmware update only) | | |
| **Frequency Settings** | **Range** | **Increment** | **Accuracy** |
| | 10Hz to 20kHz | 1 digit steps | 0.01% |
| **Stepped Sweep** | **Freq. Range** | **Increment** | **Sweep Speed** |
| | Freely Selectable | 1/1, 1/3, 1/6 1/12 octave | 0.5 - 5 seconds, selectable |
| **Continuous Sweep (Chirp)** | **Freq. Range** | **Increment** | **Chirp Speed** |
| | Freely Selectable | Linear / Logarithmic | 1 - 99 seconds per cycle |
| **Output Level Units** | dBu, dBV, V | | |
| **Output Level Ranges** | **Waveform** | **Min** | **Max** |
| | Sine, Sweep, Chirp | -80 dBu | +8 dBu |
| | White Noise | -80 dBu | 0 dBu |
| | Pink Noise | -80 dBu | -2 dBu |
| | Polarity & Delay Test | -80 dBu | +6 dBu |
| **Flatness** | ±0.5dB @ RL ≥600Ω | | |
| **Accuracy** | ±0.5dB @ 1kHz | | |
| **THD + N** | 22Hz - 22kHz, avg, @1kHz, typ. (-90dB @8dBu, noise floor typ. 25µV) | | |
| **Batteries** | 3x AA Alkaline giving 20 hours life (typ.) | | |
| **Weight** | 250g (including batteries) | | |

492301.501793

| Description | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| Audio Generator | MR2 MINIRATOR | **150-5732** | 199.62 |

## Programmable Analogue Audio Signal Generator

**Minirator MR-PRO**




New

An extremely powerful analogue audio generator to satisfy every need for the professional engineer. Proprietary user wave forms may be loaded via USB into the internal flash memory. Innovative and unique technology includes continuous monitoring of the impedance of the connected load, the signal balance and the phantom power. Plus the integrated cable testing promotes the MR-PRO to the level of a cable analyzer, simplifying trouble shooting tasks.

- Sine Wave, Sweeps, Noise & more
- Proprietary Wave Forms (*.WAV)
- Impedance Meter
- Cable Tester
- +18 dBu Max. Output Level
- THD+N < -96 dB (0.002%)
- True Level Output Stage
- Up to 10 preset instrument configurations can be stored and reloaded later

W=81 H=152 D=43mm

The following waveforms are supported:

- **Sine Waves** - pure sine waveforms with freely selectable frequencies and Sweep capability
- **Pink Noise / White Noise** - synthesised with high spectral density, normal amplitude distribution and infiniate cycle duration
- **Polarity & Delay Test Signals** - for measuring speaker or cable polarity and delays
- **Custom Waveforms** - custom .WAV files can be created offline and uploaded for use on the MR-PRO

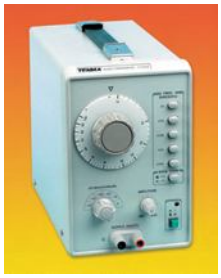
| | | | |
|---|---|---|---|
| **Outputs** | Balanced XLR, Unbalanced Phono. Output Impedance: 12.5Ω | | |
| **Inputs** | DC power supply, USB | | |
| **Wave File Format** | **Sampling Freq.** | **Resolution** | **Output Level** |
| | 48kHz | 16-bit mono | 0 dBFS (18dBu sine) |
| **Frequency Settings** | **Range** | **Increment** | **Accuracy** |
| | 10Hz to 20kHz | 1 digit steps | 0.01% |
| **Stepped Sweep** | **Freq. Range** | **Increment** | **Sweep Speed** |
| | Freely Selectable | 1/1, 1/3, 1/6 1/12 octave | 0.5 - 5 seconds, selectable |
| **Continuous Sweep (Chirp)** | **Freq. Range** | **Increment** | **Chirp Speed** |
| | Freely Selectable | Linear / Logarithmic | 1 - 99 seconds per cycle |
| **Output Level Units** | dBu, dBV, V, dBFS, % | | |
| **Output Level Ranges** | **Waveform** | **Min** | **Max** |
| | Sine, Sweep, Chirp | -80 dBu | +18 dBu |
| | White Noise | -80 dBu | +10 dBu |
| | Pink Noise | -80 dBu | +8 dBu |
| | Polarity & Delay Test | -80 dBu | +16 dBu |
| **Flatness** | ±0.2dB | | |
| **Accuracy** | ±0.2dB | | |
| **THD + N** | 22Hz - 22kHz, avg, @1kHz, typ. (-96dB @18dBu, noise floor typ. 15µV) | | |
| **Impedance Measurement** | **Method** | **Meas. Range** | **Accuracy** |
| | Absolute Value Z | 4Ω - 50kΩ unbalanced | ±10% or ±2Ω |
| | | 2Ω - 25kΩ balanced | |
| **Phantom Power Reading** | | **Meas. Range** | **Accuracy** |
| | | 0 to 54V | ±3% or ±0.5V |
| **Flash Memory** | 32 MByte (for storing wave files and configurations) | | |
| **Batteries** | 3x AA Alkaline giving 10 hours life (typ.) | | |
| **Weight** | 310g (including batteries) | | |

492324

| Description | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| Audio Generator | MR-PRO MINIRATOR | **150-5733** | 301.81 |

## Bench Audio Generator

TENMA



A low distortion audio waveform generator for testing audio systems and components. Supplied with test lead and power cord. IEC1010 rating 30V ac, 60V dc.

- 10Hz to 1MHz frequency generator in 5 range with rotary dial
- Sine and Square wave output
- Variable amplitude
- Output attenuator -10dB/-20dB/-30dB/-40dB/-50dB
- External sync. input

| | | | |
|---|---|---|---|
| Output Voltage | | Output Voltage | |
| Sine | 7V RMS | Rise/Fall Time | ≤200nsec |
| Square | 10V pk-pk | Overshoot | ≤2% |
| Output Impedance | 600Ω | Power | Mains Connected |
| Distortion | ≤0.1% | Dimensions (WxHxD) | 140x197x254mm |

249492

| Description | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| Audio Generator | **426-1999** | 119.54 | 117.16 | 114.81 | 112.52 |

## Audio Analyser

**ML1 Minilyzer**




- Large 100x64 pixel graphic LCD screen with backlight
- Autoranging
- Absol
- Frequency measurement with 5Hz to 25kHz frequency range
- dBu, dBV, VRMS, V peak level measurements in Absolute or Relative modes
- ±0.5% accuracy
- THD + N measurements in dB and %
- Polarity test
- Common mode measurements (signal balance)
- Frequency sweep capability with external signals
- Selectable HP and A/C weighting
- Auto scaling and nulling
- Balanced XLR and unbalanced RCA Phono inputs
- +20dBu to -90dBu input range
- Headphone output

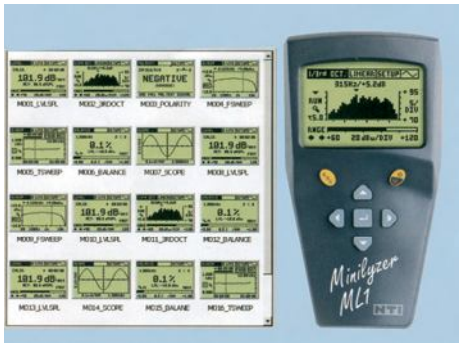
A professional, hand-held audio analyser that provides a comprehensive set of analysis functions. Supplied with batteries.

**ML1 MiniLink PC Interface & Software**

## Audio/Video & Security - continued

### Audio Analyser - continued

**ML1 MiniLink PC Interface & Software - continued**




A presentation, documentation and data aquisition software and comms package for PCs. Also enables the updating of the instruments firmware.

**MiniSPL Microphone**

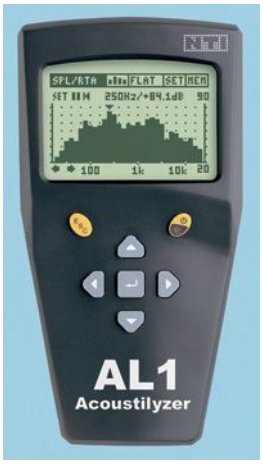
A perfect accessory for acoustic measurements. When combined with the ML1, the unit becomes a comprehensive sound level meter

381110.267422

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|---|
| Audio Analyser | ML1 | **351-0748** | 409.88 | 399.74 |
| Interface and Software | MINILINK | **553-9511** | 213.74 | 202.67 |
| Microphone | MINISPL | **416-9037●** | 222.33 | 204.07 |
| Attenuator -20dB | ML1 -20DB ATT | **850-8550** | 31.54 | 30.73 |

### Compact Acoustic Analyser

**AL1 Acoustilyzer**




W=86 H=163 D=42mm

New

The AL1 offers a practical blend of electrical and acoustical functions, combined with computer connectivity through the standard USB interface. An indispensable tool for every sound/system contractor, installer and multi-media specialist.

- Real Time Analyzer
- Reverberation Time RT60
- Speech Intelligibility STIPA
- Zoom FFT, Delay, THD+N, ...
- Class 0 design
- Long Battery Life (>16h)

**Sound Pressure Level**
- Leq, short-time Leq , Lmin, Lmax
- Timer for single and repeated measurements
- Dynamic range (using MiniSPL): 30 - 130 dBSPLA
- Filters: Flat, A- and C-weighted, X-Curve-1, RLB
- Logging of SPL/LEQ results into AL1 memory
- Wideband- and RTA values simultaneously available

**Real Time Analyzer**
- 1/3 or full octave band resolution, class 0 fi lters
- SPL, LEQ and Max-Min display per band
- Fast logging of results to the PC

**Zoom FFT**
- Real-time Zoom FFT with 50% overlapping, 93 Bins
- Frequency Range: 10 Hz - 20 kHz
- Resolution: 187.5 Hz to 0.73 Hz

**Reverberation Time**
- 8 octave bands results, based on T20, according to ISO3382. Automatic averaging with individual result readout and storage
- Source signal: Gated pink noise (CD included)

**Delay Time**
- Propagation delay between electrical and acoustical signal input using built-in mic. Resolution < 0.1 ms, max time: 1 s
- Dedicated test signal: NTI chirp (CD included)

**STIPA**
- Single value STI and CIS test result. Modulation indices and individual band level results accessible. Error indicator.
- According to IEC 60268-16, 2003 release
- TNO verified algorithm
- Post processing with recorded spectra supported

**Electrical**
- Level RMS, THD+N, Frequency, Polarity
- Filters: Flat, A- and C-weighted, HP400, HP19k

**PC Interface**
- MiniLINK USB interface with PC software and interface cable included

**Inputs** Balanced XLR, Unbalanced Phono. Input Impedance: 40kΩ balanced, 20kΩ unbalanced
**Input RMS** +20dBu balanced, +14dBu unbalanced
**Max. DC Input** ±50V dc
**Residual Noise** <12µV, XLR input shorted
**Internal Mic.** Omnidirectional (for polarity and delay measurements only)
**Monitor Output** 3.5mm Jack Socket
**Display** Backlit graphic LCD, 64x100 pixels
**Batteries** 3x AA Alkaline giving 16 hours life (typ.)
**Weight** 300g (including batteries)

492343.503474

| Description | Mftrs. List No. | Order Code | Price Each 1+ |
|---|---|---|---|
| Acoustic Analyser | AL1 ACOUSTILYZER | **150-5734** | 604.07 |

### ECM8000 Measuring Microphone



- Precise electret condenser measurement microphone
- Ultra-linear frequency response
- Well-balanced, true omni-directional pattern
- Optimally suited for room correction applications
- Phantom powered, +15V to +48V
- Rugged construction and sleek, modern design
- Microphone stand adaptor and windshield for outdoor measurements
- Ideal for use with Behringer Ultra-Curve or other real-time analyzers

| Technical Data | | Technical Data | |
|---|---|---|---|
| Frequency Response | 15Hz to 20kHz | Sensitivity | -60dB |
| Polar Pattern | Omni-directional | Phantom Power | +15V to +48V |
| Impedance | 600Ω | | |

339366.276814

| Order Code | Price Each 1+ | 3+ |
|---|---|---|
| **509-7125** | 44.80 | 43.30 |

### Speaker Impedance Meter

**72-6947**




Avoid amplifier damage by verifying actual speaker system impedance prior to operation. Unlike conventional V/Ω meters, which measure DC resistance, this unit utilises an internal 1KHz oscillator to measure true impedance. Accurately measure speaker lines that utilise impedance matching volume controls, switchers, transformers and passive crossovers. Because this unit accurately measures up to 2KΩ, it may also be utilised with 25V, 50V, 70V, and 100V speaker line transformers in commercial installations (information included in the manual).

- Large digital display for easy viewing
- Measuring range: 0 to 2000Ω
- Rugged, double insulated case is CATIII rated for use up to 100V
- Supplied with test leads, carry case and owners manual
- Power: 6x AA batteries (not supplied)
- Dimensions (HxWxD): 203 x 89 x 57mm

381129.345264

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| 72-6947 | **838-8725** | 96.90 | 89.47 |

### Loudspeaker Tester

**72-850**



New

Essential for design, refurbishing or DIY speaker building. This compact interface is powered directly from the USB port of most PC's, including laptops, and provide full T/S parameters of the connected speaker. Simply connect to an unmounted driver, and in a few minutes, this device will provide Fs, Cms, Qts, Vas, BL, Re, Le, Mms and CMS measurements, as well as an impedance curve and more. Measurements can be performed in most any shop or home, no special microphones or testing area is required.

- Self powers from any USB port, including laptops
- Single button Q and Fs testing
- Single button Vas testing for Delta Mass, Delta Compliance and Sensitivity methods
- Single button Vented Box analysis finds effective box size and tuning
- T/S Parameters for mid ranges and tweeters
- Measures Cms-vs-drive suspension non-linearity

- Closed, Vented and Infinite Baffle box simulation
- Measures and Simulates Rem/Xem non linear inductance, Qport, Qbox, Qleak and room boost effects
- Adjustments for setting atmospheric conditions
- Air wound inductor and Ellipse calculators
- A real time continuous phase and impedance meter
- True current source drive (not an approximation)
- Continuously adjustable 1Hz-20KHz line output
- Measure resistors, inductors, capacitors, test leads, cables and more
- Measures 1Hz -20 kHz with 0.01Ω and 0.1° phase accuracy
- Dimensions (WxHxD): 63 x 25 x 63mm

469561.469543

| Order Code | Price Each 1+ | 3+ |
|---|---|---|
| 132-9278 | 141.48 | 134.39 |



## Audio Connectors

See our selection in Book 1, Section 10

## Audio Impedance Meter

GOLD LINE TEF

**ZM1**




A powerful compact unit for measuring impedance at 100Hz, 1kHz and 10kHz. The meter can provide accurate measurement of a single loudspeaker, an entire distributed system, or individual components such as resistors, capacitors and inductors. On 70V distributed systems, it calculates the wattage rating of the entire system. Measurements are taken at audio frequencies which allows use with impedance matching transformers, switchers and volume controls providing more accurate readings than conventional DMMs. Supplied with test leads.

- Powerful and compact
- 3½ digit LCD display
- Measures 0 to 19.99kΩ
- Measures 0 to 1999W
- Battery powered (not supplied)

| | |
|---|---|
| Test frequencies | 100Hz, 330Hz, 1kHz and 10kHz |
| Voltage ranges | 25V, 50V, 70V, 100V |
| Measurement range (Ω) | 0 - 199.9Ω, 0 - 1999Ω, 0 - 19.99kΩ |
| Measurement range (W) | 0 - 19.9W, 0 - 199.9W, 0 - 1999W |
| Accuracy | Impedance ±2%, Wattage ±3% |
| Power | 8x AA batteries (not supplied) |

381123.345266

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ |
|---|---|---|---|
| ZM1 | 838-8709 | 331.34 | 321.37 |

## Video Service Kits with LCD TFT Monitor



A TFT monitor with a rugged metal case and carry case with carry/shoulder straps. Supplied with 1000mA rechargable battery pack, DC power cord, AAC adaptor and phono to BNC adaptors (4x).

- Sharp, high contrast display utilising TFT active matrix technology
- High resolution 269,568 pixels (1152x234)
- Brightness, contrast and volume controls
- Compatible PAL & NTSC systems (a suitable TV tuner and aerial is needed to use this unit as a television)
- Controls are loacated on the top of the unit, connections are at the side
- Video Right/Left reverse and Top/Bottom picture switch
- 2 x video inputs with input 1 or 2 selection
- 2 x composite video and mono audio IN via phono sockets (BNC adaptors included)
- Video OUT via phono socket (BNC adaptors included)
- Headphone socket (3.5mm stereo jack)
- Monitor dimensions (WxHxD): 195x130x35mm
- Weight: 755g

246827

| Screen Size | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| 4" | 865-1833 | 140.45 | 137.33 | 126.93 | 124.85 |

## CCTV Tester

IDEAL

**SecuriTEST**



New

Incorporating a bright 2.5-inch color LCD screen, the Securi-TEST dramatically reduces CCTV system installation time and expense by performing the duties of six separate devices:

- **Video Tester/Monitor** for local aiming and focusing of CCTV cameras (NTSC/PAL) without requiring a second technician in the control room to give adjustment instructions and verify functionality
- **PTZ Controller** with support for multiple protocols to control operation of pan, tilt and zoom functions on most PTZ cameras, allowing technicians to locally test and program PTZ cameras as they are being installed
- **Digital Multimeter** to test power supply problems. Multimeter feature measures DC and AC voltage (max: 400V), current and resistance, plus operates as a continuity tester
- **UTP Cable Tester** to find shorts, opens and crossed pairs on installed cabling, including CAT5e cable used to carry PTZ control signals and video signals
- **Video Test Pattern Generator** to check color bar, brightness and contrast on a monitor or DVR
- **PTZ Protocol Analyzer** determines the PTZ protocol being used and displays the command codes for all transmitted data. The SecuriTEST is compatible with over a dozen PTZ protocols, including as Pelco and Samsung, to decode and identify output from a PTZ console to aid in troubleshooting.

