Laurel High Performance DPMs

FEATURES
- ±99999 Display Span
- User Selectable Ranges
- 60 Readings Per Second
- Adaptive Digital Filter
- 1/8 DIN, NEMA-4X Front
- 5, 10, 24V DC Excitation Out

OPTIONS (all outputs isolated)
- Dual Setpoint Relay Outputs
- Linearized Isolated Analog Transmitter Outputs
- USB, RS-232 & RS-485 Data I/O
- Custom Curve Linearization
- Datalogging PC Software

Laureate™ DPMs offer exceptional accuracy at high reading rates. Advanced programming features provide flexibility in measuring DCV, ACV, DCA, ACA, temperature, weight, strain, process & pot follower.

SPECIFICATIONS

Display	Five 14.2 mm (.56") high LED digits
A-to-D Conversion	
A-to-D rate	60/s at 60 Hz, 50/s at 50 Hz
Display update	3.5/s at 60 Hz, 3/s at 50 Hz
Accuracy at 25°C	
DC, Process	< 0.01% FS ±1 ct
Strain, Load	< 0.01% FS ±1 ct
True RMS	< 0.1% FS (10 Hz-10 kHz)
	CF = 3.0 at full scale (AC or DC coupled)
Thermocouple	< 0.2°C
RTD	< 0.1°C
Noise Rejection	
CMR, DC to 60 Hz	130 dB
NMR to 50/60Hz line	90 dB with min filtering
Transducer Excitation Output (std)	
Output	100 mA @ 5V, 120 mA @ 10V, 50 mA @ 24V
Dual Relay Output (opt)	
Contact relays .	8A @ 250 Vac or 24 Vdc
Solid state relays	0.13A @ 140 Vac or 180 Vdc
Linerarized Analog Output (opt)	
Level	0-20 mA, 4-20 mA, 0-10 Vdc, ±10 V
Resolution	16 bits (0.0015%)
Environmental	
Operating temperature	0 – 55°C, 95% RH at 40˚C, non-condensing
Data Communications (opt)	
Type	USB, RS-232, RS-485 (2- or 4-wire)
Protocol	Modbus RTU, Modbus ASCII or Laurel ASCII

ACCESSORIES

CBL01	RJ11 TO DB9 Cable to PC Com port
CBL02	USB to DB9 Adapter
CBL05	USB Cable to PC USB Port

ORDERING INFORMATION

Example: L10010DCV1

❑ **Laureate Series**	L	Laureate Panel Meter
	LW	Laureate Weight Meter
❑ **Main Board**	1	DPM with green LEDs
	2	DPM with red LEDs
	3	Extended, green LEDs
	4	Extended, red LEDs

Note: Extended capability for DPMs is required for custom curve linearization.

❑ **Power**	0	85-264 Vac/90-370 Vdc
	1	10-48Vdc/12-30 Vac
❑ **Setpoint Output**	0	None
	1	Dual 8 A relays
	2	Dual solid state relays
❑ **Analog Output**	0	None
	1	0-20 mA & 0-10 V
❑ **Digital Interface**	0	None
	1	RS-232 (Isolated)
	2	RS-485 (Isolated)
	4	RS485 Modbus (Isolated)
	5	USB
	6	USB to RS-485 Converter

❑ **Input Type**

DC Volts	DCV1	200.00 mV
	DCV2	2.0000 V
	DCV3	20.000 V
	DCV4	200.00 V
	DCV5	600.0 V
DC Amperes	DCA1	2.0000 mA
	DCA2	20.000 mA
	DCA3	200.00 mA
	DCA4	5.000 A
Process Signals		
(4-20 mA, 0-5 V, etc.)	P	4-20 mA = 0-10000
	P1	Custom Scaling
Strain Gage, Potentiometer		
(4-wire ratio)	SG	0-200 mV = 0-20000
	SG1	Custom Scaling

Note: The same DC signal conditioner board can be user configured for DC Volts, DC Amps, process, or strain.

100-Ohm Platinum RTDs	P385C	-202 to 850°C
	P385F	-331 to 1562°F
	P392C	-202 to 850°C
	P392F	-331 to 1562°F

Thermocouples

JC	-210 to 760°C	EF	-400 to 1830°F
JF	-347 to 1400°F	NC	-245 to 1300°C
KC	-244 to 1372°C	NF	-410 to 2370°F
KF	-408 to 2501°F	SC	-46 to 1768°C
TC	-257 to 400°C	SF	-51 to 3214°F
TF	-430 to 752°F	RC	-45 to 1768°C
EC	-240 to 1000°C	RF	-49 to 3213°F

Note: The same temperature signal conditioner board can be user configured for all T/C and RTD types