469578.469567

| Order Code | Price Each 1+ | 3+ | + |
|---|---|---|---|
| 132-9300 | 380.63 | 355.25 | – – |

## Professional PAL Audio/Video Pattern Generator

OZAN

**Teletest-Pro**




- 8 test pattern colour bars:grey scale, crosshatch, red purity, white purity, black burst, dots, multi-burst, colour bars
- Composite video output and S-Video output
- 1kHz and 10kHz audio sine wave output
- Stereo balanced audio line output
- Handheld and battery powered

Requires 9V PP3 Battery (not supplied), See Order Code **279-298**

| | |
|---|---|
| 8 Test Patterns | 75% EBU |
| Video output | Composite video 75Ω IV P-P, BNC socket<br>S-Video 75Ω IV P-P(Y) 0.3V P-P(C) 4-pin DIN socket |
| Audio test signals | 1kHz and 10kHz pure sine wave |
| Audio output | Stereo balanced line audio, 600Ω 0dBu (0.775Vrms)<br>2 x XLR (Cannon) sockets |
| Weight | 265g |
| Power | 9VPP3 battery |

222477

| | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| Teletest Pro | 908-174 | 245.45 | 243.69 | 238.28 |
| Adaptor 9V | 908-307 | 20.84 | 20.68 | 18.95 |

## PAL TV/Video pattern generator

OZAN

**Teletest-2**




DURACELL Ultra M3 9V

- Battery powered unit designed for comprehensive testing and full sevice of domestic AV equipment
- Generates essential video patterns and audio test signals
- 6 test patterns:grey scale, crosshatch, red purity, white purity, black burst
- Tuneable UHF frequencies
- Composite video output
- S-Video output
- 1kHz audio sine wave
- Audio line output

| | |
|---|---|
| 6 test pattern | 75% EBU colour bars |
| Video output | Composite video 75Ω IV P-P phono socket<br>S-video, 75Ω IV P-P (Y) 0.3 P-P (C) 4-pin DIN<br>UHF tuneable channels 32-42, 75Ω co-axial socket |
| Audio test signal | 1kHz pure sine wave |
| Audio outputs | Line audio, 1kHzΩ IV P-P phono socket<br>UHF Pal1 6mHz subcarrier |
| Weight | 265g |
| Power | 9V PP3 |

## Audio/Video & Security - continued

### PAL TV/Video pattern generator - continued

**Teletest-2 - continued**

Requires 9V PP3 Battery (not supplied), See Order Code **279-298**

222478

| | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| Teletest 2 | **908-150** | 186.90 | 185.57 | 181.44 |
| Adaptor 9V | **908-307** | 20.84 | 20.68 | 18.95 |
| Carry case | **908-162** | 20.84 | 20.68 | 18.95 |

### PC Monitor Test Pattern Generator — OZAN

**Teletest PC**




- Designed for comprehensive testing of computer monitors and multi-sync presentation video projectors
- 8 test patterns, grey scale, crosshatch, dots, frequency burst, red purity, white purity, sync.
- VGA sync
- S-VGAsync
- RGB video output
- Handheld battery powered

| | | | |
|---|---|---|---|
| Syncs | VGA: 640x480 lines 31.5kHz, 60Hz<br>S-VGA: 800x600 lines, 32.5kHz, 56Hz | Test patterns | 100% colour bars |
| | | Video output | Red, green, blue, 75Ω IVP-P |
| Sync output | Horizontal sync 10kΩ TTL<br>Vertical sync 10kΩ TTL | Monitor connector | High density 15-way D-socket |
| | | Weight | 265g |
| Sync. invert switch | Inverts the sync. | Dimensions | 150x90x40 |

Requires 9V PP3 Battery (not supplied), See Order Code **279-298**

222476

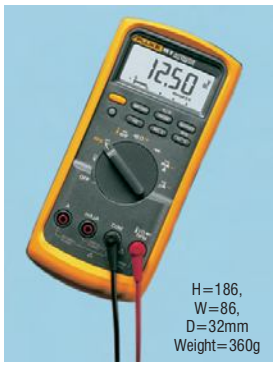
| | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| Teletest PC | **908-319** | 184.63 | 183.33 | 179.25 |
| Adaptor 9V | **908-307** | 20.84 | 20.68 | 18.95 |
| Carry case | **908-162** | 20.84 | 20.68 | 18.95 |

## Automotive

### Automotive Multimeter Kit

FLUKE

**88-V/A**




LATEST PRICING

- Built-in thermometer (probe supplied)
- Continuity check
- Frequency for pulsed DC and AC tests
- Duty cycle to verify operation of feedback carburetors
- Diode test for alternator testing
- Peak min/max to capture intermittent events as short as 250ms
- Large, easy to read, two level backlit display
- Magnetic hanger (supplied) for easy set-up and viewing, freeing your hands for other tasks
- CAT III 1000V, CAT IV 600V






Perhaps the most important tool you'll use in troubleshooting auto electrical systems is the multimeter. Basic multimeters measure voltage, current and resistance, while automotive multimeters like this can also check frequency, duty cycle, make diode tests, and measure temperature, pressure and vacuum.

| | Range | Resolution | Accuracy |
|---|---|---|---|
| Voltage DC | 0 - 1000V | 10 μV | ±(0.1% + 1) |
| Voltage AC | 0 - 1000V | 100 μV | ±(0.5% + 2) |
| Current DC | 0 - 10 A | 0.01 μA | ±(0.4% + 2) |
| Current AC | 0 - 10 A | 0.01 μA | ±(1.2% + 2) |
| Resistance | 0 - 50MΩ | 0.01Ω | ±(0.4% + 1) |
| Capacitance | 0 - 10000 μF | 0.01 nF | ±(1% + 2) |
| Frequency | 0 - 200kHz | 0.01 Hz | ±(0.01% + 1) |
| Temperature | -200 - 1090 °C | 0.1 °C | 1% |

**Accessories**

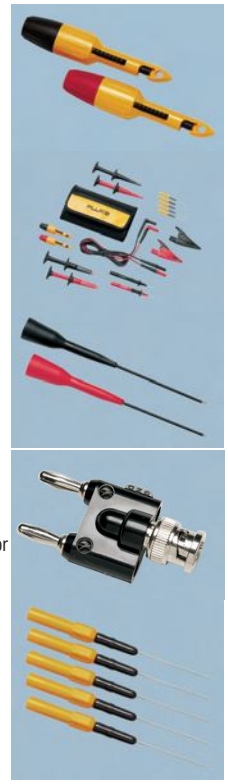
**Insulation piercing clip set**
TP81 (4mm) for making contact without cutting or stripping insulation. Tiny hole left in insulation can easily be seeled

**Suregrip automotive test lead kit**
TL281 kit contains:
- TL224 Suregrip silicone test lead set
- TP220 Suregrip test probe set
- AC220 Suregrip alligator clip set
- AC285 Suregrip large jaw alligator clip set
- Soft case

**Suregrip deluxe automotive test lead kit**
TL282 kit contains:
- TP81 Insulation piercing clip set
- TP40 automotive back probe pins
- TL224 Suregrip silicone test lead set
- TP220 Suregrip test probe set
- AC220 Suregrip alligator clip set
- AC285 Suregrip large jaw alligator clip set
- AC280 Suregrip hook clip set
- Soft case

**BNC to female to double stacking banana plug**
BP880 BNC to female allows the use of coax cabling or instruments with automotive meters

**Five Automotive back probe pins (4mm)**
Make connections to terminals inside connectors. Pins can be bent to fit into tight spaces



Prices where indicated by a ↕ are subject to change.
Please call your local sales office or visit
www.farnell.com for the latest prices.

339486.409233

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Automotive multimeter | 88-V/A | **803-4990** | 414.00 | 401.58 | 389.53 |
| 4mm insulation clips | TP81 | **852-5340** | 30.00 | 29.10 | 28.23 |
| Suregrip deluxe lead kit | TLK282 | **852-5382** | 95.00 | 92.15 | 89.39 |
| Back probe pin set | TP88 | **852-5390** | 7.00 | 6.79 | 6.59 |
| BNC to female | BP880 | **852-5404** | 8.00 | 7.76 | 7.53 |
| Automotive back probe pins | TP40 | **852-5420** | 22.00 | 21.34 | 20.70 |

### Infrared Thermometer for Automotive Diagnostics

Raytek

**AutoPro™**




Temperature variances can indicate common mechanical and electrical problems. Diagnose them faster, safer and easier with AutoPro™, the noncontact infrared thermometer specially designed for the automotive professional. AutoPro™ features SmartSight™ - two lasers merge into a single laser point to indicate a 13mm target, an ideal spot-size for small area measurements often required for auto diagnostics. AutoPro can read temperatures up to 535°C, and can accurately measure in low light conditions, illuminating the work area with a built-in LED flashlight. AutoPro also features an illsutrated, step-by-step user manula with detailed instructions for many common automotive diagnostic procedures, uncluding engine misfires, exhaust and emmisions, cooling systems and heating and air conditioning systems.

- SmartSight laser sighting
- Integral LED flashlight for low light conditions
- -32°C to 535°C measurement range
- Comprehensive, illustrated diagnostics handbook
- MAX temperature display
- LCD backlight
- Display hold (7 seconds)
- Hard carry case
- Tripod mounting
- Removable base magnet
- Nylon holster

| | |
|---|---|
| Temperature Range | -32°C to 535°C |
| Accuracy for Target Temperatures | Targets 23°C to 510°C: ±1% of reading or ±1°C<br>Targets above 510°C: ±1.5% of reading<br>Targets at -32°C to -26°C: ±3°C<br>Targets at -26°C to -18°C: ±2.5°C<br>Targets at -18°C to +23°C: ±2°C |
| Repeatability | ±0.5% or ≤ ±1°C, whichever is greater |
| Response Time | ≤ 0.5 second (95% of reading) |
| Spectral Response | 8-14 μ |
| Emissivity | Pre-set at 0.95 |
| Ambient Operating Temperature | 0 to 50°C |
| Relative Humidity | 10 - 90% |
| Storage Temperature | -20°C to 60°C without battery |
| Weight/Dimensions | 360g / 205x160x55mm |
| Power | 9V Alkaline ir NiCd Battery |
| Battery Life (Alkaline) | 4hrs w/laser, flashlight & backlight on<br>20hrs w/laser, flashlight & backlight off |
| Laser (Class II) | SmartSight™ dual laser sighting system |

| | |
|---|---|
| Typical Distance To Target | 200mm - 600mm |
| Distance to Spot (D:S) | Optimized for use at 200mm<br>Approximately 16:1 at focus point |
| Temperature Display | °C or °F selectable |
| Display Resolution | 0.2°C |
| Work Area Illumination | Bright White LED (7100 millicandle) |

339395.344020

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | 10+ |
|---|---|---|---|---|---|
| ST25 AUTOPRO. | **492-2414** | 74.90 | 72.50 | 70.00 | 68.43 |

## Automotive Test Lead Kit

**129393**

SILVERTRONIC



**Automotive kit consists of:**

- Pair of double insulated silicone test leads, one end terminating in a straight fixed shrouded plug, the other in a right angled plug, both compatible with all standard 4mm instrument sockets
- Pair of large fully insulated crocodile clips with wide jaw opening
- Pair of cable piercers for intrusive measurement taking
- Pair of slim back probing probes

381206.381276

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ | 10+ |
|---|---|---|---|---|---|---|
| 1.2m Automotive Test Kit | 129393 | **844-8876** | 25.41 | 23.29 | 22.18 | 20.60 |
| 3m Automotive Test Kit | 129393/3 | **844-8884** | 32.16 | 29.46 | 28.07 | 26.06 |

# Test Adaptors

## Male BNC Adaptor

TENMA



A low cost BNC male connector to 4mm binding posts.

- Black thermoplastic body
- Rated 500V RMS 3A

230674

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-005 | **356-2414** | 5.18 | 5.06 | 4.94 |

## Insulated BNC to Sheathed 4mm Sockets Adaptor

TENMA



A low cost insulated BNC connector to 4mm sockets.

- Insulated male BNC, body and sockets
- Meets **IEC-1010 5000V CAT I** and **150V**
- **Cat III, 3A**

230676

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-083 | **356-2463** | 7.25 | 7.08 | 6.91 |

## Bridging Links

**2.0mm and 4.0mm**

MC



A selection of standard and touch-protected bridging links

- Vibration proof contacts
- High corrosion resistance
- Low contact resistance
- Asymetrically positioned safety socket

| | **2.0mm Standard** |
|---|---|
| Current Rating | 10A |
| Rated Voltage | 30V ac / 60V dc |
| Temperature range | -40°C to +80°C |
| Insulation | PA Black |
| Contacts | Brass Gold plated |

238725

| Plug Spacing mm | Mftrs. List No. | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|---|
| **2.0mm Bridge Links** | | | | | | |
| 12.0 | 63.9848-21 | **413-0194●** | 4.45 | 4.02 | 3.91 | 3.57 |
| 14.0 | 20.1020-21 | **413-0224** | 5.85 | 5.30 | 5.16 | 4.73 |

## 4mm Couplers

HIRSCHMANN Test & Measurement



Socket to socket L=44, Dia.=10

Free socket solder termination L=48, Dia.=11

Insulated couplers for two 4mm dia. plugs or one plug and wire with solder connection.

| | |
|---|---|
| Operating voltage | 60V dc |
| Continuous load current | 10A |
| Contact resistance | 5mΩ max |
| Temperature range | -25°C to +70°C |
| Housing | PVC **UL94-HB**<br>PVC (KUN30) |
| Contacts | Brass, Nickel plated |
| Max wire size solder | 2.5mm² |
| Max wire size screw | 1.5mm² |

Mftrs. List No. KD10+colour Socket to socket, KUN30+colour Free socket, solder terminal, KUN10+colour Free Socket, Screw Terminal

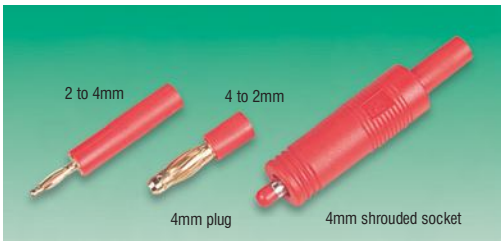
209806

| 5 Per Pack | Order Code | Price Per Pack 1+ | 10+ | 25+ | 50+ | 100+ |
|---|---|---|---|---|---|---|
| **Socket to Socket** | | | | | | |
| Red | **117-6447●** | 3.38 | 2.96 | 2.61 | 2.26 | 2.11 |
| Black | **117-6448●** | 3.38 | 2.96 | 2.61 | 2.26 | 2.11 |
| **Free Socket, Solder** | | | | | | |
| Red | **117-6449●** | 3.49 | 3.05 | 2.72 | 2.35 | 2.28 |
| Black | **117-6450●** | 3.49 | 3.05 | 2.72 | 2.35 | 2.28 |
| **Free Socket, Screw** | | | | | | |
| Red | **810-162●** | 4.77 | 3.68 | 2.91 | 2.75 | 2.56 |
| Black | **810-150●** | 4.22 | 3.13 | 2.47 | 2.34 | 2.17 |

## Adaptors

**2mm to 4mm, 4mm to 2mm**

MC




A range of adaptors suitable for converting and inter-connecting 2mm and 4mm connecting leads and plugs. Also a 4mm plug protected by a retractable shroud to convert to a 4mm shrouded socket. Maximum current 25A.

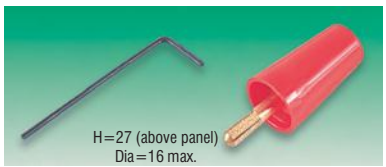
Mftrs. List No. 24.0115-1=152-740, 24.0106-1=152-742, 24.0166-1=462-834, 24.0115-4=152-741, 24.0106-4=152-743

209769

| Mftrs. List No. | Colour | Order Code | Price Each 1+ | 10+ | 25+ | 50+ | 100+ |
|---|---|---|---|---|---|---|---|
| **2mm Plug - 4mm Socket** | | | | | | | |
| 24.0115-1 | Red | **152-740** | 3.18 | 3.02 | 2.96 | 2.88 | 2.58 |
| 24.0115-4 | Black | **152-741** | 3.33 | 3.16 | 3.10 | 3.02 | 2.70 |
| **4mm Plug - 2mm Socket** | | | | | | | |
| 24.0106-1 | Red | **152-742** | 2.65 | 2.50 | 2.45 | 2.16 | 1.92 |
| 24.0106-4 | Black | **152-743** | 2.74 | 2.58 | 2.52 | 2.23 | 1.98 |
| **4mm Plug - 4mm Shrouded Socket** | | | | | | | |
| 24.0166-1 | Red | **462-834** | 2.60 | 2.38 | 2.29 | 2.08 | 1.89 |

## Adaptor

MC




Converts standard 4mm sockets into 4mm shrouded sockets. Covers existing 4mm sockets up to 13.5 dia. and 5mm high. The expanding brass plug has an internal grub screw to secure the assembly in 4mm diameter sockets. Allen key supplied.

| | | | |
|---|---|---|---|
| Current rating | 32A | Housing | Polyamide, UL94V-2 |
| Operating voltage | 1000V/CAT II | Contacts | Brass, Gold plated |
| Contact resistance | 0.3mΩ | Temperature range | -40°C to +80°C |

Mftrs. List No. 24.0160-x, where x = 1 - red, 4 - black

209792

| 2 Per Pack + Allen key | | Price Per Pack | | | | |
|---|---|---|---|---|---|---|
| Colour | Order Code | 1+ | 10+ | 25+ | 50+ | 100+ |
| Red | **462-858** | 3.68 | 3.48 | 3.41 | 3.10 | 2.82 |
| Black | **462-860** | 3.56 | 3.37 | 3.30 | 3.01 | 2.73 |

Over 480,000 products online QGO

# Test Leads, Probes & Accessories

## BNC to Crocodile Clip Lead



A common test lead for electronics applications. Connects to oscilloscopes, freuency counters, function generators, etc. Manufactured from 50Ω coaxial cable.
IEC1010 rating: 30V AC, 60V DC.

248961

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| JR9021-2M | **428-4227** | 2.25 | 1.91 |

## BNC Plug to Alligator Clip



- BNC plug to alligator clips RG58/U test lead
- 3ft length

414729.404679

| Description | Mftrs List No. | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|---|
| BNC Test Lead | 10HA084 | **100-3024** | 1.84 | 1.73 | 1.54 |

## BNC Adapter Lead

**BNC-AL 0.64**



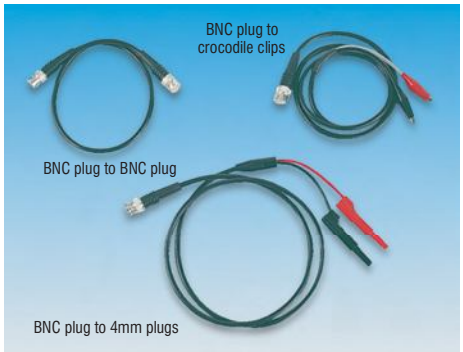
- BNC adapter lead with insulated sockets for 0.64mm diameter
- Fits to MICRO SMD Clip 1 (Order Code 859-047)
- Red inner lead, black shielding
- Cable type RG58 A/U 50R
- For use with oscilloscopes, PC cards etc

| | |
|---|---|
| Rated Voltage | 60V dc |
| Temperature Range | -15°C to +70°C |
| Length | 1200mm |

222541

| Mftrs List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| BNC-AL 0.64 | **401-7468●** | 4.29 | 3.95 |

## Cable Test Leads 50Ω




Ready-made test and interconnection leads using RG58 cable and fitted moulded strain relief sleeves. Available in various cable lengths.

230392

| Cable Length | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|
| **BNC Plug to BNC Plug** | | | | | |
| 0.5m | **315-3472●** | 6.82 | 6.23 | 5.87 | 5.38 |
| 1m | **315-3484●** | 7.23 | 6.65 | 6.46 | 6.08 |
| 2m | **315-3496●** | 10.04 | 8.99 | 7.97 | 7.62 |
| **BNC Plug to Crocodile Clips** | | | | | |
| 1m | **315-3502●** | 5.10 | 4.64 | 4.53 | 4.45 |
| **BNC Plug to 4mm Plugs** | | | | | |
| 1m | **315-3514●** | 5.60 | 5.09 | 4.99 | 4.89 |

## 4mm Test Lead with Probes



Test leads with totally shrouded, right angled 4mm plug connection and comfort grip probes with finger barriers. The notched probe tips are manufactured from hard alloy to prolong service life. Supplied in a red and black pair with tip covers. Rated at 15A and IEC1010 1000V CTAII. Length: 700mm.

248962

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| CT-3A | **433-8832** | 2.61 | 2.49 |

## Lantern Tip Test Lead

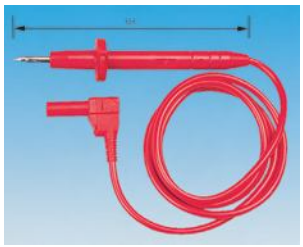


- 4mm Lantern tip to 4mm 90° shrouded plugs
- Double insulated
- IEC1010: CAT III 1000V 16A
- 1m Cable length

414748.404585

| Description | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| Lantern Tip Test Leads | **100-3028** | 5.24 | 4.90 | 4.49 |

## Shrouded Probe Test Lead, 4mm Plug



A 1m long PVC test lead fitted at one end with a test probe having a spring loaded retractable transparent shroud shielding a combined 4mm plug style pointed probe tip. The other end of the test lead is fitted with a right angle fixed shroud 4mm plug having an insulated tip centre pin.

Working voltage 50v CAT II

Mftrs. List No. 20066-1=226-130, 20066-4=226-142

222352

| Colour | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|
| Red | **226-130●** | 13.66 | 12.76 | 12.40 | 10.83 |
| Black | **226-142●** | 13.66 | 12.76 | 12.40 | 10.83 |

## Test Leads



Superior quality test leads that are an ideal upgrade for existing test probes in terms of ruggedness, reliability and increased safety. The fine test probes have finger guards and terminate in either straight or right angle, shrouded 4mm plugs that fit the vast majority of multimeters. Ideal for electronics testing applications. IEC1010 1000V CAT III rated. Length: 1m.

248964

| | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Straight Plugs | **428-4239** | 5.68 | 5.46 |
| Right Angle Plugs | **428-4240** | 5.87 | 5.62 |

## Fused Test Leads



A superior quality test lead kit that is an ideal upgrade for existing test probes in terms of ruggedness, reliability and increased safety. The test leads have integral fuses within the probe bodies, large finger guards and terminate in either straight or right angle, shrouded 4mm plugs that fit the vast majority of multimeters. IEC1010 1000V CAT III rated. Length: 1m.

248970

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Straight Plugs | **428-4264** | 15.55 | 15.32 |
| Right Angle Plugs | **428-4276** | 15.35 | 14.74 |
| Probe Fuses (3 Pack) 500mA/1000V/50kA | NEW **844-8965** | 6.35 | 5.82 |

## Fused Test Leads



Superior quality, heavy duty test leads with integral fuses within the probe bodies and large finger guards.

- Supplied with interchangeable test probes and shrouded crocodile clips
- Terminate in either straight or right angle, shrouded 4mm plugs
- 660V ac, 500mA, 50KA fused
- IEC1010 600V CATIII rated
- Length: 1.2m.

414899.267877

| Description | Mftrs. List No. | Order Code | Price per Pair 1+ | 10+ |
|---|---|---|---|---|
| Straight Plugs | 131009/SH | **100-3454** | 27.82 | 26.53 |
| Right Angle Plugs | 131009/RA | **100-3455** | 27.82 | 26.53 |
| Probe fuses (3 pack) 500mA /1000V/50kA | | **844-8965** | 6.35 | 5.82 |

## Test Probes - Fused



**134255 Pair of fused test probes**

- 1 red, 1 black modular fused probe fitted with a 500mA / 1000V / 50kA fuse
- Incorporates a 4mm socket to the rear
- IEC1010 (BS EN 61010) Rating 1000V Cat III
- Compliant with HSE GS 38



**134295 Pair of fused croc clips test probes**

- 1 red, 1 black modular fused croc clip fitted with a 500mA / 1000V / 50kA fuse
- Incoporates a 4mm socket to the rear
- Jaw opening of 24mm
- IEC1010 (BS EN 61010) Rating 1000V Cat III

381204.381274

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|---|
| Fused probes | 134255 | **844-8817** | 14.56 | 13.35 | 12.71 | 11.80 |
| Croc clip probes | 134295 | **844-8825** | 14.91 | 13.67 | 13.02 | 12.09 |

## Fuses

**134340 and 134341**



Choice of 2 packs of fuses:
134340: Pack of 3 10A / 600V / 500kA or
134341: Pack of 3 500mA / 1000V / 50kA fuses

381208.381278

| Mftrs. List No. | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|
| 134340 | **844-8957** | 3.38 | 3.09 | 2.96 | 2.82 |
| 134341 | **844-8965** | 6.35 | 5.82 | 5.54 | 5.31 |

## Test Lead Kit



A test lead kit that is an ideal upgrade for existing test probes supplied with multimeters. The leads and accessories are IEC1010 1000V CAT II rated.

**Kit contents:**

- 4x Coloured (blue, black, red & green), 1m, test leads fitted with 4mm stackable, shrouded plugs
- 2x insulated crocodile clips
- 2x spring action IEC test clip probes with finger guards

414726.411362

| Description | Order Code | Price per Kit 1+ | 10+ |
|---|---|---|---|
| Test Lead Kit | **100-3023** | 21.34 | 20.26 |

## Basic Test Accessory Kit

**76-081**



Features:

- A high quality, replacement basic test lead set
- 1m red and black silicone leads, rated **1000V,CAT III, 12A**
- Probe bodies with replacement tips, rated **1000V, CAT III, 36A**
- 90° flexible pincer clips rated **1000V, CAT III, 6A**
- **CE** marked

230698

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-081 | **342-1636** | 22.18 | 21.51 | 20.42 |

## Deluxe Test Accessory Kit

**76-082**



Kit Includes:

- Probe bodies with 4mm spring contacts, replaceable 2mm tips with IC caps, black and red, **1000V CAT III, 36A**
- Flexible pincer clips, black and red, **1000V, CAT III, 20A**
- 4mm banana plug adapters, black and red, **42V, 10A**
- Spring-tip mini probe with IC caps, black and red, **600V CAT II, 1A**
- Insulated spade lug adapters, black and red, **42V, 36A**
- Leads, 4mm sheathed straight to right-angle plugs, 1.5m PVC wire, black and red, **1000V, CAT III, 12A**

230699

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-082 | **342-1648** | 25.43 | 24.66 | 23.42 |

## General Purpose DMM Test Lead Kit

**76-103**



Features:

- 1.5m red and black silicone leads, rated 1000V, **CAT III 12A**
- Insulated alligator clips rated **1000V, CATIII, 20A**

# Test Leads, Probes & Accessories - continued

## General Purpose DMM Test Lead Kit - continued

**76-103 - continued**

- Spade lug adapters, rated **42V, 20A**
- Probe sprung hooks, rated **500V, CAT I, 15A**
- Probe bodies, rated **1000V, CAT III, 36A**

230701

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-103 | **342-1650** | 23.95 | 23.24 | 22.07 |

## Right-angle Test Lead Set

TENMA

**76-091**



- High flexible silicone leads
- Set includes 1 red, 1 black 1.5m lead with 4mm right-angle sheathed plugs, 1 red, 1 black probe body, 1 red and 1 black sprung hook probe adaptor
- 1000V CAT III 36A probe body and leads
- 500V CAT I 5A sprung hook adaptor

230702

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-091 | **356-2487** | 14.71 | 14.33 | 13.97 |

## General Purpose Right Angle DMM Test Leads

TENMA



- Silicone lead wire, straight to right angle 4mm sheathed plugs
- Set includes 1 red, 1 black 1.5m lead, 1 red, 1black probe, 1 red, 1 black crocodile clip with piercing point, 1 red 1 black sprung hook probes, 1 red, 1 black spade lug adaptor
- **1000V CAT III 36A** probe bodies, **1000V CAT III 12A** leads, crocodile clips **1000V CAT III 20A**
- **500V CAT I 5A** probe sprung hooks

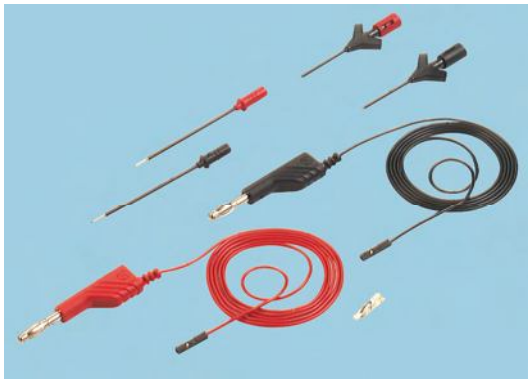
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| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-104 | **356-2499** | 33.49 | 32.65 | 31.81 |

## Micro Test Lead Set for SMD Components: 0.64 mm

HIRSCHMANN Test & Measurement

**PMS 0.64**



Contains:

- 2 x Miniature clamp-type test probe MICRO-KLEPS (1x red, 1x black)
- 2 x Miniature test probe MICRO-PRUEF MPS 2/0.64 FT (1x red, 1x black)
- 1 x Miniature crocodile clip AGF 1 (blank)
- 2 x Test leads MAL N 4-0.64/100-0.25 (from 0.64mm to 4mm)

| | | | |
|---|---|---|---|
| System: | 0.64mm | Clamping range: | 1mm (MICRO-KLEPS); 2mm (AGF1) |
| Cable length: | 100 cm | Operating temperature: | -15°C to +70°C |
| Conductor size: | 0,25 mm² | Rated voltage | 60V dc |
| Cable type: | LiY, 130x0,05 | | |

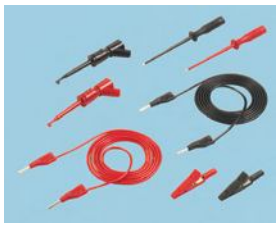
415572

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| PMS0.64 SMD | **101-1414●** | 22.80 | 20.97 | 19.07 |

## Test Lead Set: 2mm

HIRSCHMANN Test & Measurement

**PMS 2**



Contains:

- 2 x Clamp-type test probe KLEPS 2 BU
- 2 x Miniature test probe MPS 1
- 2 x Miniature-crocodile clip MA 1
- 2 x Test lead MVL 2/100

| | | | |
|---|---|---|---|
| System: | 2.0mm | Clamping range: | 2mm |
| Cable length: | 100 cm | Operating temperature: | -40°C to +60°C |
| Conductor size: | 0.5 mm² | Rated voltage | 60V dc |
| Cable material: | PVC | | |

415573

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| PMS2 SET | **101-1422●** | 18.67 | 17.17 | 15.61 |

## Test Lead Set: 4mm

HIRSCHMANN Test & Measurement

**PMS 4**



Contains:

- 2 x Clamp-type test probe KLEPS 30 (1x red, 1x black)
- 2 x Test-Probe PRUEF 2 (1x red, 1x black)
- 2 x Crocodile clip AK 2 S (1x red, 1x black)
- 2 x Test lead MLN 100/1 (1x red, 1x black)

| | | | |
|---|---|---|---|
| System: | 4.0mm | Cable type: | LEH-XY, 259x0.07 |
| Cable length: | 100cm | Operating temperature: | -15°C to +70°C |
| Conductor size: | 1.0mm² | Rated voltage | 60V dc |
| Clamping range: | 4-9.5mm | | |

415576

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| PMS4 SET | **101-1429●** | 17.56 | 16.14 | 14.69 |

## Test Lead Kit

SILVERTRONIC LEADS



A superior quality test lead kit that is an ideal upgrade for existing test probes supplied with multimeters. The leads and accessories are rugged, reliable and have many features that maximise user safety. IEC1010 1000V CAT III rated. Length 1.2m.

- 2x leads: Right angle to straight 4mm shrouded plugs
- 2x probes with shrouding and finger guards
- 2x heavy duty, shrouded crocodile clips
- 2x spring action IEC test clip probes with finger guards

248969

| | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Test Lead Kit | **428-4252** | 16.58 | 15.89 |

## Test Lead Sets and Accessories

Tyco Electronics

**To BSEN61010-2-031**

A new range of high quality fully shrouded test leads and accessories designed for use with all multimeters fitted with full safety 4mm sockets. The construction and design of all products has been made in accordance with **BS EN61010-2-031** allowing the products to be used at 3 levels of maximum voltage according to the over voltage of the circuit under test - as defined by **IEC664**. All products are maufactured with multi-stranded copper conductors 1mm$_2$ rated to 10A. The outer sheath of the cables are soft grade double insulated PVC for flexibility and durability

222431

## Modular Test Lead Set
**1000V Cat III**

Tyco Electronics



- High quality replacement test leads
- 1.2m long, straight to right angle 4mm plugs
- Fixed test prods with insulating covers for extra safety

222432

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 1-1248618-1 | **562-210** | 8.86 | 8.48 | 8.32 |

## Fully Insulated Croc Clips
## Fused Prod Modules

Tyco Electronics



- Pair of fully insulated shrouded crocodile clips **600V CAT III**
- Overlapping steel jaws grip down to 0.3mm max opening 30mm
- Pair of shrouded fused prod modules fitted with 2A 600V 50KA HBC fuses
- Prod tips are exposed 4mm to meet **HSE GS38** safety guidance
- Pair of 'wide body' unfused test prod **CATIII1000V 10A** rating
- 4mm diameter lantern style tip with point

**600V CAT III**

- Pair of electronic sprung hook **CATIII 1000V 10A** rating
- Fits 4mm sockets, grips down to 0.1mm
- Designed to be used with modular test lead set or any other 4mm safety plug

222433

| | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| Fully insulated croc clips | **562-245** | 5.94 | 5.57 | 5.26 | 4.89 |
| Fused Probe modules | **562-257** | 23.47 | 21.80 | 20.43 | 20.23 |
| Sprung hooks | **100-183** | 7.46 | 7.32 | 7.15 | 6.91 |

## Safety, Shrouded, 4mm Plugs
**1000V**

MC



A high quality safety test lead set manufactured to **IEC1010-1, VDE0100/0110** and approved by **BG**.

Comprising rigid test probes featuring moulded finger guards and refined steel sharp point tips, shrouded crocodile clips and 1m long flexible PVC connecting leads. One end of the lead is fitted with a stackable, fixed shrouded 4mm plug, the other end is fitted with an in-line, fixed shroud 4mm plug. Both plugs feature insulated tip centre pins for additional safety.

Supplied in a plastic zip wallet.

Working voltage 1000V, maximum current 32A.

Mftrs. List No. 20067

222351

| Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|
| **226-154** | 33.12 | 30.44 | 29.84 | 28.94 |

**700 products added online every week**

WWW

See our pick of the hottest products and latest technologies in '**What's New?**' at **www.farnell.co.uk**

## TL80A/TL81A Electronic Test Lead Sets

FLUKE







Highly flexible, silicone test lead sets that are shrouded to IEC1010 CATII, 300V rating. The lead kits are supplied with a pair of red and black, 10A rated leads and a selected range of common clips and probes. Supplied in a handy zipped, soft vinyl cases. UL listed.

LATEST PRICING

**Basic Test Lead Set:**

*Contents:*

- Pair of 1m silicone test leads with a right angle, shrouded 4mm plug at one end and a stainless steel probe on the other
- Pair of insulated alligator type clips
- Pair of insulated probe tips

**Deluxe Test Lead Set:**

*Additional components:*

- Pair of 1m silicone test leads with straight to right angle shrouded 4mm plugs
- Pair of plug-in test probes
- Pair of hook and pinch style probe clips
- Pair of IC probe tip adaptors

Prices where indicated by a ↕ are subject to change. Please call your local sales office or visit www.farnell.com for the latest prices.

248755

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 2+ | 5+ |
|---|---|---|---|---|---|
| Basic Test Lead Set | TL80 | **493-314** | 40.00 | 38.80 | 37.64 |
| Deluxe Test Lead Set | TL81A | **431-3902** | 95.00 | – – | – – |

## SureGrip™ Test Lead Sets

FLUKE







SureGrip

High quality test lead sets with a range of components designed to improve steadiness in slippery hands. Include rubber, over-moulded surfaces and finger hugging curves to give the user a comfortable, reliable grip allowing them to focus on accurate measurements.

- 1.5m silicone, isolated test leads for maximum flexibility and resistance to high and low temperatures
- Reinforced strain reliefs ensure proper contact and increase lifetime
- Fully insulated probes
- IEC1010 CAT IV 600V, CAT III 1000V safety rating for use with the highest rated equipment
- UL listed

**SureGrip™ Industrial Test Lead Set:** Includes:

- TP222 Straight to 90° 4mm Test Lead
- AC220 Alligator type probe set
- TP220 Industrial test probes

**SureGrip™ Electrical Test Lead Set:** Includes:

- TP222 Straight to 90° 4mm Test Lead
- AC220 Alligator type probe set
- TP1 Slim-Reach™ test probes

**TL238 SureGrip High Energy Test Lead Kit**:

Designed for use in high energy environments. Allows the user to extend reach to 30cm away from the measurement. This helps to further reduce the risk for an arc flash explosion. Kit includes:

- TP238 SureGrip slim reach test probes set with 2mm exposed metal reduces risk of short circuits. Probe has removeable finger guard for measuring in tight spaces
- TP280 SureGrip Test Probe extender keep hands away from live circuits
- TL224 SureGrip Silicone Test Lead Set

# Test Leads, Probes & Accessories - continued

## SureGrip™ Test Lead Sets - continued

248494

| Description | Mftrs. List No. | Order Code | Price Each + |
|---|---|---|---|
| Industrial Test Lead Set | TL220 | **431-4189** | 41.00 |
| Electrical Test Lead Set | TL223 | **145-4914** | 36.00 |
| High Energy Test Lead Set | TL238 | **800-2231** | 41.00 |

## SureGrip™ Test Leads and Accessories

FLUKE













A range of high quality test leads, clips and probes that are designed to improve steadiness in slippery hands. The accessories include rubber, over-moulded surfaces and finger hugging curves to give the user a comfortable, reliable grip allowing them to focus on accurate measurements.

- Silicone, isolated test leads for maximum flexibility and resistance to high and low temperatures
- Reinforced strain reliefs ensure proper contact and increase lifetime
- IEC1010 CAT IV 600V, CAT III 1000V. 10 A rating. UL listed.

**SureGrip™Silicon Test Lead Sets:**Sets of 1.5m, red + black test leads with shoruded 4mm type plugs.Available in either 90° to 90° or straight to 90° plugs. Suitable for use with the SureGrip™ range of test probes and clips.

**SureGrip™Alligator Clip Set:**A pair (red + black) of insulated, trigger action alligator type clip probes with blunt heads for gripping objects up to 9.5mm OD.

**SureGrip™Hook Clip Set:**A pair (red + black) of insulated, trigger action hook type clip probes. The profiles narrow to 5.6mm at the tip, with the hook openeing 6.4mm at the front, 2mm at the base.

**SureGrip™ Pincer Clip Set:**A pair (red + black) of insulated, pincer type clip probes consisting of a 114mm flexible shaft and trigger action, pincers that open to 5mm.

**SureGrip™ Alligator Clip Set:**A pair (red + black) of insulated, alligator type clips with multi-purpose tooth patterns to grip anything from fine wire gauges to a 20mm bolt.