TRMS Volts	RMV1	200.00 mV	RMV2	2.0000 V
	RMV3	20.000 V	RMV4	200.00 V
	RMV5	600.0 V (Not Agency Approved)		
	RMV6	300.0 V		
TRMS Amperes	RMA1	2.0000 mA	RMA2	20.000 mA
	RMA3	200.00 mA	RMA4	5.000 A

Note: The same AC RMS signal conditioner can be user-configured for AC Volts or Amps

Load Cells (6-wire ratio)	WM1	-99,999 to +99,999

Note: Excitation is 10V DC for up to four 350Ω load cells in parallel

Red Lion Deluxe Panel Meters

- Process, Voltage, Current, Temperature & Strain Gage Inputs
- 5 Digit 0.56" Sunlight Readable Red Display (Green Optional)
- Variable Display Intensity
- 16 Point Scaling for Non-linear Processes
- Four Setpoint Alarm Outputs (Optional)
- 1/8 DIN, NEMA 4X/IP65 Front Bezel
- Digital Communication Options (Free Setup Software)
- Retransmitted Analog Output (Optional)

PAX ▶

The PAX® Analog Panel Meters offer many features and performance capabilities to suit a wide range of industrial applications. Five different models handle various analog inputs with 3½ to 5 digit resolution.

The meters provide a MAX and MIN reading memory with programmable capture time. The capture time is used to prevent detection of false max or min readings which may occur during start-up or unusual process events. The signal totalizer (integrator) can be used to compute a time-input product. This is useful to provide a readout of totalized flow, calculate service intervals of motors or pumps. The totalizer can also accumulate batch weighing operations.

Four setpoint output can be configured to suit a variety of control and alarm requirements. A linear DC output (20 mA or 10 V) can be scaled independent of the input range and can track either the input, totalizer, max or min readings.

Communication and bus capabilities are also available as option cards. Readout values and setpoint alarm values can be controlled through the bus. Once the meters have been initially configured, the parameter list may be locked against further modification or only the setpoint values can be made front panel accessible.

ORDERING INFORMATION

To Order—Insert Number Code for Each Letter to Select Catalog Number.
Order Example: PAXD0100

PAX [A] [B] [C]

A	Input	
	D	DC Voltage/Current
	P	Process
	H	AC TRMS Voltage/Current (requires 85-250V supply)
	S	Strain Gage / Bridge
	T	Thermocouple / RTD
B	LED Display	
	00	Red, Sunlight Readable
	01	Green
C	Power	
	00	85 - 250 VAC
	10	11 - 36 VDC, 24 VAC

Plug-In Options: *	
PAXCDS10	Dual Form C Setpoint Relays (5 A @ 240 VAC or 28 VDC res.)
PAXCDS20	4 Form A Setpoint Relays (3 A @ 250 VAC or 30 VDC res.)
PAXCDS30	4 Setpoint Sinking Open Collector Outputs (0.1 A @ 50 V)
PAXCDS40	4 Setpoint Sourcing Open Collector Outputs (0.1 A @ 30 V)
PAXCDL10	Analog Output Card (0-20/4-20 mA, 0-10 VDC)
PAXCDC10	RS485 Serial Communications Card with Terminal Block
PAXCDC1C	Extended RS485 Card with Dual RJ11 Connector
PAXCDC20	RS232 Serial Communications Card with Terminal Block
PAXCDC2C	Extended RS232 Card with 9 Pin D Connector
PAXCDC30	DeviceNet Communications Card
PAXCDC40	RS485 Modbus Communications Card
PAXCDC4C	Extended Modbus Card with Dual RJ11 Connector
PAXCDC50	Profibus-DP Communications Card
SFCRUSB1	USB Programming Card, Cable & Software

*add -ASSY to PAX model number for factory installation of options & meter setup. Crimson software is a free download from the Red Lion website.

SPECIFICATIONS

Range	Resolution	Input R	Max. Input	Basic Accy.
PAXD:				(%rdg@23°C)
±200 µADC	10 nA	1.111 kΩ	15 mA	0.03%+3d
±2 mADC	0.1 µA	111 Ω	50 mA	0.03%+3d
±20 mADC	1 µA	11 Ω	150 mA	0.03%+3d
±200 mADC	10 µA	1 Ω	500 mA	0.05%+3d
±2 ADC	0.1 mA	0.1 Ω	3 A	0.5%+3d
±200 mVDC	10 µV	1.066 MΩ	100 V	0.03%+3d
±2 VDC	0.1 mV	1.066 MΩ	300 V	0.03%+3d
±20 VDC	1 mV	1.066 MΩ	300 V	0.03%+3d
±300 VDC	10 mV	1.066 MΩ	300 V	0.05%+3d
100 Ω	0.01 Ω	(0.175 V)	30V	0.05%+3d
1000 Ω	0.1 Ω	(1.75 V)	30V	0.05%+3d
10 kΩ	1 Ω	(17.5 V)	30V	0.05%+3d
PAXP:				
20 mADC	1 µA	20 Ω	150 mA	0.03%+2d
10 VDC	1 mV	500 kΩ	300 V	0.03%+2d
PAXH: (TRMS AC or AC+DC, 50-400 Hz)				
200 mVAC	10 µV	686 kΩ	30 V	0.1%+40d
2 VAC	0.1 mV	686 kΩ	30 V	0.1%+20d
20 VAC	1 mV	686 kΩ	300 V	0.1%+20d
300 VAC	10 mV	686 kΩ	300 V	0.1%+30d
200 µAAC	10 nA	1.11 kΩ	15 mA	0.1%+40d
2 mAAC	0.1 µA	111 Ω	50 mA	0.1%+20d
20 mAAC	1 µA	11.1 Ω	150 mA	0.1%+20d
200 mAAC	10 µA	1.1 Ω	500 mA	0.1%+20d
5 AAC	1 mA	0.02 Ω	7 A	0.5%+5d
PAXS: (2 or 4 wire)				
±24 mVDC	1 µV	100 MΩ	30 V	0.02%+3d
±240 mVDC	10 µV	100 MΩ	30 V	0.02%+3d

PAXT:	Range	Accuracy 23°C	Accuracy 0-50°C
100 Ω Pt 385/392	-200 to 850°C	0.4°C	1.6°C
120 Ω Nickel 672	-80 to 260°C	0.2°C	0.5°C
10 Ω Copper 427	-100 to 260°C	0.4°C	0.9°C
TC Type T	-200 to 400°C	1.2°C	2.1°C
TC Type E	-200 to 871°C	1.0°C	2.4°C
TC Type J	-200 to 760°C	1.1°C	2.3°C
TC Type K	-200 to 1372°C	1.3°C	3.4°C
TC Type R, S	-50 to 1768°C	1.9°C	4.0°C
TC Type B	100 to 300°C	3.9°C	5.7°C
	300 to 1820°C	2.8°C	4.4°C
TC Type N	-200 to 1300°C	1.3°C	3.1°C
TC Type C	0 to 2315°C	1.9°C	6.1°C

RTD Input:	2, 3 or 4 wire sensor, 10Ω max lead res. (3Ω on Cu RTD)
Readout:	°C or °F, with 1° or 0.1° resolution
Offset Range:	-19999 to 99999 digits
Totalizer:	9 digit, 0.001 to 65.000 scale factor, 0.01% accuracy
A/D Converter:	16 bits, 20 readings/sec.
Control Inputs:	Three, jumper selectable sink/source, max. input 30 VDC continuous, not isolated to sensor input
AC Power:	85 to 250 VAC 50/60 Hz, 15 VA.
LV Power:	11 to 36 VDC, 11 W; 24 VAC, 50/60 Hz, 15 VA
Input Isolation:	2300 Vrms to AC power, 500 Vrms to LV power, 500 Vrms to digital comm & analog out
Sensor Power:	24 VDC, 50 mA for DC in, 5/10V on strain gage in
Temperature:	0 to 50 °C operating, <85% RH (non-condensing)
Connections:	Cage-clamp terminal block
Dimensions:	1.95" H x 3.80" W x 4.1" D (50x97x105mm)

Red Lion Dual Display Panel Meter

- Universal Process Inputs, DC Current, DC Voltage, Process Signals, Resistance, Thermocouples or RTDs
- Wide Range Power Supply: 50–250 VAC & 21.6–250 VDC
- 6/9 Digit Dual Line/Multi-Color Display with 0.7" and 0.35" digits
- Variable Contrast and Intensity Display
- Meter Update Rate up to 160/Second
- Up to Four Setpoint Relays
- Retransmitted Analog Output
- Built-in USB port & Modbus Protocol
- R232 & RS485 Optional

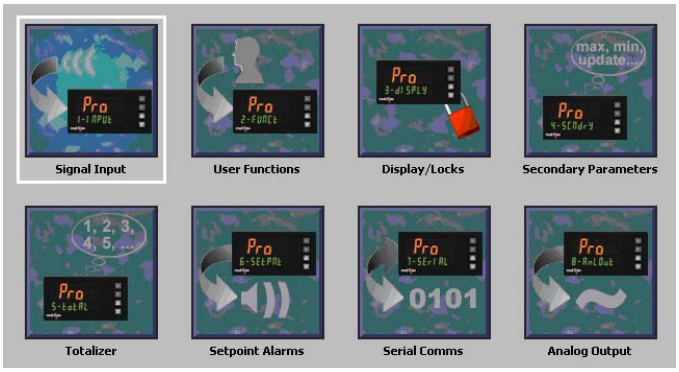
PAX2A

The PAX2A is packed full of features that set it apart from other panel meters. The input, total, min., max. or setpoint value can be displayed on the 0.7" high 6-digit main LCD display. The main display also offers three programmable, easy-to-read colors: red, orange and green. The color change can be tied to the setpoints, providing the operator with a visual display of changing conditions in the application. A second display line is a 0.35" high, green LCD that can be programmed for any of the above parameters as well. This 9-digit display accommodates totalizing applications that easily exceed the normal 6-digit displays. In addition to the dual displays, the meter also includes a 3-character programmable unit indicator.