**SureGrip™Extension Lead Set**A pair (red + black) of insulated extension leads plus a 4mm socket to socket adaptor for extending SureGrip™ test leads.

248462

| Description | Mftrs. List No. | Order Code | Price Per Pack 1+ |
|---|---|---|---|
| **Test Leads (Pair)** | | | |
| 90° to 90° | TL222 | **431-4062** | 18.00 |
| Straight to 90° | TL224 | **431-4074** | 18.00 |
| Extension Lead Kit | TL221 | **431-4037** | 18.00 |
| **Probes and Clips (Pair)** | | | |
| Alligator Probes | AC220 | **431-4098** | 25.00 |
| Hook Probes | AC280 | **431-4130** | 18.00 |
| Pincer Probes | AC283 | **431-4141** | 22.00 |
| Alligator Clips | AC285 | **431-4165** | 11.00 |

## SureGrip Test Accessories

FLUKE





LATEST PRICING

A range of accessory kits to complement Fluke multimeters and multi-function test equipment. The kits offer significant savings of accessories bought separately and are supplied with carry cases.

**TLK-220 EUR: SureGrip Accessory Kit**
Handy all-in-one kit that includes:

- AC220 SureGrip™ Alligator Clip Set
- AC285 SureGrip™ Large Jaw Alligator Clip Set
- TP74 Slim Reach Test Probe Set (4mm)
- TL224 SureGrip™ Silicone Test Lead Set
- Zippered soft case with moveable divider
- Soft case is large enough to hold most Fluke multimeters

**TLK-225: SureGrip Master Accessory Kit**
This kit includes all the SureGrip™ leads and probes, combined in a handy soft carrying case. The kit includes:

- AC220 SureGrip™ Alligator Clip Set
- AC280 SureGrip™ Hook Clip Set
- AC283 SureGrip™ Pincer Clip Set
- AC285 SureGrip™ Large Jaw Alligator Clip Set
- TP220 SureGrip™ Test Probe Set
- TL224 SureGrip™ Silicone Test Lead Set
- 6-Pocket Storage Pouch

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

339469

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ |
|---|---|---|---|
| TLK-220 | **491-7236** | 78.00 | 75.66 |
| TLK-225 | **491-7248** | 83.00 | 80.51 |

## Probe and Light Set

FLUKE

**L215**





LATEST PRICING

The L215 Kit is ideal for use in high-energy environments. Be prepared with a modular test lead set that includes probe extenders and a light to illuminate those hard-to-reach spaces.

Kit Contents:

- L200 Probe light
- TP280 20cm Test Probe Extenders
- TP220 SureGrip Test Probes
- TL224 SureGrip Silicone Insulated Test Leads
- Soft foldable pouch with six pockets with hook-and-loop

Prices where indicated by a ⇅ are subject to change. Please call your local sales office or visit www.farnellinone.com for the latest prices.

339468.343943

| Mftrs. List No. | Order Code | Price Each 1+ | + |
|---|---|---|---|
| L215 | **488-2921** | 49.00 | – – |

## Micro-SMD Clip

HIRSCHMANN Test & Measurement



- Spring loaded, two-pole test clip
- Specially designed for SMD components
- Gold-plated hardened tip
- 0.64mm connection
- Electrically isolated spring

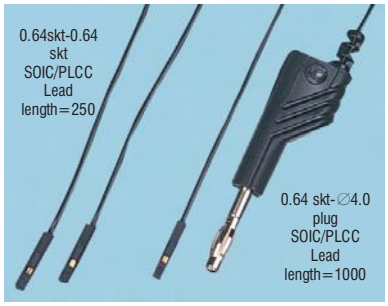
Rated voltage 60V dc
Volume resistance 6mΩ
Clamping range 0 to
-20°C90°C

222528

| | Order Code | Price Each 1+ | 10+ | 50+ |
|---|---|---|---|---|
| Micro SMD Clip 1 | **859-047●** | 12.29 | 12.05 | 11.80 |

## SOIC, PLCC and PQFP Test Leads

HIRSCHMANN Test & Measurement




211468

| Description | Order Code | Price Each 1+ | 10+ | 100+ |
|---|---|---|---|---|
| Test - Test Black | **518-025●** | 3.05 | 2.40 | 2.08 |
| Test - Test Red | **101-1430●** | 2.22 | 1.97 | 1.78 |
| 0.64mm Socket - 4mm Stackable Red | **121-2467●** | 5.10 | 4.01 | 3.44 |
| 0.64mm Socket - 4mm Stackable Red | **121-2467●** | 5.10 | 4.01 | 3.44 |
| 0.64mm Socket - 4mm Stackable Black | **121-2468●** | 5.10 | 4.01 | 3.44 |
| 0.64mm Socket - 4mm Stackable Black | **121-2468●** | 5.10 | 4.01 | 3.44 |

## SMD Tweezer Set

TENMA



- Isolated contact tips connect to 4mm banana plugs
- 1m cable length
- Durable gold plated contact tips
- Rated 400V RMS 1A

SMD component testing tweezers designed to grip small components during testing.

230673

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-001 | **356-2402** | 12.28 | 11.98 | 11.67 |

## Surface Mount Test Lead Set

TENMA



- Extra sharp tips for small surface mount components
- High flexble silicone leads
- Set includes 1 red, 1 black test probe body, 1 red, 1 black 60" 4 mm sheathed, straight to right-angle plus
- 1000V CAT III 20A probe body

230677

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-090 | **356-2475** | 14.52 | 14.16 | 13.79 |

## Miniature

DELTRON Components




A plunger action miniature hooked test probe with gold plated contacts, solder connections. Working voltage 50V ac.

Mftrs. List No. 575+Colour

222587

| Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| Red | **119-3802●** | 1.30 | 1.21 | 1.11 | 0.87 |
| Black | **119-3805●** | 1.30 | 1.21 | 1.11 | 0.87 |
| Blue | **119-3807●** | 1.02 | 0.95 | 0.87 | 0.69 |
| Green | **119-3808●** | 1.30 | 1.21 | 1.11 | 0.87 |
| Yellow | **119-3809●** | 1.30 | 1.21 | 1.11 | 0.87 |

## Miniature

HIRSCHMANN

523-525
Solder L=61



523-549
2mm Plug L=69.5

Miniature plunger action test hooks with gold plated hook. Two types are available for either solder or 2mm pin connection at side. Working voltage 50V.

Mftrs. List No. KLEPS 2 + Colour (Solder), KLEPS 2 BU + Colour (Plug)

222383

| | Order Code | Price Each 1+ | 10+ | 50+ |
|---|---|---|---|---|
| **Solder** | | | | |
| Red | **523-525●** | 3.57 | 2.57 | 2.31 |
| Black | **523-537●** | 3.57 | 2.57 | 2.31 |
| **Plug** | | | | |
| Red | **117-6451●** | 6.24 | 3.44 | 3.13 |
| Black | **523-550** | 6.19 | 4.42 | 4.00 |

## IC Test Clips



- IC test clip
- Spring hook grips down to 0.1mm
- Anti roll guard
- Finger grip
- 4mm fully shrouded safety socket
- 1KV CAT II, 600V CAT III, 10A
- Pollution Degree 2

414722.345048

| Colour | Order Code | Price Each 1+ | 10+ |
|---|---|---|---|
| Black | **100-3020** | 2.29 | 2.11 |
| Red | **100-3022** | 2.29 | 2.11 |

## Safety 2mm Socket Connection

MC




- High grade steel tip
- IEC 1010-2-031 compliant
- Safety cap to prevent injury
- Handle guard flatted to prevent rolling
- Non slip cap prevents shorting on IC pin contacts

Working voltage 1000V CAT II

222456

| Colour | Mftrs. List No. | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|---|
| Black | 240239-21 | **746-691** | 2.64 | 2.50 | 2.45 | 2.25 |
| Red | 240239-22 | **746-708** | 2.64 | 2.50 | 2.45 | 2.25 |

## 2mm 90° Safety Plug Connection

MC




- Right angle 2mm safety plug connection
- Grips pins up to 2mm in diameter
- Gold plated contacts
- **IEC 1010-2-031** compliant
- Comfortable finger grip
- Fully insulated

Working voltage 300V CATII maxium current 1A

222440

| Colour | Mftrs. List No. | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|---|
| Black | 659187-21 | **746-370** | 5.32 | 5.05 | 4.93 | 4.57 |
| Red | 659187-22 | **746-381** | 4.19 | 3.98 | 3.89 | 3.60 |

# Test Leads, Probes & Accessories - continued

## Miniature, 2mm

HIRSCHMANN




Miniature test probes for testing the smallest of components or area of high density. Insulating and backing layers of printed circuit boards can be penetrated by the slim stainless steel tip. Two versions are available with solder connection for cables up to 0.5mm dia. or gold plated socket connection for 2mm measuring leads.Working voltage 50V.

Mftrs. List No. PRUF 1 + Colour (Solder), MPS 1 + Colour (Socket)

222393

| | Order Code | Price Each 1+ | 20+ | 100+ | |
|---|---|---|---|---|---|
| **Probe, Solder** | | | | | |
| Red | **523-483** | 2.75 | 1.95 | 1.76 | |
| Black | **523-495** | 2.17 | 1.54 | 1.38 | |
| **Probe, Socket** | | **1+** | **10+** | **50+** | **100+** |
| Red | **523-501** | 2.99 | 2.59 | 2.40 | 1.97 |
| Black | **523-513** | 2.99 | 2.59 | 2.40 | 1.97 |

## Miniature

**MPS 2/0.64 FT**

HIRSCHMANN Test & Measurement



- Miniature test probe with sprung stainless steel probe tip for small measuring points
- Connects MKL and MAL

Rated voltage 60V dc
Temperature range -25°C to +80°C

Mftrs. List No. 973995-100(black), 973995-101(red)

222540

| Colour | Order Code | Price Each 1+ | 10+ | 50+ |
|---|---|---|---|---|
| Black | **821-810●** | 7.95 | 7.79 | 7.63 |
| Red | **821-822●** | 7.70 | 7.55 | 7.40 |

## Slimline Sharp-tip Test Probe

**76-030/76-031**

TENMA



- 4mm slimline probe with a sharp stainless steel tip
- Extended length probe body
- Wire insulated piercing feature
- Available individually (76-030 red,76-031 black)
- CE marked, meets **IEC1010, 1000V, CAT III 20A**

230680

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-030 red | **342-1673** | 2.23 | 2.17 | 2.06 |
| 76-031 black | **342-1685** | 2.23 | 2.17 | 2.06 |

## Shatter-proof, 4mm Test Probe

HIRSCHMANN Test & Measurement



L=97.5

Test probe with elastic shatter-proof insulating sleeve. Insulating and backing layers of printed circuit boards can be penetrated by the slim stainless steel tip. Socket connection for 4mm measuring leads. Working voltage 50V, Current 5A.

Mftrs. List No. PRUF 2 + Colour

222385

| Mftrs. List No. | Order Code | Price Each 1+ | 20+ | 100+ |
|---|---|---|---|---|
| Red | **523-665** | 1.34 | 1.23 | 1.16 |
| Black | **523-677** | 1.34 | 1.23 | 1.14 |

## Safety Test Probes

**PRUEF 2610 FT**

HIRSCHMANN Test & Measurement



- Test probe with elastic insulating sleeve
- Slender, sprung stainless steel tip
- Allows a constant pressure to be applied without the tip slipping off the component, even in the smallest measuring points
- 4 mm diameter brass socket connection
- Meets IEC 61010 CAT III

| | | | |
|---|---|---|---|
| Rated voltage | 1000V ac/dc | Contact material: | Stainless Steel |
| Contact resistance: | 50mΩ | Contact plating material: | Rhodium |
| Housing material: | | Operating temperature: | -25°C to +80°C |

415577

| Colour | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|
| Red | **101-1416●** | 4.74 | 4.21 | 3.80 | 3.45 |
| Black | **101-1415●** | 4.74 | 4.21 | 3.80 | 3.45 |

## Contact Protected Test Probe

**PRUEF2S**

HIRSCHMANN Test & Measurement



- Contact-protected test probe
- Elastic, shatter-proof insulation
- Tip breaks through insulation layers
- 4mm socket

Rated Voltage: 60Vdc
Contact Resistance: 50
Temperature Range: -25°C to +50°C

Mftrs. List No. 973659-100(black), 973659-101(red)

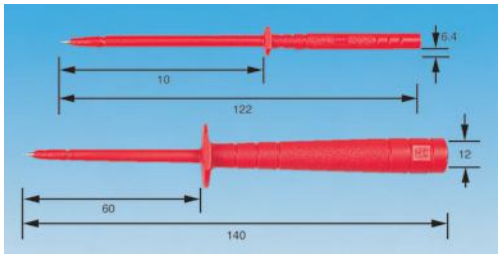
222536

| Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| Black | **810-435** | 2.24 | 1.96 | 1.67 | 1.31 |
| Red | **810-447** | 2.28 | 2.00 | 1.69 | 1.34 |

## Test Probe - Safety

**1000V**

MC




A rigid probe fitted with a 4mm socket to accept shrouded connecting leads and plugs. Each probe features a moulded finger guard/anti-roll body and a refined steel sharp point tip fitted with a removable safety cap. Manufactured to IEC1010-1, VDE0100/0110, approved by BG. Working voltage 1000V.

Mftrs. List No: 24.0235-1 = 152-730 24.0235-4 = 152-731
24.0231-1 = 152-732 24.0231-4 = 152-733

222346

| Colour | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| Red (slimline) | **152-730** | 3.37 | 3.06 | 2.99 |
| Black (slimline) | **152-731** | 3.37 | 3.06 | 2.99 |
| Red | **152-732** | 3.22 | 3.02 | 2.96 |
| Black | **152-733** | 3.22 | 3.02 | 2.96 |

## Insulated Probe Sprung Hooks

TENMA



- 4mm probe sprung hooks
- 3mm hook opening
- Available individually (76-032 red, 76-033 black)
- **CE** marked meets **IEC-1010, 500V, CATI, 5A**

230687

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-032 Red | **342-1697** | 3.63 | 3.53 | 3.35 |
| 76-033 Black | **342-1703** | 3.57 | 3.47 | 3.30 |

## Insulated Crocodile Clips

HIRSCHMANN Test & Measurement



Overall length = 55, Clamping limit = 4

Crocodile clip for clamping very small components in areas of high component density. Contact tongues insulated on outside to prevent short circuit. For use with 2 and 4mm plugs.

| | |
|---|---|
| Volume resistance | 300mΩ |
| Temperature range | -25°C to +80°C |
| Housing | Vestolit |
| Contacts | Stainless Steel |

Mftrs. List No: AGF2 + colour

209815

| | Order Code | Price Each 1+ | 10+ | 25+ | 50+ | 100+ |
|---|---|---|---|---|---|---|
| Red | **495-189** | 5.75 | 4.97 | 4.45 | 3.85 | 3.58 |
| Black | **495-190** | 5.75 | 4.97 | 4.45 | 3.85 | 3.55 |

## Insulated 2mm

MC



Miniature crocodile clips with very fine serrated jaws. Cables can either be plugged into the 2mm socket or solder and crimp terminated.

Overall length = 41, Clamping limit = 3

| | | | |
|---|---|---|---|
| Current Rating | 5A | Housing | Hostalen |
| Voltage Rating | 30V ac, 60V dc | Material | Brass, Tin plated |
| Temperature range | -25°C to +80°C | | |

Mftrs. List No: 24.0154-1 = 152-427 24.0154-4 = 152-428

209749

| | Order Code | Price Each 1+ | 10+ | 50+ | 100+ | 250+ |
|---|---|---|---|---|---|---|
| Red | **152-427** | 2.50 | 2.31 | 2.20 | 1.98 | 1.75 |
| Black | **152-428** | 2.50 | 2.31 | 2.20 | 1.98 | 1.75 |

## Miniature Insulated Alligator Clips

**MA1and MA1S Series**

HIRSCHMANN Test & Measurement



- Miniature alligator clips with unbreakable insulation
- Capable of clamping flat components (soldering eyes) and wires up to a maximum diameter of 4 mm
- The flat part of the jaws (fine wire section) allows a secure contact to be made when clamping even the thinnest wires
- 2mm female connector
- Nickel-plated brass jaws (MA1 series)
- Stainless steel jaws - rust-proof, acid-proof, non magnetic (MA1S series)

| | | | |
|---|---|---|---|
| Clamping Range | 4mm | Contact Resistance | 5mΩ |
| Jaw Strength | 1N | Operating Temperature | -25°C to +100°C |

239842

| Mftrs. List No. | Order Code | Price per Pack (5 pack) 1+ | 10+ | 50+ | + |
|---|---|---|---|---|---|
| MA1 BLACK | **810-502** | 5.69 | 5.01 | 4.40 | – – |
| MA1 RED | **810-514** | 5.69 | 5.01 | 4.40 | – – |
| **Supplied in Pairs** | | | Price Pair | | |
| | | **1+** | **10+** | **25+** | **50+** |
| MA1 RED+BLACK | **496-145** | 2.26 | 1.97 | 1.75 | 1.50 |
| **Supplied Individually** | | | Price Each | | |
| | | **1+** | **10+** | **25+** | **50+** |
| MA1S BLACK | NEW **101-1419●** | 1.00 | 0.88 | 0.78 | 0.72 |
| MA1S RED | NEW **101-1421●** | 1.00 | 0.88 | 0.78 | 0.72 |

## Alligator Test Clips

BSI



- High safety alligator clips for 2mm pin tip test lead
- CAT III 1000V, 10A

414732.404587

| Description | Colour | Order Code | Price Each 1+ | 25+ | 50+ |
|---|---|---|---|---|---|
| Alligator Clip | Black | **100-3025** | 0.82 | 0.77 | 0.71 |
| Alligator Clip | Red | **100-3026** | 0.82 | 0.77 | 0.71 |

## Insulated 4mm 10A

DELTRON Components



A 10 Amp insulated crocodile clip that will accept 4mm plug or thin stranded wire which may be retained by using an integral screw.

Clamping limit = 15mm at point of jaws

Mftrs. List No: 307-0500 = 119-3801 307-0100 = 119-3804

209750

| | Order Code | Price Each 1+ | 20+ | 50+ | 100+ |
|---|---|---|---|---|---|
| Red | **119-3801●** | 3.06 | 2.80 | 2.75 | 2.54 |
| Black | **119-3804●** | 3.27 | 2.99 | 2.94 | 2.71 |

## Insulated 4mm 15A

MC



Touch-proof insulated clips for use with 4mm standard or shrouded plugs. Complies with **IEC1010-2/3**.

Overall length = 53.5, Clamping limit = 11

| | | | |
|---|---|---|---|
| Current Rating | 15A | Housing | Polyamide |
| Working Voltage | 300V CATII | Contacts | Brass, Nickel plated |
| Temperature range | -40°C to +80°C | | |

Mftrs. List No: 24.0157-1 = 225-083 24.0157-4 = 225-095

209760

| 5 Per Pack | Order Code | Price Per Pack 1+ | 10+ | 20+ | 50+ |
|---|---|---|---|---|---|
| Red | **225-083** | 15.74 | 14.32 | 13.26 | 11.02 |
| Black | **225-095** | 15.74 | 14.32 | 13.26 | 11.02 |

## Insulated 4mm 20A

HIRSCHMANN



Overall length = 80.5, Clamping limit = 9.5

Accepts 4mm standard plugs or can be screw terminated. Unbreakable insulation on all sides, conforming to **DIN 57 470 Pt 1**. Clamps fine wires and pins up to 9.5mm.