Beyond the display, the PAX2A provides the maximum in configuration flexibility, allowing users to stock just one meter for numerous applications. Featuring universal input, the same meter accepts DC current, DC voltage, process signal, plus thermocouple and RTD temperature sensor inputs. The PAX2A also has a wide range AC/DC power input.

With its dual display and versatile functionality, the PAX2A delivers an ideal solution for applications that require two parameters to be visualized at the same time (e.g. present temperature and setpoint value or flow rate and total gallons).

The Crimson 2 setup software allows quick and easy configuration of the meter from any PC, using the supplied USB cable.



ORDERING INFORMATION

PAX2A	Dual Display Process Meter (USB cable, panel gasket and mounting clip included)
Plug-In Options: *	
PAXCDS10	Dual Form C Setpoint Relays (5 A @ 240 VAC or 28 VDC res.)
PAXCDS20	4 Form A Setpoint Relays (3 A @ 250 VAC or 30 VDC res.)
PAXCDS30	4 Setpoint Sinking Open Collector Outputs (0.1 A @ 50 V)
PAXCDS40	4 Setpoint Sourcing Open Collector Outputs (0.1 A @ 30 V)
PAXCDL10	Analog Output Card (0-20/4-20 mA, 0-10 VDC)
PAXCDC10	RS485 Serial Communications Card with Terminal Block
PAXCDC1C	Extended RS485 Card with Dual RJ11 Connector
PAXCDC20	RS232 Serial Communications Card with Terminal Block
PAXCDC2C	Extended RS232 Card with 9 Pin D Connector
PAXCDC30	DeviceNet Communications Card

*order PAX2A-ASSY for factory installation of options & meter setup. Crimson 2 software is a free download from the Red Lion website.

SPECIFICATIONS

Display:	Positive image LCD
Top Line:	6 digit, 0.71" (18 mm) tri-color backlight (red/green/orange) -199,999 to 999,999 display range
Bottom Line:	9 digit, 0.35" (8.9 mm) green backlight -199,999,999 to 999,999,999 display range
Power:	50 to 250 VAC, 50/60 Hz, 14 VA 21.6 to 250 VDC, 8 W
Annunciators:	4 red 'setpoint active' indicators
Units Label:	3 programmable characters with tri-color backlight
Keypad:	2 programmable function keys, 4 keys total
A/D Converter:	24 bit resolution, conversion rate programmable from 5 to 160 readings/sec.
Input:	Multi-function, user selectable
Current:	± 250 µADC, ± 2.5 mADC, ± 25 mADC, ± 250 mADC, ±2 ADC
Voltage:	± 250 mVDC, ± 2.0 VDC, ± 10 VDC, ± 25 VDC, ± 100 ADC, ± 200 VDC
Thermocouple:	T, E, J, K, R, S, B, N, and C
RTD:	100Ω Pt (α= 0.00385 & 0.00392), 120Ω Nickel (α= 0.00672), 10Ω Copper (α= 0.00427)
Resistance:	100Ω, 1000Ω, 10kΩ
Excitation Power:	Jumper selectable Transmitter Power: +18 VDC @ 50mA Reference Voltage: +2 VDC, +/- 2% Reference Current: 1 mADC, +/- 2%
Totalizer:	
Time Base:	Second, minute, hour or day
Batch:	Can accumulate (gate) input display from a user input
Time Accuracy:	0.01% typical
Decimal Point:	0 to 0.0000
Scale Factor:	0.001 to 65.000
Low Signal Cut-out:	-19,999 to 99,999
Total:	9 digits (main display alternates between high order and low order readouts)
Custom Linearization:	
Data Point Pairs:	Selectable from 2 to 16
Display Range:	-19,999 to 99,999
Decimal Point:	0 to 0.0000
Compensation:	User value 0.00 to 650.00 µV/C (for ice point)
Memory:	Non-volatile E2PROM memory retains all programmable parameters and display values
User Inputs:	Two programmable user inputs
Operating Temp:	0 to 50°C, 85% RH max. (non-condensing) (0 to 45°C with all three plug-in cards installed)
Connections:	High compression cage-clamp terminal block
Case:	1/8 DIN, rated for NEMA 4X/IP65 indoor use; IP20 Touch safe; Installation Category II, Pollution Degree 2
Construction:	Flame resistant, one piece bezel/case with synthetic rubber keypad
Dimensions:	1.95" H x 3.80" W x 4.24" D (50x97x108mm)

Laurel Programmable Counters

FUNCTIONS

- Rate, Frequency, Period
- Simultaneous Total & Rate
- Time Interval, Stopwatch
- Quadrature Position or Rate
- Ratio / Draw
- Batch Controller
- Analog Totalizer
- Phase Angle & Power Factor
- Duty Cycle

FEATURES

- ±999,999 Display Span
- Scaling in Engineering Units
- Crystal Time Base Error <0.001%
- Sensor Excitation Output
- 1/8 DIN, NEMA-4X Front Panel

OPTIONS

- Dual Relay Outputs
- Isolated Analog Outputs
- USB, RS-232 & RS-485 Data I/O
- Custom Curve Linearization
- Datalogging PC Software

Exceptional flexibility is provided by advanced programmable features and by modular architecture with a choice of main boards (basic or extended), signal conditioners (FR, VF or QD), power supplies, analog output, relay outputs, and serial data I/O.

The FR module provides two independently scalable frequency/pulse input channels. These channels can be combined arithmetically to display the sum or difference of two flows, the ratio of two rates, etc. As a counter, each channel may be independently set and scaled to count up to or down from a preset value. The displayed channel (A or B) is selected via front panel pushbutton. The totals are stored in non-volatile memory & retained in the absence of power.

SPECIFICATIONS

Display	Six 14.2 mm (.56") high LED digits
Conversion Technique	
Frequency measurement technique	1/period
Rate	Gate time + 30 ms + 0-2 input periods
Gate time	Selectable 0 to 199.99 sec
Scale Factor	$\pm 10^{-10}$ to $\pm 10^{6}$
Isolation	250V RMS working, 2.3kV RMS test
FR Signal Conditioner (2 channels)	
Inputs	AC, pulses from NPN or PNP transistors, contact closures, magnetic pickups
Level	±12 mV min, 250 Vac max
Frequency	CH A: 0 Hz to 1 MHz; CH B: 0 Hz to 250 kHz
VF Signal Conditioner	
Inputs	0-10 V, 0-1 mA, 4-20 mA
Span error	< 0.015% of full scale ±1 count
Span tempco	< 0.003% of reading/°C
Zero tempco	< 0.001% of full scale/°C
QD Signal Conditioner	
Inputs	Quadrature encoders to 250 kHz
Polarity	Differential or single-ended
Error correction	Zero index (z-channel)
Transducer Excitation Output (std)	
Output	100 mA @ 5 V, 120 mA @ 10 V, 50 mA @ 24 V
Isolation	50 Vdc to meter ground
Data Communications (opt)	
Type	USB, RS-232, RS-485 (2- or 4-wire)
RS-485	Modbus RTU, Modbus ASCII, or Laurel ASCII
Operating Temperature	0°C to 55°C

ORDERING INFORMATION

Example: L50010FR

❑ **L** — Laureate™ with plug-in screw terminal connectors

❑ **Main Board**
- **5** — Meter with green LEDs
- **6** — Meter with red LEDs
- **7** — Extended, green LEDs
- **8** — Extended, red LEDs

❑ **Power**
- **0** — 85-264 Vac/90-300 Vdc
- **1** — 10-48 Vdc/12-30 Vac

❑ **Setpoint Output**
- **0** — None
- **1** — Dual 8 A relays (250 Vac/24 Vdc)
- **2** — Dual 130mA solid state relays (140 Vac/180 Vdc)

❑ **Analog Output**
- **0** — None
- **1** — 0-20 mA, 4-20 mA, 0-10 V, ±10 V

❑ **Digital Interface**
- **0** — None
- **1** — RS-232 (Isolated)
- **2** — RS-485 (Isolated)
- **4** — RS-485 Modbus (Isolated)
- **5** — USB
- **6** — USB to RS-485 Converter

❑ **Input Type**

FR — **Frequency**
With main boards 5 & 6: Scalable to ±999,999 for frequency, period, up/down total, interval, rate or square root of rate. With main boards 7 & 8: Above plus rate and total simultaneously, custom curve linearization, atio, draw, arithmetic functions (A*B, A/B, A/B-1, A+B, A-B), phase angle, stopwatch, batch counting.

VF1 — **4-20 mA**
VF2 — **0-1 mA**
VF3 — **0-10 V**
With main boards 5 & 6: V-to-F converter for rate or square root of rate from differential pressure or target type flow meters. With main boards 7 & 8: Above plus rate and total simultaneously, linearization of nonlinear inputs, batch counting, 1/rate (time).