Mftrs. List No: AK2S RED AND BLACK

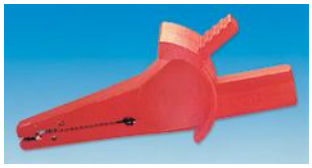
| | | | |
|---|---|---|---|
| Current Rating | 20A | Temperature range | -25°C to +100°C |
| Working Voltage | 50V | Housing | Polypropylene |
| Contact resistance | 10mΩ | Material | Brass, Tin plated |
| Clamping force at tip (max) | 10N | | |

209821

| 1 Pair Per Pack | Order Code | Price Per Pair 1+ | 10+ | 25+ | 50+ | 100+ |
|---|---|---|---|---|---|---|
| Red, Black | **495-311** | 4.02 | 3.47 | 3.12 | 2.69 | 2.52 |

## Fully Insulated Alligator Clips

TENMA



Features:
- Fully insulated 4mm alligator clips
- Wire insulated piercing feature
- Available individually (76-054 red, 76-055 black)
- **CE** marked meets **IEC-1010, 1000V, CATI-II, 20A**

230689

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-0124 Red | **342-1715** | 2.68 | 2.61 | 2.48 |
| 76-126 Black | **342-1727** | 2.73 | 2.65 | 2.52 |

## Shrouded 4mm 32A 'Dolphin'

MC



Clamping limit = 30

Touch proof insulated clips for use with 4mm standard or shrouded plugs. With a large clamping limit, easy grip body and flat clamp area for fine wires. Complies to **IEC1010-2-031**. Supplied in pairs of red and black.

| | |
|---|---|
| Current Rating | 32A |
| Rated Voltage | 1000V CAT III |
| Temperature range | to +80°C |
| Housing | Polyamide, UL94V-2 |
| Material | Brass, Nickel plated |

Mftrs. List No: 66.9575-22 = red 66.9575-21 = black

209797

| 1 Pair Per Pack | Order Code | Price Per Pair 1+ | 10+ | 25+ | 50+ | 100+ |
|---|---|---|---|---|---|---|
| Red and Black | **338-3507** | 9.64 | 9.04 | 8.63 | 7.36 | 6.71 |

# Test Leads, Probes & Accessories - continued

## Miniature



Pin L=52

Miniature test hooks with revolving clip-on gripper. Suitable for extremely thin wires and densely packed circuits and contacts such as ICs. Can clamp diameters up to 3.5mm. With single 0.64mm diameter pin. Working voltage 50V.

222386

| Single Pin | List No. | Order Code | Price Each 1+ | 10+ | 50+ |
|---|---|---|---|---|---|
| Black | KLEPS3ST BLACK | **523-458** | 3.58 | 2.57 | 2.31 |
| Red | KLEPS3ST RED | **523-446** | 3.58 | 2.57 | 2.31 |

## Micro



L=53.8

Micro-miniature test hook with revolving clip-on gripper. Designed for extremely thin wires, especially SMD technology and densely packed circuits and contacts such as ICs with a conductor spacing of 1.27mm. The powder-coated shaft can be bent to 35° and can clamp diameters up to 2.5mm. Two connections via gold-plated 0.64mm diameter pins. Working voltage 50V. Current 2A.

Mftrs. List No. MICRO-KLEPS + Colour

**Test leads specifically for these connectors. order codes 518025 and 518050**

222384

| Colour | Order Code | Price Each 1+ | 10+ | 50+ |
|---|---|---|---|---|
| Red | **523-409** | 4.80 | 4.41 | 3.30 |
| Black | **523-410** | 4.80 | 4.41 | 3.30 |

## 4mm Plug/Cable Entry Test Probes



Clip-on (flexible) L=158

KLEPS 30 + Colour

Features a flexible shaft which has a clip-on facility with a sprung easy push button action. Moulded with a 4mm socket which doubles up as a 4mm plug entry or a terminal block for a lead. Working Voltage 50V, Maximum Current 5A.

222388

| | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| Red | **148-792** | 6.49 | 5.93 | 5.65 | 5.40 |
| Black | **148-793** | 6.49 | 5.93 | 5.63 | 5.40 |

## Safety Probes
**KLEPS2700**



- Safety clamp-type test probe with split test clamps
- Can contact insulated leads with an outer diameter upto 3.5mm
- Displaced insulation at the contact points
- 4mm socket

Rated Voltage: 1000Vdc
Contact resistance: 100mΩ
Temperature Range: -25° to +80°C

Mftrs. List No. 972307-100(black), 972307-101(red)

222533

| Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| Red | **859-151** | 9.23 | 8.35 | 6.83 | 5.43 |
| Black | **859-163** | 9.23 | 8.35 | 6.83 | 5.43 |

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**www.global-legislation.com**

## 4mm Plug Test Probes
**KLEPS250**



- Contact protected clamp-type test probe
- Flexible shaft, rotating grips
- 4mm socket connection

Rated Voltage: 300Vdc
Contact resistance: 100mΩ
Temperature Range: -25°C to +80°C

Mftrs. List No. 973528-100(black), 973528-101(red)

222538

| Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| Black | **810-411** | 5.92 | 5.37 | 4.41 | 3.48 |
| Red | **810-423** | 5.92 | 5.37 | 4.41 | 3.48 |

## Test Connectors

See our selection in Book 1, Section 19



## 4mm Plug/Cable Entry Test Probes
**KLEPS60**



- Clamp-type test probe
- Flexible shaft
- 4mm socket connection and additional screw connection

Rated Voltage: 60Vdc
Contact resistance: 50mΩ
Temperature Range: -25°C to +60°C

Mftrs. List No. 973053-100(black), 973053-101(red)

222539

| Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| Black | **810-393** | 2.97 | 2.60 | 2.24 | 1.97 |
| Red | **810-400** | 2.86 | 2.60 | 2.13 | 1.69 |

## Safety Test Probes
**KLEPS2600**



- Safety clamp-type test probe with rotating grip jaws and flexible shaft
- Max. clamp diameter 4mm
- 4mm socket

Rated Voltage: 1000Vdc
Contact resistance: 50mΩ
Temperature Range: -25°C to +80°C

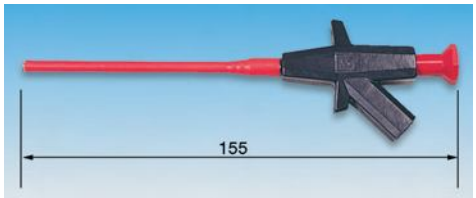
Mftrs. List No. 972306-100(black), 972306-101(red)

222532

| Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| Red | **858-973** | 7.04 | 6.38 | 5.23 | 4.12 |
| Black | **858-985** | 7.04 | 6.38 | 5.23 | 4.12 |

## Safety, Long Reach, 4mm Socket Test Probes
**1000V**

MC




Test clips with flexible shafts and open jaw clip on contacts, designed for three finger single hand operation. Fitted with 4mm sockets to accept shrouded connecting leads and plugs, manufactured to **IEC1010-1, VDE0100/0110** approved by **BG**. Working voltage 1000V, maximum current 3A.

Mftrs. List No. 24.0224-1=152-734, 24.0224-4=152-735

222341

| Colour | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| Red | **152-734** | 15.98 | 14.40 | 14.12 |
| Black | **152-735** | 15.98 | 14.40 | 14.12 |

## Safety Alligator Flexible Clips

TENMA



Features:
- Alligator style contacts can grasp terminals up to 12.7mm diameter
- Insulation on alligator contacts protects against shorting
- **CE** marked, meets **IEC-1010, 1000V CAT III 6A**

230695

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-062 Red | **342-1739** | 11.16 | 10.82 | 10.29 |
| 76-063 Black | **342-1740** | 11.16 | 10.82 | 10.29 |

## 4.0mm Test Lead Kit

MC



A kit of 4mm plugs sockets and highly flexible cable to make up test leads for standard and safety applications. Supplied in a plastic case. The kit comprises:

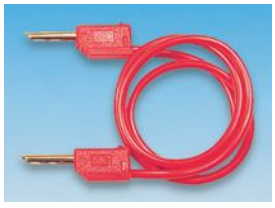
| Order Code | Quantity | Colour |
|---|---|---|
| **4mm Stackable Safety Plugs** | | |
| 22.2300-4+22.1022. | 14 | Black |
| 22.2300-1+22.1022. | 14 | Red |
| 22.2300-2+22.1022. | 6 | Blue |
| 22.2300-5+22.1022. | 6 | Yellow |
| 22.2300-6+22.1022. | 6 | Green |
| **4mm In Line Safety Sockets** | | |
| 66.9500-21 | 4 | Black |
| 66.9500-22 | 4 | Red |
| **4mm In Line Safety Plugs** | | |
| 22.2260-1+22.1025. | 4 | Red |
| 22.2260-6+22.1025. | 4 | Black |
| **4mm RA Safety Plugs** | | |
| 22.2370-1+22.1042. | 4 | Red |
| 22.2370-4+22.1042. | 4 | Black |
| **Highly Flexible Double Insulated PVC Cable** | | |
| 20546 | 5m | Blue |
| 60.7033-23 | 5m | Yellow |
| 60.7033-24 | 5m | Green |
| 60.7033-22 RED 5M | 5m | Red |
| 60.7033-21 BLK 5M | 5m | Black |

239823

| | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| 4mm Test Lead Kit | 20546 | **413-0297** | 124.46 | 119.56 | 117.16 |

## Stackable, 2mm Plugs

MC



PVC test leads, 300mm in length terminated at each end with 2mm gold plated hermaphrodite stackable plugs. Working voltage, 240V ac maximum current 10A.

Mftrs. List Nos: 21.0170-1 = 152-746
21.0170-4 = 152-747

222343

| Colour | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|
| Red | **152-746** | 3.38 | 3.08 | 2.84 | 2.51 |
| Black | **152-747** | 3.38 | 3.08 | 2.84 | 2.51 |

## Stackable, 2mm

HIRSCHMANN



Miniature injection-moulded test lead with shatter-proof handle and PVC cable. Connector diameter 2mm, nickel-plated brass. 2mm dia. socket for stacking. Gold plated copper beryllium contact spring. Highly flexible 0.5mm$^2$ stranded wire. Working Voltage 50V, Current 6A. Available in two lengths.

Mftrs. Part No. MVL2/ +Length + Colour

222389

| Length/Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| **500mm** | | | | | |
| Red | **523-586** | 4.00 | 3.46 | 3.12 | 2.63 |
| Black | **523-598** | 4.00 | 3.46 | 3.12 | 2.63 |
| **1000mm** | | | | | |
| Red | **523-604** | 4.52 | 3.93 | 3.54 | 2.83 |
| Black | **523-616** | 4.52 | 3.93 | 3.54 | 2.83 |

## Safety Shrouded 2mm

MC



- Fully shrouded
- Gold plated contact
- Flexible P.V.C test lead
- IEC 1010-2-031 compliant

Working Voltage 600V CAT II maximum current 10A cable 0.5mm$^2$.

Plug L=39.5 Dia=6.0

222442

| Length | Colour | Mftrs. List No. | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|---|---|
| 1000mm | Black | 659173-100-21 | **746-630** | 7.44 | 7.21 | 7.04 | 6.75 |
| 1000mm | Red | 659173-100-22 | **746-642** | 7.44 | 7.21 | 7.04 | 6.75 |

## Stackable 2mm Shrouded

MC



- Fully shrouded 2mm plugs & sockets
- Stackable plugs with gold contacts
- Flexible PVC test lead
- **IEC-1010-2-031** compliant

Working voltage 600V Cat II maximum current 10A cable 0.5mm$^2$.

Plug L=36.2 W=7.6 H=11.3

222462

| Length | Colour | Mftrs. List No. | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|---|---|
| 1000mm | Black | 659179-100-21 | **746-575** | 5.94 | 5.64 | 5.51 | 5.10 |
| 1000mm | Red | 659179-100-22 | **746-587** | 6.14 | 5.82 | 5.70 | 5.26 |

## 4mm Patch Leads with Stackable Plugs



- 4mm stackable plugs
- Voltage rating: 30V ac, 60V dc
- Highly flexible cable

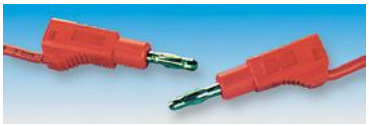
383518.345059

| Length | Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|---|
| 0.5m | Red | **869-3994** | 1.39 | 1.28 | 1.19 | 1.00 |
| 0.5m | Black | **428-4290** | 0.80 | 0.79 | – – | – – |
| 0.5m | Yellow | **869-4010** | 0.97 | 0.90 | 0.82 | 0.71 |
| 0.5m | Green | **869-4028** | 0.47 | 0.43 | 0.40 | 0.35 |
| 0.5m | Blue | **869-4036** | 0.83 | 0.77 | 0.71 | 0.60 |
| 1m | Red | **869-4044** | 1.66 | 1.51 | 1.37 | 1.19 |
| 1m | Black | **869-4052** | 1.66 | 1.51 | 1.37 | 1.19 |
| 1m | Yellow | **869-4060** | 1.66 | 1.51 | 1.37 | 1.19 |
| 1m | Green | **869-4079** | 1.66 | 1.51 | 1.37 | 1.19 |
| 1m | Blue | **869-4087** | 1.64 | 1.49 | 1.35 | 1.17 |
| 1.5m | Red | **869-4095** | 1.11 | 0.99 | 0.91 | 0.77 |
| 1.5m | Green | **869-4125** | 1.93 | 1.71 | 1.57 | 1.34 |
| 1.5m | Blue | **869-4133** | 1.95 | 1.73 | 1.59 | 1.36 |

# Test Leads, Probes & Accessories - continued

## 4mm Stacking Patch Cords

TENMA



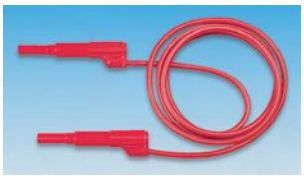
- 4mm stacking banana plugs
- Flexible silicone jacketed wire
- CE marked rated 1200V
- Max. current 12A @ 60V dc

230712

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 76-008 Red 1m | **356-2426** | 5.06 | 4.93 | 4.81 |
| 76-009 Black 1m | **356-2438** | 5.06 | 4.93 | 4.81 |
| 76-010 Red 1m | **356-2440** | 5.56 | 5.41 | 4.81 |
| 76-011 Black 1m | **356-2451** | 5.56 | 5.41 | 4.81 |

## Shrouded Patch Cord 4mm Plugs

Tyco Electronics



Silicone rubber test leads available in 1.0m or 1.5m lengths terminated at each end with 4mm shrouded stackable plugs. Spring loaded shroud retracts when inserted.

Maximum current 5A.

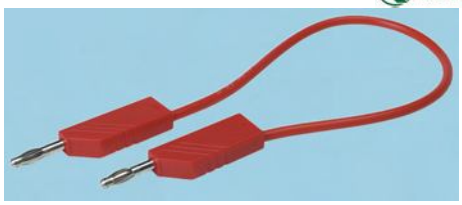
Mftrs. List No. 0-1248850-1 = 143-294, 0-1248850-2 = 143-985, 0-1248840-1 = 152-257, 0-1248840-2 = 152-258

222584

| Colour | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|
| **1m Length** | | | | | |
| Red | **152-258** | 7.84 | 7.37 | 7.09 | 6.53 |
| Black | **152-257** | 7.84 | 7.37 | 7.09 | 6.53 |
| **1.5m Length** | | | | | |
| Red | **143-985** | 8.59 | 7.74 | 6.87 | 6.23 |
| Black | **143-984** | 10.79 | 9.72 | 8.63 | 7.82 |

## MLN Series

HIRSCHMANN Test & Measurement



- Injection-moulded measuring lead
- 4mm diameter plug with caged spring and 4mm diameter socket for towercon-struction
- Nickel-plated copper beryllium contact spring
- High flexible double insulated stranded lead
- Shatter proof

Rated Voltage: 60Vdc
Rated Current: 32A
Temperature Range: -15° to +70°C

Mftrs. List No. 972437 250mm 972435 500mm 972439 1000mm 972440 2000mm
+Colour Code: 100(black), 101(red), 102(blue), 103(yellow), 104(green)

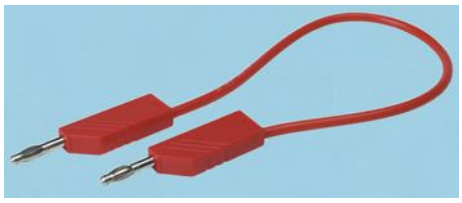
222535

| Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| **250mm, 6mohm** | | | | | |
| Blue | **401-7638●** | 2.50 | 2.27 | 1.86 | 1.46 |
| Yellow | **401-7640●** | 2.50 | 2.27 | 1.86 | 1.46 |
| Green | **401-7651●** | 2.50 | 2.27 | 1.86 | 1.46 |
| Red | **401-7675●** | 2.50 | 2.27 | 1.86 | 1.46 |
| Black | **401-7687●** | 2.50 | 2.27 | 1.86 | 1.46 |
| **500mm, 8mohm** | | | | | |
| Blue | **401-7766●** | 2.80 | 2.56 | 2.09 | 1.65 |
| Yellow | **401-7778●** | 2.80 | 2.56 | 2.09 | 1.65 |
| Green | **401-7780●** | 2.80 | 2.56 | 2.09 | 1.65 |
| Red | **401-7808●** | 2.64 | 2.18 | 1.95 | 1.82 |
| Black | **401-7810●** | 2.64 | 2.15 | 1.96 | 1.82 |
| **1000mm, 12mohm** | | | | | |
| Blue | **401-7833●** | 3.12 | 2.82 | 2.31 | 1.84 |
| Yellow | **401-7845●** | 3.12 | 2.82 | 2.31 | 1.83 |
| Green | **401-7857●** | 3.12 | 2.82 | 2.31 | 1.84 |
| Red | **401-7870●** | 3.12 | 2.82 | 2.31 | 1.83 |
| Black | **401-7882●** | 3.12 | 2.82 | 2.31 | 1.83 |
| **2000mm, 20mohm** | | | | | |
| Blue | **401-7912●** | 4.24 | 3.84 | 3.14 | 2.49 |
| Yellow | **401-7924●** | 4.24 | 3.84 | 3.14 | 2.49 |
| Green | **401-7936●** | 4.24 | 3.84 | 3.14 | 2.49 |
| Red | **401-7950●** | 4.24 | 3.84 | 3.14 | 2.49 |
| Black | **401-7961●** | 4.24 | 3.84 | 3.14 | 2.49 |

Over 480,000 products online GO

## Test Leads With Stackable, 4mm Plugs

HIRSCHMANN Test & Measurement



Injection-moulded PVC measuring lead with 4mm dia. shatter-proof connectors. Incorporates cage spring plugs and 4mm dia. sockets for stacking. Nickel-plated copper beryllium contact spring. Highly flexible, double insulated, 1mm2 stranded lead. Working voltage 50V, Current 16A. Available in various lengths.