QD — **Quadrature**
With main boards 5 & 6: Scalable to ±999,999 for position from encoders.

QDR — **Quadrature Rate**
With main boards 7 & 8; Scalable to ±999,999 for position or rate from encoders.

ACCESSORIES

CBL01	RJ11 TO DB9 Cable to PC Com port
CBL02	USB to DB9 Adapter
CBL05	USB Cable to PC USB Port

Fluke Power Logger

▲ **1735**

Includes soft carrying case, 4 flexible current probes (15/150/3000A), voltage leads & clips, RS-232 PC interface cable, Power Log software, AC adapter, manual

- Monitor demand at 15 minute or user-defined averaging periods
- Verify efficiency improvements with energy consumption tests
- Measure harmonic distortion caused by electronic loads
- Capture voltage dips and swells from load switching
- Easily confirm instrument setup with color display of waveforms and trends
- Measure all three phases and neutral with included 4 flexible current probes
- View graphs and generate reports with included Power Log software
- Compact, rugged design with IP65 case, 600 V CAT III and 2-year warranty

The Fluke 1735 Power Logger is ideal for conducting 30-day load studies according to National Electric Code 220.65. The 1735 also logs most electrical parameters and harmonics as well as capturing voltage events. Sets up in seconds with the included flexible current probes and color display.

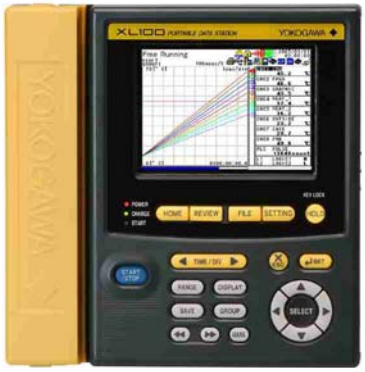
ORDERING INFORMATION

Fluke 1735	Power Logger
Accessories	
FL/MBX 1A/5A	Clamp for secondary CT applications
FL/MBX 5A/50A	Clamp for general applications
FL/C534	Water-tight hard carry case with rollers

SPECIFICATIONS

V-rms Wye Ranges	57/66/110/120/127/220/230/240/260/277/347/380/400/417/480 V ac
V-rms Delta Ranges	100/115/190/208/220/380/400/415/450/480/600/660/690/720/830 V ac
Resolution	0.1 V
A-rms Ranges	15/150/3000 A rms (at sine) with supplied flex clamps
Resolution	0.01 A
PF (Power factor)	Range 0-1, Resolution 0.001
Frequency	46-54 Hz and 56-64 Hz, Resolution 0.01 Hz
Power Measurements	P (active), S (apparent), Q (reactive), D (distorting)
Energy Measurements	kWh, kVAh, kVARh
Display	¼ VGA Graphic Color, 320x240 pixel, with background lighting
Battery Life	Typical >12 hours with backlight low and >6 hours with backlight high
Working Temperature	-10 °C to +50 °C (+14 °F to +122 °F)
Dimensions	240 mm x 180 mm x 110 mm (6.1 in x 4.6 in x 2.8 in)

Yokogawa Portable Data Logger



▲ **XL122** CE

SP1 Kit includes mating screw terminal block, US power cord, rechargeable battery, protective rubber boot, carrying case, utility software & manual.

Utility software for Windows XP displays data & waveforms, copies data, converts to CSV, saves settings & files.

Accessories

YE/90060	Type K thermocouple, 48" length with mini-plug
YE/93037	Carrying case
YE/94009	Lithium ion battery, 2.4Ah, 7V
YE/91029	Digital I/O cable, 3m
YE/91011	RS232 cable to PC (9 pin)
YE/93039	Stand for tilted desktop, wall or DIN rail mounting
YE/XL900	Datum-LOGGER PC data analysis software (WinXP)

- 8 or 16 isolated analog input channels
- Supports direct TC, RTD and DCV inputs
- 16MB internal memory + flash card capability
- Wide viewing angle 3.5" color LCD
- Trigger and alarm functions
- 1 pulse and 2 digital logic inputs
- 100msec to 1 hour sample interval
- Ethernet, USB, RS232 & RS485
- Web server, FTP client and email functions