Mftrs. List No. ML + Length + Colour

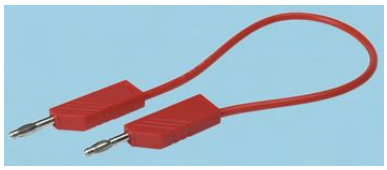
222387

| Length Mftrs. List No./Colour | Order Code | Price Each 1+ | 25+ | 50+ | 100+ |
|---|---|---|---|---|---|
| **250mm** | | | | | |
| MLN25/1 RED | **523-689●** | 4.34 | 2.65 | 2.39 | 2.15 |
| MLN25/1 BLACK | **523-690●** | 3.05 | 1.86 | 1.68 | 1.51 |
| **500mm** | | | | | |
| MLN50/1 RED | **523-719●** | 4.58 | 2.82 | 2.52 | 2.27 |
| MLN50/1 BLACK | **523-720●** | 3.41 | 2.10 | 1.88 | 1.70 |
| MLN50/1 BLUE | **523-732●** | 3.41 | 2.10 | 1.88 | 1.70 |
| **1000mm** | | | | | |
| MLN100/1 RED | **523-744●** | 3.80 | 2.32 | 2.14 | 1.92 |
| MLN100/1 BLACK | **523-756●** | 3.80 | 2.32 | 2.14 | 1.92 |
| MLN100/1 BLUE | **523-768●** | 3.80 | 2.32 | 2.14 | 1.92 |
| MLN100/1 YELLOW. | **871-801** | 2.23 | 2.11 | 1.89 | 1.80 |
| MLN 100/1 GREEN | **828-1874●** | 3.49 | 3.36 | 3.05 | 2.79 |
| **1500mm** | | | | | |
| MLN150/1 RED | **523-770●** | 4.34 | 2.67 | 2.45 | 2.25 |
| MLN150/1 BLACK | **523-781●** | 4.34 | 2.67 | 2.45 | 2.25 |
| MLN150/1 BLUE | **523-793●** | 2.76 | 1.70 | 1.56 | 1.43 |
| MLN 150/1 GREEN | **828-1882●** | 3.94 | 3.79 | 3.44 | 3.15 |
| **2000mm** | | | | | |
| MLN200/1 RED | **523-800●** | 4.89 | 2.99 | 2.75 | 2.54 |
| MLN200/1 BLACK | **523-811●** | 4.89 | 2.99 | 2.75 | 2.54 |

## Silicone Test Leads, 4mm

### MLN SIL Series

HIRSCHMANN Test & Measurement



- 4mm stackable plugs at both ends
- Nickel-plated copper beryllium caged spring contact
- Highly flexible, double insulated, strand-ed lead
- Shatterproof plugs

Conductor Area 1.0mm²
Rated Current 16A
Rated Voltage 60V dc
Cable Material
Temperature Range -15°C to +70°C

373954

| Mftrs. List No. | Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|---|
| **Length: 50cm** | | | | | | |
| MLN SIL 50/1 | Red | **828-2056●** | 2.39 | 2.25 | 2.04 | 1.87 |
| MLN SIL 50/1 | Black | **828-2064●** | 2.39 | 2.25 | 2.04 | 1.87 |
| MLN SIL 50/1 | Yellow | **828-2129●** | 2.39 | 2.25 | 2.04 | 1.87 |
| MLN SIL 50/1 | Green | **828-2137●** | 2.39 | 2.25 | 2.04 | 1.87 |
| MLN SIL 50/1 | Blue | **828-2099●** | 2.39 | 2.25 | 2.04 | 1.87 |
| **Length: 100cm** | | | | | | |
| MLN SIL 100/1 | Red | **828-1998●** | 2.91 | 2.74 | 2.49 | 2.29 |
| MLN SIL 100/1 | Black | **828-2013●** | 2.91 | 2.74 | 2.49 | 2.29 |
| MLN SIL 100/1 | Yellow | **828-2102●** | 2.91 | 2.74 | 2.49 | 2.29 |
| MLN SIL 100/1 | Green | **828-2110●** | 2.91 | 2.74 | 2.49 | 2.29 |
| MLN SIL 100/1 | Blue | **828-2080●** | 2.91 | 2.74 | 2.49 | 2.29 |
| **Length: 150cm** | | | | | | |
| MLN SIL 150/1 | Red | **828-2072●** | 3.30 | 3.09 | 2.80 | 2.57 |
| MLN SIL 150/1 | Black | **828-2048●** | 3.30 | 3.09 | 2.80 | 2.57 |
| MLN SIL 150/1 | Yellow | **828-2188●** | 3.20 | 3.00 | 2.73 | 2.50 |
| MLN SIL 150/1 | Green | **828-2170●** | 3.20 | 3.00 | 2.73 | 2.50 |
| MLN SIL 150/1 | Blue | **828-2153●** | 3.20 | 3.00 | 2.73 | 2.50 |
| **Length: 200cm** | | | | | | |
| MLN SIL 200/1 | Red | **828-2030●** | 3.93 | 3.70 | 3.36 | 3.09 |
| MLN SIL 200/1 | Black | **828-2021●** | 3.93 | 3.70 | 3.36 | 3.09 |
| MLN SIL 200/1 | Yellow | **828-2161●** | 3.74 | 3.50 | 3.20 | 2.92 |
| MLN SIL 200/1 | Green | **828-2196●** | 3.74 | 3.50 | 3.20 | 2.92 |
| MLN SIL 200/1 | Blue | **828-2145●** | 3.74 | 3.50 | 3.20 | 2.92 |

## Coming soon

Register your interest for items that are 'Coming Soon' at **www.farnell.co.uk** and we'll email you to let you know that they're in stock.

## Safety Test Lead, 4mm
**MLS GG Series**



- 4mm straight safety plugs at both ends
- Nickel-plated copper beryllium spring contact
- Highly flexible, double insulated, stranded lead
- Shatterproof plugs with integrated kink protection

| | | | |
|---|---|---|---|
| Connector Area | 2.5mm² | Rated Current | 32A |
| Cable Material | PVC | Rated Voltage | 1000V AC/DC |
| Safety Standard | IEC 61010 1000V Cat III | Temperature Range | -15°C to +70°C |

373957

| Mftrs. List No. | Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|---|
| **Length: 50cm** | | | | | | |
| MLS GG 50/2.5 | Red | **828-1475●** | 3.34 | 3.13 | 2.85 | 2.62 |
| MLS GG 50/2.5 | Black | **828-1467●** | 3.34 | 3.13 | 2.85 | 2.62 |
| **Length: 100cm** | | | | | | |
| MLS GG 100/2.5 | Red | **828-1530●** | 3.58 | 3.37 | 3.07 | 2.80 |
| MLS GG 100/2.5 | Black | **828-1521●** | 3.58 | 3.37 | 3.07 | 2.80 |
| MLS GG 100/2.5 | Yellow | **828-1556●** | 3.58 | 3.37 | 3.07 | 2.80 |
| MLS GG 100/2.5 | Yellow / Green | **828-1572●** | 4.38 | 4.11 | 3.74 | 3.43 |
| MLS GG 100/2.5 | Blue | **828-1548●** | 3.58 | 3.37 | 3.07 | 2.80 |
| **Length: 200cm** | | | | | | |
| MLS GG 200/2.5 | Red | **828-1599●** | 4.10 | 3.85 | 3.49 | 3.22 |
| MLS GG 200/2.5 | Black | **828-1580●** | 4.10 | 3.85 | 3.49 | 3.22 |
| MLS GG 200/2.5 | Yellow | **828-1610●** | 4.10 | 3.85 | 3.49 | 3.22 |
| MLS GG 200/2.5 | Yellow / Green | **828-1637●** | 4.90 | 4.60 | 4.18 | 3.84 |
| MLS GG 200/2.5 | Green | **828-1629●** | 4.10 | 3.85 | 3.49 | 3.22 |
| MLS GG 200/2.5 | Blue | **828-1602●** | 4.10 | 3.85 | 3.49 | 3.22 |

## Contact Protected Test Lead
**MLB/1V**



- Contact protected measuring lead 1mm²
- 4mm diameter plug insulated by latching and sprung insulating sleeve which is only released by pressure on the side-mounted locking spring
- Highly flexible PVC insulation

| | |
|---|---|
| Rated Voltage: | 60Vdc |
| Rated Current: | 16A |
| Temperature Range: | -15° to +70°C |

Mftrs. List No. 972644 250mm 972645 500mm 972646 1000mm 972647 2000mm
+Colour Code: 100(black), 101(red), 102(blue), 103(yellow), 104(green)

222534

| Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|
| **250mm, 8.5mohm** | | | | | |
| Black | **810-526●** | 6.51 | 5.90 | 4.82 | 3.83 |
| Red | **810-538●** | 6.51 | 5.90 | 4.82 | 3.83 |
| Blue | **810-540** | 6.51 | 5.90 | 4.82 | 3.83 |
| Yellow | **400-2957** | 6.51 | 5.90 | 4.82 | 3.83 |
| Green | **400-2969** | 6.51 | 5.90 | 4.82 | 3.83 |
| **500mm, 13mohm** | | | | | |
| Black | **810-551** | 4.02 | 3.73 | 3.47 | 3.22 |
| Red | **810-563●** | 5.11 | 4.73 | 4.41 | 4.09 |
| Blue | **810-575●** | 5.11 | 4.73 | 4.41 | 4.09 |
| **1000mm, 22mohm** | | | | | |
| Black | **810-587●** | 5.49 | 5.13 | 4.73 | 4.39 |
| Red | **810-599●** | 7.38 | 6.69 | 5.47 | 4.02 |
| Blue | **810-605●** | 7.38 | 6.69 | 5.47 | 4.02 |
| Yellow | **400-2994●** | 8.12 | 7.37 | 6.04 | 4.77 |
| Green | **400-6008** | 8.12 | 7.37 | 6.04 | 4.77 |
| **2000mm, 40mohm** | | | | | |
| Black | **810-617●** | 8.12 | 7.37 | 6.04 | 4.77 |
| Red | **810-629** | 8.12 | 7.37 | 6.04 | 4.77 |
| Yellow | **400-6010** | 8.12 | 7.37 | 6.04 | 4.77 |

## Safety Measuring Lead, 4mm
**Series MLS WS**



- Safety measuring lead, at either end 4 mm diametersafety connector with onward connection capability.
- Nickel-plated copper beryllium contact spring
- Highly flexible, double insulated stranded lead, shatter-proofgrip sleeve and lead
- In accordance to IEC 61010 standards
- Built in colour indicator for easy identifcation of insulation damages.

| | | | |
|---|---|---|---|
| CSA: | 1.0 / 2,5mm² | Rated Voltage: | 1000V AC/DC |
| Isolation: | PVC | Class: | Cat II |
| Rated Current (1,0/2,5mm²): | 16/32A | Temperature Range: | -15°C to +70°C |

373962

| Mftrs. List No. | Colour | Order Code | Price Each 1+ | 10+ | 50+ | 100+ |
|---|---|---|---|---|---|---|
| **1,0mm² length: 50cm** | | | | | | |
| MLS WS 50/1 | Red | **828-1653●** | 3.80 | 3.55 | 3.23 | 2.98 |
| MLS WS 50/1 | Black | **828-1645●** | 2.99 | 2.80 | 2.54 | 2.35 |
| MLS WS 50/1 | Yellow | **828-1670●** | 2.91 | 2.73 | 2.48 | 2.28 |
| MLS WS 50/1 | Green | **828-1688●** | 2.91 | 2.73 | 2.48 | 2.28 |
| MLS WS 50/1 | Blue | **828-1661●** | 3.70 | 3.46 | 3.15 | 2.89 |
| **lenght: 100cm** | | | | | | |
| MLS WS 100/1 | Red | **828-1700●** | 3.93 | 3.70 | 3.36 | 3.09 |
| MLS WS 100/1 | Black | **828-1696●** | 3.93 | 3.70 | 3.36 | 3.09 |
| MLS WS 100/1 | Yellow | **828-1726●** | 3.93 | 3.70 | 3.36 | 3.09 |
| MLS WS 100/1 | Green | **828-1734●** | 3.93 | 3.70 | 3.36 | 3.09 |
| MLS WS 100/1 | Blue | **828-1718●** | 3.93 | 3.70 | 3.36 | 3.09 |
| **lenght: 200cm** | | | | | | |
| MLS WS 200/1 | Red | **828-1750●** | 4.18 | 3.94 | 3.58 | 3.28 |
| MLS WS 200/1 | Black | **828-1742●** | 4.18 | 3.94 | 3.58 | 3.28 |
| MLS WS 200/1 | Yellow | **828-1777●** | 4.18 | 3.94 | 3.58 | 3.28 |
| MLS WS 200/1 | Green | **828-1785●** | 4.18 | 3.94 | 3.58 | 3.28 |
| MLS WS 200/1 | Blue | **828-1769●** | 4.18 | 3.94 | 3.58 | 3.28 |
| **2,5mm² length: 50cm** | | | | | | |
| MLS WS 50/2,5 | Red | **828-1807●** | 3.96 | 3.73 | 3.39 | 3.11 |
| MLS WS 50/2,5 | Black | **828-1793●** | 3.96 | 3.73 | 3.39 | 3.11 |
| MLS WS 50/2,5 | Blue | **828-1815●** | 3.96 | 3.73 | 3.39 | 3.11 |

## Stackable, 4mm Plugs

MC



PVC test leads, 1m in length terminated at each end with 4mm gold plated hermaphrodite stackable plugs. Working voltage 240V ac. Maximum current 19A.

Mftrs. List No. 21.0830-1 = 152-748,
21.0830-4 = 152-749

222344

| Colour | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| Red | **152-748** | 5.11 | 4.57 | 4.18 |
| Black | **152-749** | 5.47 | 4.80 | 4.21 |

## Safety, In-Line Non Stackable, 4mm Plugs
**1000V**

MC



Flexible, 1m length PVC connecting leads fitted with in-line style non-stackable 4mm plugs. Each plug features fixed shrouds and insulated tip centre pins for additional safety. Manufactured to **IEC1010-1, VDE0100/0110**, approved by **BG**.

Working voltage 1000V, maximum current 32A.

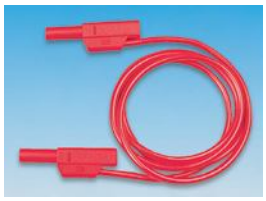
Mftrs. List Nos: 21.5080-1 =226-099
21.5080-4 =226-105

222354

| Colour | Order Code | Price Each 1+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|
| Red | **226-099** | 9.75 | 8.62 | 7.42 | 6.31 |
| Black | **226-105** | 9.75 | 8.62 | 7.42 | 6.31 |

## Safety, Shrouded, 4mm Plugs
**1000V**

MC



Flexible 1m length PVC connecting leads fitted with 4mm plugs. The slimline stackable plugs feature fixed shrouds and insulated tip centre pins for additional safety. Manufactured to **IEC1010-1, VDE0100/0110,** approved by **BG**. Working voltage 1000V, maximum current 32A.

Mftrs. List No. 21.5430-1 = 152-736,
21.5430-4 = 152-737

222342

| Colour | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|
| Red | **152-736** | 7.95 | 7.20 | 7.07 |
| Black | **152-737** | 8.31 | 7.53 | 7.39 |

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## Test Leads, Probes & Accessories - continued

### Right Angle/In-Line Non Stackable, 4mm Plugs

MC



PVC test leads, 1m in length terminated with a 4mm right angle plug at one end and a 4mm in-line plug at the other. Each plug features fixed shrouds and insulated tip centre pins for additional safety.

Working voltage 1000V, maximum current 32A

Mftrs. List Nos: 21.3390-1 =226-117
21.3390-4 =226-129

222353

| | | Price Each | | | |
|---|---|---|---|---|---|
| Colour | Order Code | 1+ | 10+ | 25+ | 50+ |
| Red | **226-117** | 9.60 | 8.68 | 7.82 | 6.69 |
| Black | **226-129** | 9.60 | 8.68 | 7.82 | 6.69 |

### Adaptor, 2mm to 4mm

MC



PVC test lead adaptor, 300mm in length terminated with a 2mm plug at one end and a 4mm plug at the other. For convenience, gold plated hermaphrodite stackable plugs are fitted. The leads are suitable for converting and inter-connecting between either system. Working voltage 240V ac, maximum current 10A.

Mftrs. List Nos: 21.1620-1 =152-752
21.1620-4 =152-753

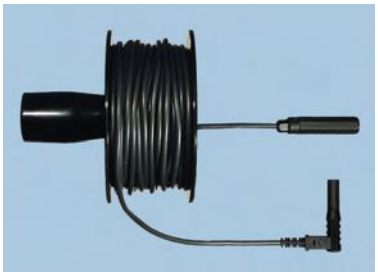
222345

| | | Price Each | | |
|---|---|---|---|---|
| Colour | Order Code | 1+ | 10+ | 25+ |
| Red | **152-752** | 4.08 | 3.50 | 3.04 |
| Black | **152-753** | 3.95 | 3.39 | 2.95 |

### Test Lead Extension Reel

SILVERTRONIC

134328



- 12m Black cable reel
- Silicone double insulated
- Highly flexible
- One end is terminated 4mm right angled plug
- One end has a 4mm socket which original lead is plugged

381203.381273

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ | 25+ |
|---|---|---|---|---|---|
| 134328 | **844-8809** | 33.55 | 30.75 | 29.29 | 27.21 |

### Test Lead and Tool Holder




A 350mm aluminium rail complete with 15 moulded hooks which can be snapped onto the rail in any desired position. The rail can be mounted on any vertical surface (mounting screws supplied).

222367

| Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|
| **147-010** | 15.28 | 13.91 | 12.00 |

## Troubleshooting tips

**Chat live online** to one of our technical engineers at **www.farnell.co.uk**

## Pomona Test Accessories

### 4mm Test Leads

Pomona Electronics

**4911A**



- Retractable sheath end allows interfacing to either sheathed or non-sheath style 4mm banana jacks
- Plug and housing are molded directly to the cable in an integral one piece design and the wire is double crimped for a long lasting connection
- Multi-leaf banana spring material is Beryllium Copper, nickel plater for extended insertion life cycle and low contact resistance
- Test leads can mate to a broad assortment of Pomona probes, alligators, spade lugs etc
- Choice of red or black
- Choice of 0.6, 0.9 and 1.2 meter lengths
- IEC1010-2-031 CAT III 1000V

| | |
|---|---|
| Operating voltage | 1000 Vrms |
| Current | 10A |
| Operating temperature | +55°C |

382076

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Black, 0.6m | 4911A-24-0 | **847-1622** | 7.66 | 7.43 | 7.21 |
| Red, 0.6m | 4911A-24-2 | **847-1630** | 7.66 | 7.43 | 7.21 |
| Black, 0.9m | 4911A-36-0 | **847-1649** | 7.66 | 7.43 | 7.21 |
| Red, 0.9m | 4911A-36-2 | **847-1657** | 7.66 | 7.43 | 7.21 |
| Black, 1.2m | 4911A-48-0 | **847-1665** | 7.66 | 7.43 | 7.21 |
| Red, 1.2m | 4911A-48-2 | **847-1673** | 7.66 | 7.43 | 7.21 |

### Replacement DMM Test Leads

Pomona Electronics



- Monolithic probes with fixed tips
- Durable 2 mm tips for long life
- Comfort-grip probe
- Fits most DMM's including Fluke, HP (Agilent), Wavetek (Meterman) and others
- Silicone insulated 1.2m leads




1. Right angle DMM 2. Straight DMM 3. Retractable sheath 4mm

| Model No. | Application | Plug Type | Rating |
|---|---|---|---|
| 5907A | Hand-held DMM modular test leads | 1 - Right angle DMM | CAT III 1000V UL |
| 5908A | Bench-top DMM modular test leads | 2 - Straight DMM | CAT III 1000V UL |
| 5909A | Hand-held DMM modular test leads | 1 - Right angle DMM at both ends | CAT III 1000V UL |
| 6358 | Stainless steel heavy-duty Universal DMM test leads | 3 - Retractable sheath DMM | CAT III 1000V UL |

240910

| Mftrs. Model No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 5907A | **413-6056** | 8.66 | 8.40 | 8.15 |
| 5908A | **413-6068** | 8.66 | 8.40 | 8.15 |
| 5909A | **413-6070** | 8.66 | 8.40 | 8.15 |
| 6358 | **413-6081** | 8.66 | 8.40 | 8.15 |

## Replacement DMM Test Lead Sets

Pomona Electronics



- Monolithic probes with fixed tips
- Durable 2 mm tips for long life
- Comfort-grip probe
- Fits most DMM's including Fluke, HP (Agilent), Wavetek (Meterman) and others
- Silicone insulated 1.2m leads

| Model No. | Probe Tip | Plug Type | Rating |
|---|---|---|---|
| 5519A | Standard Nickel/brass | 1 - Right angle DMM | CAT III 1000V 10A UL |
| 6365 | Standard Nickel/brass | 2 - Straight DMM | CAT III 1000V 10A UL |
| 6366 | Standard Nickel/brass | 5 - Retractable sleeve | CAT III 1000V 10A UL |
| 5898 | Stainless steel heavy-duty | 1 - Right angle DMM | CAT III 1000V 10A UL |
| 5309A | Stainless steel heavy-duty | 3 - Stacking banana | 30V ac, 60V dc, 10A |

240901

| Mftrs. Model No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 5519A | **413-5945** | 8.57 | 8.31 | 8.06 |
| 6365 | **413-5957** | 8.57 | 8.31 | 8.06 |
| 6366 | **413-5969** | 8.66 | 8.40 | 8.15 |
| 5898 | **413-5970** | 8.66 | 8.40 | 8.15 |
| 5309A | **413-5982** | 8.66 | 8.40 | 8.15 |

## Precision Probe Set

**Small Outline**

Pomona Electronics



- Replaceable spring-loaded tips
- Comfort-grip textured surface
- Fits all meters including Fluke, HP (Agilent), Metrix, Wavetek (Meterman) and others
- Silicone insulated leads resist abrasion and heat
- CAT III, 1000V, 3A




1. Sharp-point gold spring-loaded tip
2. Tri-point gold spring-loaded tip
3. Quad-point gold spring-loaded tip
4. Sharp stainless steel rigid tip
5. 7.7cm long extended stainless steel tip

| Model No. | Product Description |
|---|---|
| 6341 | Precision probe with set of 5 tips |
| 6342 | Probes with gold pogo tips |
| 6275. | Probes with sharp stainless steel rigid tips |
| 6354 | Set of 5 replacement probe tips |

240831

| Mftrs. Model No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 6341 | **413-5775** | 24.24 | 23.51 | 22.81 |
| 6342 | **413-5787** | 13.85 | 13.43 | 13.03 |
| 6275. | **413-5799** | 12.12 | 11.76 | 11.40 |
| 6354 | **413-5805** | 13.00 | 12.61 | 12.23 |

## Retractable Tip Test Probes

**Sharp thin tips**

Pomona Electronics



- Silicone insulated 1.2m leads
- Fully insulated tip extends to 7.6cm
- Durable 1mm stainless-steel tip reaches into inaccessable areas
- Fits most meters from Fluke, Metrix, Wavetek (Meterman) and others
- Set of two probes, one black & one white

| Model No. | Product Description |
|---|---|
| 5953A | Probe set with right-angle DMM plugs - CAT II 600V |
| 5952A | Probe set with stacking banana plugs - 30V ac, 70V dc rating |

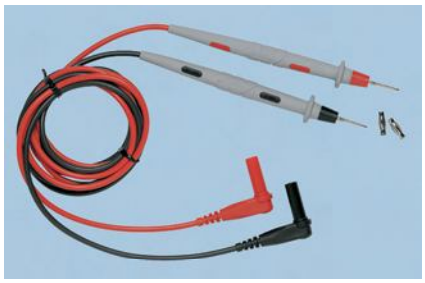
240870

| Mftrs. Model No. | Order Code | Price Each 1+ | 5+ | 5+ |
|---|---|---|---|---|
| 5953A | **413-5817** | 15.59 | 15.12 | 15.12 |
| 5952A | **413-5829** | 15.59 | 15.12 | 15.12 |

## 2mm/4mm Test Lead Set

**6601**

Pomona Electronics



- Designed for all DMMs with a safety style sheathed banana jack
- 2mm notched pin probe tip with screw on standard 4mm banana plug adapter
- Probe handle made of Santoprene rubber and Polypropylene
- Probe body and banana plug are molded directly to the wire
- Test leads are silicone, high wire strand count
- Banana adapter and banana plug spring are nickel plated beryllium copper
- IEC 1010-2-031 CAT III

| | | | |
|---|---|---|---|
| Operating voltage | 1000 VRMS/DC | Rating | IEC 1010-2-031, CAT III |
| Current | 10 A | | |

382085

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 6601 | **847-1819** | 10.97 | 10.64 | 10.32 |

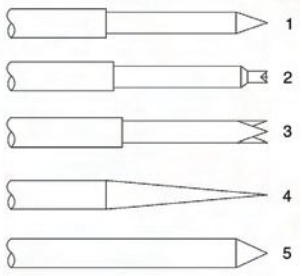
## Replaceable Tip Probe Set

**Combination Lead Terminations**

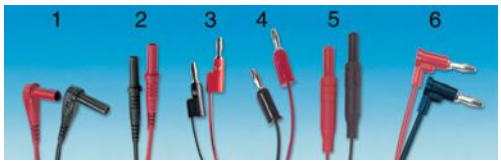
Pomona Electronics



- Silicone insulated 1.2m leads
- Fully insulated tip extends to 7.6cm
- Durable 1mm stainless-steel tip reaches into inaccessable areas
- Fits most meters from Fluke, Metrix, Wavetek (Meterman) and others
- Set of two probes, one black & one red




1. Gold-plated sharp-point pogo
2. Gold-plated microtip pogo
3. Gold-plated triple-point pogo
4. Stainless-steel sharp-point
5. Standard tip, 060 nickel/brass




1. Right angle DMM plug
2. Straight DMM plug
3. Stacking banana plug
4. Straight banana plug
5. Retractable sleeve banana plug
6. Right angle banana plug

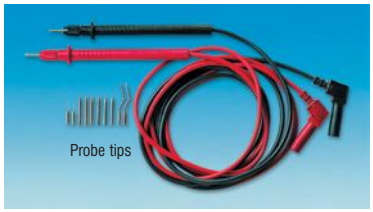
| Model No. | Probe Tip | Plug Type | Rating |
|---|---|---|---|
| 6469 | 2 | 1 | CAT III 1000V UL |
| 6477 | 4 | 1 | CAT III 1000V UL |
| 5951A | 5 | 6 | 30V ac, 60V dc |
| 5676A | All 5 | 1 | CAT III 1000V |

240881

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 6469 | **413-5830** | 15.59 | 15.12 | 14.67 |
| 6477 | **413-5878** | 15.59 | 15.12 | 14.67 |
| 5951A | **413-5891** | 15.59 | 15.12 | 14.67 |
| 5676A | NEW **414-6086** | 22.51 | 21.84 | 21.18 |

## Probe Kit with Replacement Tips

Pomona Electronics




- Two test probes with a set of all five probes tips
- Silicone insulated 1.2 m leads

## Pomona Test Accessories - continued

### Probe Kit with Replacement Tips - continued

| Model No. | Product Description | Plug Type | Rating |
|---|---|---|---|
| 6342 | Probe set with sharp point gold pogo tips | 1 - Right-angle DMM | CAT III 1000V |
| 6275. | Probe set with sharp stainless steel rigid tips | 1 - Right-angle DMM | CAT III 1000V |
| 6354 | Replacement probe tips. Set of 5 types | | |

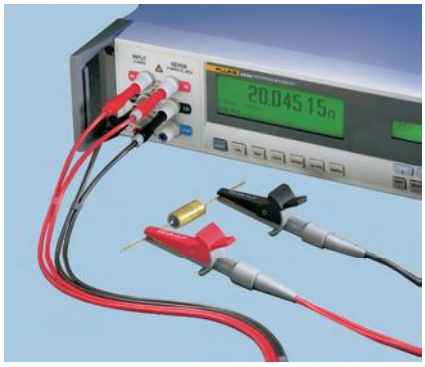
240891

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 6342 | **413-5787** | 13.85 | 13.43 | 13.03 |
| 6275. | **413-5799** | 12.12 | 11.76 | 11.40 |
| 6354 | **413-5805** | 13.00 | 12.61 | 12.23 |

### Lead Set with Kelvin Clips

Pomona Electronics

**6730**



- True wire four wire lead set with gold plated alligator clips that open to 20.3mm
- Long leads: 188cm
- Standard banana plugs with retractable sheath
- Colour coded

| | | | |
|---|---|---|---|
| Voltage RMS | 1000V Cat III | Temperature | -10 to +55°C |
| Current | 20 A | | |

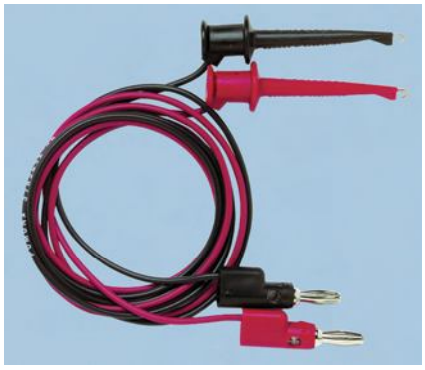
382088

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 6730 | **847-1851** | 78.61 | 76.25 | 73.96 |

### Test Clip to 4mm Stacking Banana Plug

Pomona Electronics

**3782**



- Provides a Minigrabber output from a Banana Jack
- Banana plug is capable of vertical and cross stacking
- Mates to any standard Banana Jack
- Choice of red or black
- Choice of 0.3. 0.6, 0.9 or 1.2 meter leads

| | | | |
|---|---|---|---|
| Operating temperature | 55°C | Operating hands free | 300 WVDC |
| Operating voltage hand-held | 60VAC/60VDC max | Current | 5 A |

382074

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 10+ | 50+ |
|---|---|---|---|---|---|
| Black, 0.3m | 3782-12-0. | **123-1236** | 2.95 | 2.86 | 2.78 |
| Red, 0.3m | 3782-12-2. | **123-1182** | 2.75 | 2.67 | 2.59 |
| Black, 0.9m | 3782-36-0. | **370-4257** | 2.95 | 2.86 | 2.78 |
| Red, 0.9m | 3782-36-2. | **123-1200** | 2.95 | 2.86 | 2.78 |
| Black, 1.2m | 3782-48-0 | **123-1261** | 3.20 | 3.10 | 3.01 |
| Red, 1.2m | 3782-48-2. | **123-1212** | 3.20 | 3.10 | 3.01 |

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### Minigrabber™ Test Clip with DMM jack

Pomona Electronics

**Test Lead Extender**



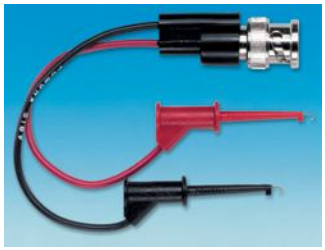
- Silicone insulated 300mm leads
- Fit on the end of modular test leads such as Pomona 5907A (4136056)
- Standard colours, Red and Black

240920

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 6248-12-0 | **414-6098** | 5.41 | 5.25 | 5.09 |

### BNC to Micro Grabber Test Clips

Pomona Electronics





- Converts BNC connectors to micro grabber test clips
- Rated at 150V RMS
- Length: 7" (180mm)

New

311607

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| BNC Female to Micro Grabber Clips | 5188 | **443-5734** | 9.39 | 9.11 | 8.84 |
| BNC Male to Micro Grabber Clips | 5189 | **443-5746** | 10.17 | 9.87 | 9.57 |

### BNC Male to Minigrabber® Test Clip

Pomona Electronics



- Minigrabber® test clip hooks attach to terminal sizes up to 1.5mm diameter
- Converts BNC/ Male jacks/ to Minigrabber test clips
- Moulded directly onto the wire for pull strength durability and environmental resistance
- Grabber hook and BNC centre contact are gold plated
- Schematic: Black minigrabber test clip to BNC shell, red Minigrabber test clip to BNC centre contact
- Length: 7" (180mm)

311504

| | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| BNC Male | 3789 | **443-5497** | 8.73 | 8.47 | 8.21 |

### BNC Female to Alligator Test Clips

Pomona Electronics



Converts BNC cable with male connectors to alligator clips for test versatility.

- Moulded directly for pull strength, durability and environmental resistance
- BNC center contact is gold plated beryllium copper
- Overall length 180mm
- Rated 150V RMS

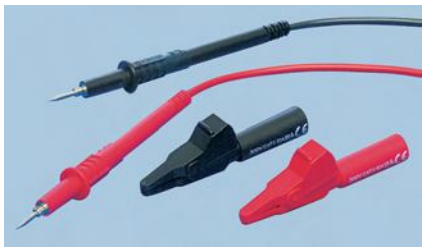
| Mftrs. List No. | Jaw Size |
|---|---|
| 2630 | Alligator Clips: Jaw opening 7.6mm |
| 2631 | Mini Alligator Clips: Jaw opening 4.7mm |

311500

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 2630 | **443-5369** | 7.36 | 7.14 | 6.93 |
| 2631 | **443-5357** | 7.36 | 7.14 | 6.93 |

## Test Lead Kit
**6723**

Pomona Electronics



- Test probe has a stainless steel sharp tip with 8/32 threaded base
- Alligator clip screws onto probe tip
- Test leads fit all standard DMM with a safety style banana jacks
- Complies to IEC 1010-2-031

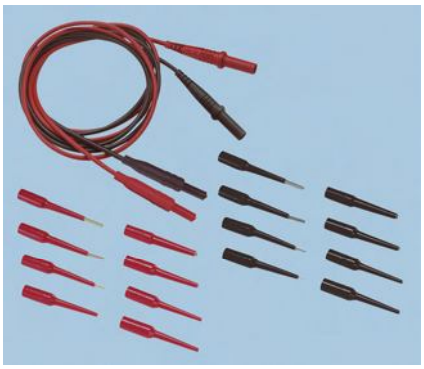
| | | | |
|---|---|---|---|
| Test probe | 1000 Vrms CAT III 20A | Temperature | -10 to +55°C |
| Alligator clip | 300 Vrms CAT II 10A | | |

382086

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 6723 | **847-1827** | 22.60 | 21.92 | 21.26 |

## Test Connector Adapter Set
**6481**

Pomona Electronics



- 18 piece kit includes one red and one black set of each pin and socket along with a set of 1.2m red and black test leads
- Round pins and socket adapters
- Flexible tip allows testing of adjacent contacts
- Full insulation protects against shorting or contact damage
- High strand count silicone wire for flexibility and high temperature resistance

**Kit consists of:**

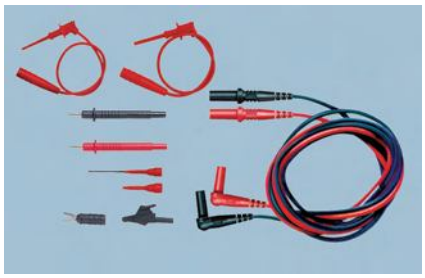
| Model | Contact size | Type | Current |
|---|---|---|---|
| 4690 | 22 AWG 0.76mm | Socket | 5 A |
| 4691 | 22 AWG 0.76mm | Pin | 5 A |
| 3560 | 20 AWG 1.02mm | Socket | 7.5 A |
| 3561 | 20 AWG 1.02mm | Pin | 7.5 A |
| 3562 | 16 AWG 1.60mm | Socket | 13 A |
| 3563 | 16 AWG 1.60mm | Pin | 13 A |
| 3564 | 12 AWG 2.36mm | Socket | 24 A |
| 3565 | 12 AWG 2.36mm | Pin | 24 A |

382082

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 6481 | **847-1746** | 48.46 | 47.01 | 45.60 |

## Test Lead Kit
**5543B**

Pomona Electronics



- Test leads with a right angle banana plug are ideal for a hand held multimeter
- High strand count silicone wire for extreme flexibility and high temperature resistance
- Banana plugs are moulded directly to the wire for strength
- Insulated extended fine point adapter
- Probe body, alligator, spade lug and test clip lead attaches directly to the test leads
- Test accessories store in tri-fold nylon pouch
- IEC 1010-2-031

**Kit consists of:**

| Model | Quantity | Description |
|---|---|---|
| 6232A | 1 red, 1 black | Modular probe set with brass tip |
| 6261 | 1 red | Minipincer test clip with DMM jack |
| 6248A | 1 red | Minigrabber test clip with DMM jack |
| 6262 | 1 red | Extended fine point test probe adapter |
| 6203 | 1 black | Insulated spade lug adapter |
| 5907A | 1 red, 1 black | Flexible lead set with right angle and straight banana plugs |
| 6263 | 1 red | IC test probe tip adapter |
| 5916A | 1 black | Medium alligator clip |

382078

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 10+ |
|---|---|---|---|---|
| 5543B | **201-2959** | 32.88 | 31.89 | 30.94 |

## Test Lead Kit
**5901B**

Pomona Electronics



- High strand count silicone wire for extreme flexibility and high temperature resistance
- Banana plugs are moulded directly to the wire for strength
- Probes, alligator clips and spade lugs fit directly onto test leads
- Interchangeable test probe tips
- Tri-fold pouch of durable nylon
- IEC 1010-2-031

**Kit consists of:**

| Model | Quantity | Description |
|---|---|---|
| 5689A | 1 red, 1 black | Modular test probe set |
| 6248 | 1 red, 1 black | Minigrabber test clip with DMM jack set |
| 5916A | 1 red, 1 black | Medium alligator clip set |
| 6364 | 1 | Replacement probe tip set |
| 5908A | 1 red, 1 black | DMM test lead set |
| 6203 | 1 red, 1 black | Insulated spade lug adapter set |

382081

| Mftrs. List No. | Order Code | Price Each 1+ | 3+ | 5+ |
|---|---|---|---|---|
| 5901B/POM | **847-1720** | 41.54 | 40.29 | 39.09 |