SPECIFICATIONS

Input	Type	Accuracy	Resolution
	DCV: ±100/500mV, ±1/5/10/50V, 1-5V F.S.	±0.1% F.S.	10µV
	TC: K,E,J,T,L,U,N	±0.05% F.S. ±1°C	0.1°C
	TC: W,R,S,B	±0.05% F.S. ±2°C	1°C
	3-wire RTD: Pt100, JPt100	±0.05% F.S. ±0.5°C	0.1°C
	Pulse: Instantaneous value, integration, revolution		
	Logic: Voltage, contact		
Maximum Input	±50V		
Measurement Interval	100/200/500ms, 1/2/5/10/20/30s, 1/2/5/10/20/30/60min (8 ch max for 100ms)		
Data Storage	16MB internal memory, External storage: Compact flash memory card (Type II), SD card, USB memory (copy function only)		
Functions	Alarm output (4ch), Trigger function (pre-trigger/triggerdelay), Calculation (inter-channel calculation, linear scaling,statistical operation), Average, Automatic Measurement		
Display Screens	Waveform, digital, bargraph, waveform + digital, alarm summary, log		
Communication	10Base-T/100-BaseTX Ethernet (SMTP, HTTP, FTP, TCP/IP, SNTP protocols) USB 1.1 (Windows XP) RS-232 @2.4-38.4kbps, RS-485 @2.4-115.2kbps half-duplex (ASCII or Modbus RTU protocols)		
Operating Temperature	0 to 50°C, 5 to 85%RH (non-condensing)		
Storage Temperature	-20 to 60°C, <90%RH (non-condensing)		
Size	6.1" x 6.1" x 2.2" (155×155×55mm), without projecting parts or rubber boot		
Weight	1.8 lbs (800g), without battery or rubber boot		
Safety	EN61010-1: Measurement Category I, Pollution degree 2, Rated transient 350Vp-p		

ORDERING INFORMATION

YE/XL121-D/SP1	8 channel Portable Data Station Kit. Plug-in screw terminal block accepts wires
YE/XL122-D/SP1	16 channel Portable Data Station Kit. Plug-in screw terminal block accepts wires
YE/XL124-D/SP1	16 channel Portable Data Station Kit. M3 screw terminal block accepts wires or lugs. [no RTD inputs]

West Paperless Recorder

NEW

- 6.4" color TFT display
- Web-based visualization & configuration
- 4, 8 or 12 universal 16-bit inputs
- Up to 12 relay outputs
- Channel visualization in up to 8 groups
- USB memory stick data storage
- Ethernet interface for configuration
- RS-485 Modbus master/slave
- Mathematical functions in realtime
- IP 65 / NEMA 4X front

▲ VU3

SPECIFICATIONS

Inputs	
T/C	J, K, T, R, S, E, N, B, L
RTD	Pt100, Ni120
DC	mV: 0-50, 10-50 V: 0-5, 1-5, 0-10, 2-10 mA: 0-20, 4-20
Basic Accuracy	
T/C	±0.1% of span ±0.3°C
RTD	±0.1% of span ±0.3°C
DC	±0.1% of span ±1d
Scan Rate	200ms minimum
Outputs	
Relays	3A@250VAC, 0.1A@250VDC resistive
Analog	Six 0-20 or 4-20ma, 12-bit
Communications (both included)	
Ethernet	Modbus TCP
RS-485	Modbus RTU
Display	640x480 color TFT
Memory	150Mb internal flash
Temperature	0-55°C operating
Power	100-240VAC, 50/60Hz
Dimensions	5.375"H x 5.44"W x 7.0"D

Math function option: up to 12 additional channels can be defined with general arithmetic calculations, logic operations, statistical functions, reporting functions & triggering of automatic sequences.

ORDERING INFORMATION

To Order, Insert Code for Each Letter to Select Catalog Number.

Example VU3-400-000-A0-0 VU3 - [A] - [B] - [C] - [D]

A	Inputs			
	400	4 channels		
	440	8 channels		
	444	12 channels		
B	Outputs			
	000	None		
	A00	12 relays		
C	Transducer Power			
	00	None		
	A0	12 supply outputs		
D	Special Functions			
	0	None	4	Batch + Math
	1	Batch report	5	Batch + Ext channels
	2	Math functions	6	Math + Ext channels
	3	External channels	7	Batch + Math + Ext ch

Hioki Data Loggers

- Miniature size
- 16,000 or 32,000 reading storage
- Data is retained even when the batteries are dead
- Power saving function

◀ 3641-20

Model	Range	Memory*	Feature
Temperature			
HK/3632-20	-20 to 70.0°C	16k	Waterproof with built-in sensor
HK/3633-20	-40 to 180.0°C	16k	External/internal sensor, waterproof
Temperature & Humidity			
HK/3641-20	-40 to 85.0°C, 0-100.0% RH	16k	Alternately record on two channels
Current			
HK/3634-20	0-20.00mA DC	16k	
HK/3636-20	0-50.00/500.0A AC RMS	32k	2ch with optional clamp sensor
HK/3638-20	AC Leakage Current	32k	2ch with optional clamp-on sensor
Voltage			
HK/3635-24	±500.0mVDC	16k	
HK/3635-25	±5.000VDC	16k	
HK/2635-26	±50.00VDC	16k	
HK/3637-20	0-600.0VAC RMS	32k	
HK/3645-20	±50.00mV/500.0mV/ 5.000V/50.00DC	32k	Multi-range logger with preheat signal function
HK/3639-20	9,999count/ interval	32k	Pulse Totalizer (1ch)
HK/3640-20	2000/20000/200000 lux	32k	Illumination (1ch)

*16k readings unit have record interval of 2/5/10/15/20/30 seconds, 1/2/5/10/15/20/30/60 minutes. Models with 32k readings also have a 1sec record interval.