## DMM Maxi Kit
**Multi use**

Pomona Electronics



- Wide range of leads, tips and probes
- Nylon storage pouch included

**Kit contents list**

| | | | |
|---|---|---|---|
| 1 | 1.2m silicone insulated leads with right-angle plug | 7 | Large aligator clip set |
| 2 | Modular probe set wioth replacement tips | 8 | Spade lugs |
| 3 | 5 sets of replacement tips | 9 | IC probe tip adapter |
| 4 | Retractable tip test probe set | 10 | Minigrabber™ test clip leads |
| 5 | Test lead coupler set | 11 | Minipincer™ test clip leads |
| 6 | Medium aligator clip set | 12 | Nylon storage pouch |

240921

## Electrical DMM Test Lead Kit

Pomona Electronics



## Pomona Test Accessories - continued

### Electrical DMM Test Lead Kit - continued

- Silicone insulated test leads with right angled plugs (4 ft)
- Modular electrical test probes
- Extended tip adaptors
- Insulated spade lugs
- Medium and large alligator clips
- Storage pouch
- Fits most DMM's from Fluke, Meterman, Agilent and others

311610

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 5673B | **443-5795** | 38.09 | 36.95 | 35.84 |

### Kelvin Probes

**4-Wire and 2-Wire measurement**



- Designed for high precision and rapid testing
- 30V ac, 70V dc Rating
- For use with 4-Wire Kelvin meters

240917

| Mftrs. Model No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 6303 | **413-6019** | 64.91 | 62.96 | 61.07 |

### Kelvin Clip Set



- Two clips connect to test points for 4-wire resistive measurement
- Gold-plated clips and plugs
- Clips open to 6.4mm maximum
- 30V ac, 70V dc Rating

240918

| Mftrs. Model No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 5940 | **413-6020** | 114.24 | 110.81 | 107.49 |

### DIY Micrograbber®



- Ideal for connecting to small circuit board components
- Supports 20 to 22 AWG wire
- Operating voltage: 150V dc RMS
- Current: 3A
- Overall length: 44mm

311582

| Mftrs. List No. | Colours | Order Code | Price Each 1+ | 10+ | 25+ |
|---|---|---|---|---|---|
| 4233-0 | Black | **412-7584** | 12.10 | 11.74 | 11.39 |
| 4233-2 | Red | **443-5953** | 12.10 | 11.74 | 11.39 |

### Mini-Pincer Test Clip

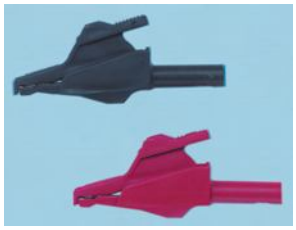


- Pincer type contact
- Length: 2.59"

311609

| Colour | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Black | 5418-0 | **443-5760** | 1.68 | 1.63 | 1.58 |
| Red | 5418-2 | **443-5771** | 1.68 | 1.63 | 1.58 |

### Aligator Clip Set



- Fits on any DMM or banana plug test lead
- Jaws open to 7.6mm
- Rated CAT III 300V 5A
- Supplied as a red and black pair

240964

| Mftrs. Model No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 5916A | **414-6104** | 6.18 | 6.00 | 5.82 |

### Connect Test Adaptors (Pin Type)



- An ideal test adaptor for testing multi socket connectors like RS232 (female)
- Flexible tip allows easy access to adjacent pins
- Brass, bright tin plated
- 2500V dc

**Materials:**
**Insulation:** Polyvinyl chloride (PVC)
**Banana Jack Body** (upper connector)
**Material:** Brass
**Finish:** Bright Tin plated

**Pin** (lower connector):
**Material:** Brass
**Finish:** Gold plated over nickel plating

| Mftrs List No. | Colour | Contact Size∅ | Ampage |
|---|---|---|---|
| 4691-0 | Black | 0.76mm | 5A |
| 4691-2 | Red | 0.76mm | 5A |
| 3561-0 | Black | 1.02mm | 7.5A |
| 3561-2 | Red | 1.02mm | 7.5A |
| 3563-0 | Black | 1.6mm | 13A |
| 3563-2 | Red | 1.6mm | 13A |
| 3565-0 | Black | 2.36mm | 23A |
| 3565-2 | Red | 2.36mm | 23A |

311503

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 4691-0 | **443-5680** | 2.69 | 2.61 | 2.53 |
| 4691-2 | **443-5692** | 2.69 | 2.61 | 2.53 |
| 3561-0 | **443-5400** | 2.90 | 2.81 | 2.73 |
| 3561-2 | **443-5412** | 2.90 | 2.81 | 2.73 |
| 3563-0 | **443-5448** | 2.56 | 2.48 | 2.41 |
| 3563-2 | **443-5450** | 2.56 | 2.48 | 2.41 |
| 3565-0 | **443-5473** | 2.56 | 2.48 | 2.41 |
| 3565-2 | **443-5485** | 2.56 | 2.48 | 2.41 |

### Connect Test Adaptors (Socket Type)



- An ideal test adaptor for testing multi pin connectors like RS232 (male)
- Flexible tip allows easy access to adjacent pins
- Brass, bright tin plated
- 2500V dc

**Materials:**
**Insulation:** Polyvinyl chloride (PVC)
**Banana Jack Body** (upper connector)
**Material:** Brass.
**Finish:** Bright Tin plated

**Socket** (lower connector):
**Material:** Copper Alloy
**Finish:** Gold over copper plate

| Mftrs List No. | Colour | Contact Size∅ | Ampage |
|---|---|---|---|
| 4690-0 | Black | 0.76mm | 5A |
| 4690-2 | Red | 0.76mm | 5A |
| 3560-0 | Black | 1.0mm | 7.5A |
| 3560-2 | Red | 1.0mm | 7.5A |
| 3562-0 | Black | 1.6mm | 13A |
| 3562-2 | Red | 1.6mm | 13A |

311502

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 4690-0 | **443-5667** | 3.51 | 3.41 | 3.30 |
| 4690-2 | **443-5679** | 3.51 | 3.41 | 3.30 |
| 3560-0 | **443-5382** | 2.69 | 2.61 | 2.53 |
| 3560-2 | **443-5394** | 2.69 | 2.61 | 2.53 |
| 3562-0 | **443-5424** | 2.90 | 2.81 | 2.73 |
| 3562-2 | **443-5436** | 2.90 | 2.81 | 2.73 |

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## Multi Stacking Banana Plug Patch Cord

Pomona Electronics



- A range of multi stacking banana plug patch cords
- 4mm to 4mm plugs
- Nickel plated finished
- 18 AWG wire

311611

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Patch cord, Black 0.3m | B-12-0 | **443-5825** | 3.20 | 3.10 | 3.01 |
| Patch cord, Black 0.5m | B-18-0 | **443-5837** | 3.20 | 3.10 | 3.01 |
| Patch cord, Black 0.6m | B-24-0 | **443-5849** | 3.20 | 3.10 | 3.01 |

## 0.64mm Square Pin Receptacle Patch Cord

Pomona Electronics



- Ideal for jumping 0.64mm square pins on PC test boards
- Receptacle is gold plated to optimize the electrical connection
- Operating voltage: 45V RMS
- Current: 3A max.

311583

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 4741-6-2 | **443-5709** | 2.86 | 2.77 | 2.69 |

## BNC Male Cable with Moulded Strain Relief

Pomona Electronics



- Body: Brass, Tarnish resistant plating
- Dielectric: PTFE
- Centre Contact - Gold plated brass
- Strain relief: PVC moulded directly to cable and connectors

| Mftrs. List No. | Specification |
|---|---|
| 2249-C | 50Ω RG58 C/U cable, for general test and measurement purposes |
| 2249-E | 75Ω cable for use with TV, Video and LAN signals |
| 2249-K | 50Ω RG58 C/U cable with superior flexibility |

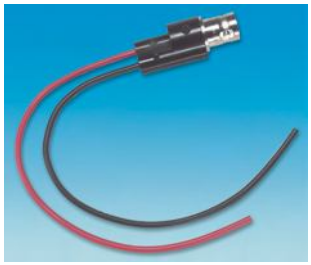
311497

| Length | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| 30cm | 2249-C-12 | **443-5242** | 10.17 | 9.87 | 9.57 |
| 60cm | 2249-C-24 | **443-5254** | 10.17 | 9.87 | 9.57 |
| 300cm | 2249-C-120 | **443-5266** | 15.23 | 14.77 | 14.33 |
| 300cm | 2249-E-120 | **443-5291** | 15.27 | 14.81 | 14.37 |
| 30cm | 2249-K-12 | **443-5308** | 15.27 | 14.81 | 14.37 |
| 60cm | 2249-K-24 | **443-5310** | 15.27 | 14.81 | 14.37 |
| 300cm | 2249-K-120 | **443-5321** | 19.47 | 18.89 | 18.32 |

## BNC connector to 20 AWG leads

Pomona Electronics





New

- Breakout quickly converts a BNC cable to flying leads
- Lead ends can be attached to terminal strips or customised
- Moulded directly to the wire for pull strength durability and environmental resistance
- BNC centre is gold plated beryllium copper
- Black lead is connected to BNC shell, red lead to BNC centre contact

311606

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| BNC Female to 20 AWG Leads | 4969 | **443-5710** | 4.81 | 4.67 | 4.53 |
| BNC Male to 20 AWG Leads | 4970 | **443-5722** | 6.63 | 6.43 | 6.24 |

## BNC Female Connector to Multi Stacking 4mm Banana Plugs

Pomona Electronics



Converts BNC cables with male plugs to stackable banana plugs for versatility.

- Moulded directly to the wire for pull strength durability and environmental resistance
- BNC center contact is gold plated beryllium copper
- Overall length 180mm
- Rated 500V RMS

311501

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 3073 | **443-5370** | 6.83 | 6.63 | 6.43 |

## BNC (Male) to Multi-Stacking Banana Plugs

Pomona Electronics



- Converts BNC (female) cable to stack-able banana plugs
- Moulded directly to the wire for pull strength durability and dust/moisture resistance
- BNC dielectric if PTFE for superior temperature performance BNC centre contact is gold plated for corrosion and environmental resistance
- Overall length is 180mm
- 500V RMS

311579

| Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 3957 | **443-5515** | 9.91 | 9.61 | 9.32 |

## Test Lead Coupler

Pomona Electronics



- Banana plug splice
- For use with any Pomona DMM test leads
- Maintains overvoltage rating up to CAT III 1000V per IEC1010-2-0312
- Supplied as a red and black pair

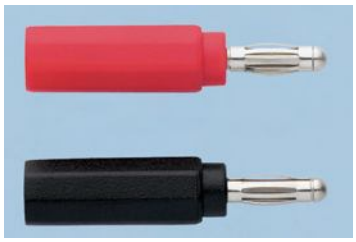
240936

| Mftrs. Model No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 6252 | **413-6100** | 2.59 | 2.51 | 2.44 |

## 4mm Adapters

Pomona Electronics

**6728**



- Adapter provides an easy and quick conversion from a standard sheathed banana plug / patch cord to a standard exposed banana plug
- Allows standard sheathed banana plugs / patch cords to connect to non-sheath style banana jacks or blinding post
- Ideal for environments using a mixture of sheathed and non-sheathed style patch cords
- Choice of red or black

Voltage 600 Vrms Temperature -10 to +55°C
Current 20 A max

382087

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Black Adapter | 6728-0 | **847-1835** | 2.38 | 2.31 | 2.24 |
| Red Adapter | 6728-2 | **847-1843** | 2.38 | 2.31 | 2.24 |

## Pomona Test Accessories - continued

### Double Banana Plug with Solder Turret Terminals



- Features solder turrets for mounting small discrete components
- Nickel plated, Beryllium copper for tarnish resistance & long insertion life

311495

| Colour | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Black | 1330-ST-0 | **443-5205** | 2.59 | 2.51 | 2.44 |

### Double Banana Plug, Solderless, with Set Screws



- Features a recessed area for mounting small discrete components
- Nickel plated
- Beryllium copper for tarnish resistance & long insertion life

311494

| Colour | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Black | 1330-0 | **443-5187** | 2.04 | 1.98 | 1.92 |
| Red | 1330-2 | **443-5199** | 2.04 | 1.98 | 1.92 |

### Double Banana Plug with Wire Guide

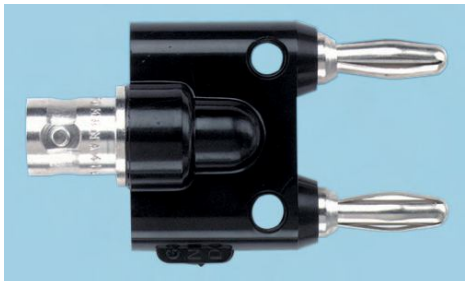


- Double banana plug
- Set crews to secure leads (MDP)
- Simplifies cable construction or component mounting (MDP)
- Nickel plated finish
- MDP-S internally fitted with shorting bar

311612

| Description | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Double banana plug with wire guide, Black | MDP-0 | **443-5898** | 1.86 | 1.80 | 1.75 |
| Double banana plug shorting bar, Black | MDP-S-0 | **443-5904** | 3.03 | 2.94 | 2.85 |
| Double banana plug shorting bar, Red | MDP-S-2 | **443-5916** | 3.03 | 2.94 | 2.85 |

### BNC Female Connector to 4mm Stackable Banana Plug

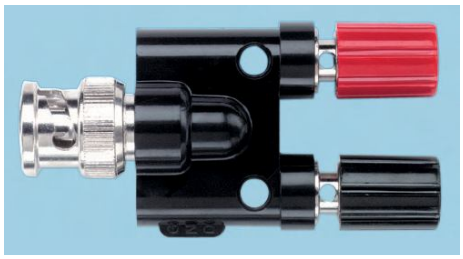


- Black ABS body
- Nickel plated banana plug
- Gold plated copper BNC center
- Rated 500V rms

385795

| Connector | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Female | 1269.. | **443-5163** | 5.02 | 4.87 | 4.72 |

### BNC Male Connector to 4mm Stackable Binding Posts

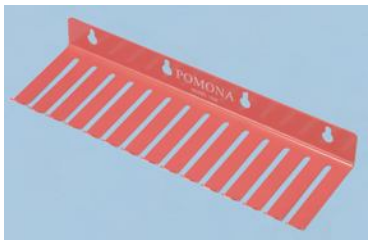


- Black ABS body
- Nickel plated copper banana plug
- Gold plated copper BNC center
- Rated 500V rms

385794

| Connector | Mftrs. List No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|---|
| Male | 1296 | **443-5175** | 9.31 | 9.03 | 8.76 |

### Test Lead Holders




- Neatly stores leads
- Attach to walls
- 4408M is magentic so will attach to cabinets
- Easy access




| Model No. | Colour | Max Cable Dia. | No. Slots |
|---|---|---|---|
| 4408 | Black | 8.13 mm | 10 |
| 4408M | Black | 8.13 mm | 10 |
| 1508 | Orange | 5.33 mm | 14 |
| 2708 | Blue | 11.43 mm | 9 |

385792

| Mftrs. Model No. | Order Code | Price Each 1+ | 5+ | 10+ |
|---|---|---|---|---|
| 4408 | **413-6111** | 6.93 | 6.72 | 6.52 |
| 4408M Magnetic | **413-6123** | 15.59 | 15.12 | 14.67 |
| 1508 | **847-1592** | 6.93 | 6.72 | 6.52 |
| 2708 | **847-1606** | 6.93 | 6.72 | 6.52 |

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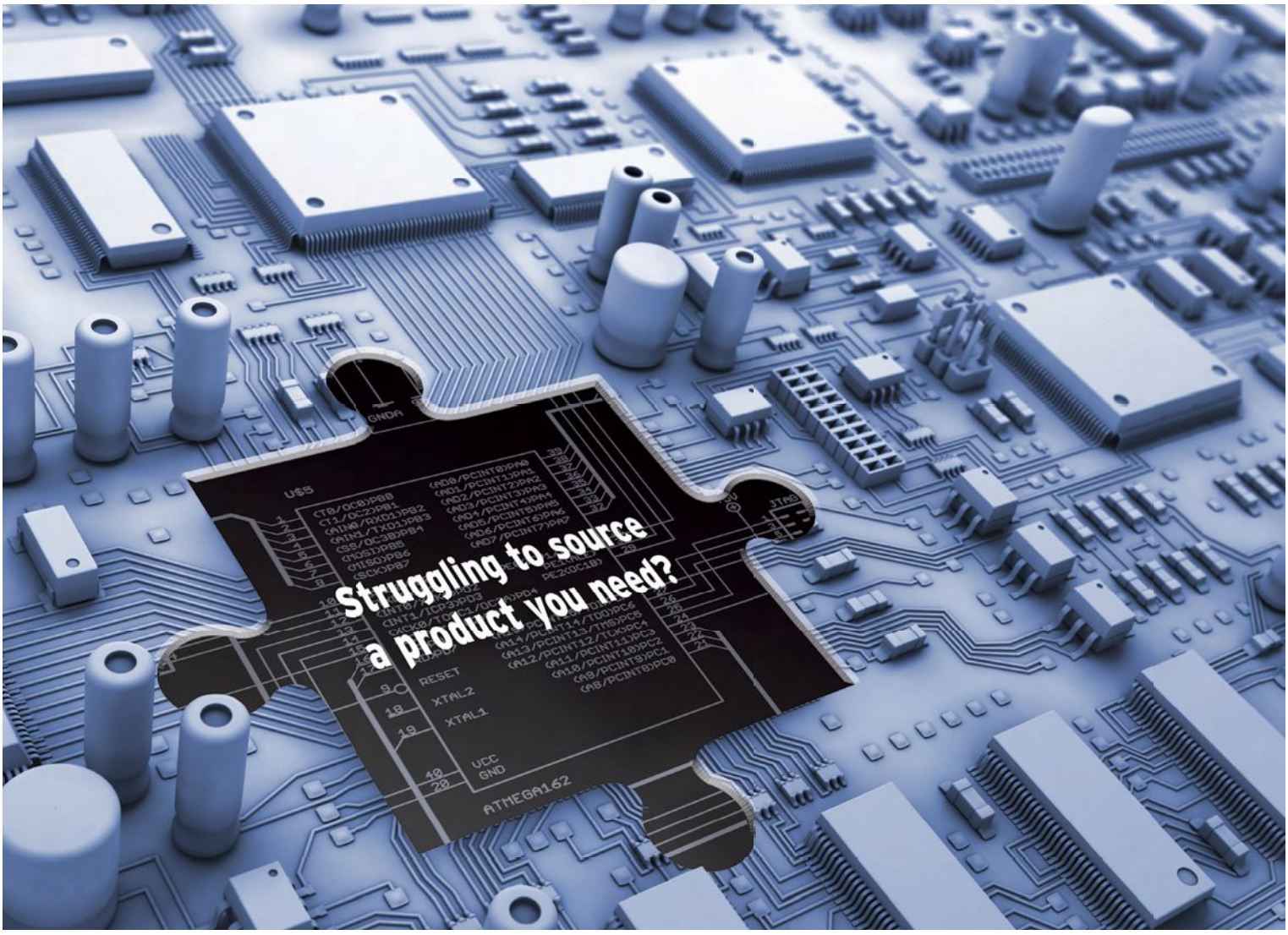
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