SPECIFICATIONS

Accuracy	
3632-20:	±1.0°C, except ±0.5°C from 0-35.0°C
3633-20:	±0.5°C (0-35.0°C)
3641-20:	±0.5°C (0-35.0°C), ±5 % RH (at 25 °C)
3634-20:	±0.8% rdg ±5d
3636-20:	±1% rdg ±5d (main unit only)
3638-20:	±1% rdg ±5d (main unit only)
3635-24/-25/-26:	±0.8 % rdg ±5d
3637-20:	±1% rdg ±5d
3645-20:	±0.5% rdg ±5d
3639-20:	±1d
3640-20:	±4% rdg ±5d
Data Transfer:	500 data elements/second via infrared link
Power Supply:	2 AAA batteries
Dimensions:	2.24"W x 2.91"H x 0.77"D
Environment:	Indoors, 0°C to 50°C, <80% RH

The Communication Base is used to transfer data from a Data Logger to PC. It can collect data on up to 16 channels. Data from multiple Data Loggers that are installed in fixed positions can be collected and then transferred to a PC via RS-232 or USB for analysis and processing.

Settings that can be made through the main unit: recording interval, recording start/stop. Settings that can be made through the Communication Base: current time, recording interval, recording start time, recording method, comment.

HK/3911-20	RS-232 Communications Base
HK/3920-20	USB1.1 Communications Base

Hioki Portable Recorder

- Ideal for transient capture & long-period recording
- Compact, easy to carry
- 4.3" color LCD display
- 2 analog & 4 logic inputs
- Sample rates up to 1M/sec
- Analog inputs isolated to 300V
- Simple USB PC interface

Wave application software displays & prints waveforms, converts data to CSV format. Includes report templates with figure annotation & comments. XP/Vista compatible.

PRO Kit includes 8870-20, 2 pair alligator clip voltage leads, AC adapter, rechargeable battery, hard carrying case, 256M flash card, USB cable, Wave software.

SPECIFICATIONS

Input	2 isolated BNC, 300V max	Memory	12 bits x 2Mwords/ch
Range	10mV - 50V/div	Expansion	1GB flash card, Type1
Accuracy	±0.5% of full scale	Calculations	4 simultaneous, saved to flash card
Bandwidth	DC-50kHz (-3dB)		
Trigger	Level, logic, manual, ext.	Calculation Types	Avg, peak, min/max, RMS, freq, period
Trigger Mode	Single, continuous		
Time Axis	100ms - 5min/div	Screen Capture	Saved to flash card
Record Length	20-20000 div, 10 settings	PC Interface	USB 2.0 mini-B
Record Time	2s to 69 days	Battery	Rechargeable, 2 hr life with continuous use
Sample Rate	1ms to 3s		
Pre-trigger	0-100% of record length	AC Adapter	100-240VAC, also charges battery
Resolution	1/100 div, both axis		
Zoom	x2, x10; both axis	DC Power	10-16VDC, 10W max
Display	4.3" TFT color LCD, 480x272	Temperature	0-40°C operating, <80% RH
Volts Display	4 digit, autoranging	Dimensions	7x4x1.6" (176x101x41mm)

ORDERING INFORMATION

HK/8870-20PRO	Portable Memory Recorder Kit

ACCESSORIES

HK/9018-50	Clamp-on Current Probe, 10-500A
HK/9132-10	Clamp-on Current Probe, 20-1000A
HK/9320-01	4 Channel Logic Probe, 50V DC max.
HK/9321-01	4 Channel Logic Probe, 250V AC/DC max.
HK/9322	1000:1 Differential Probe, 1kVAC/2kVDC max.

Extech TRMS Data Logger

- Simultaneously measure two AC Voltage inputs or two AC Current inputs or one AC Voltage & one AC Current input
- Programmable sample rate from 1 second to 24 hours
- Store up to 256,000 readings
- LCD indicates time/date, present readings and Min/Max
- USB interface
- Readings can be analyzed using the included software or exported to a spreadsheet

SPECIFICATIONS

AC Current	10 to 200A
AC Voltage	10 to 600V
Resolution	0.1A or 0.1V
Accuracy	±(2% rdg ± 1A), ±(2% rdg ± 1V)
Memory	256,000 points
Sampling Rate	1 second to 24 hours
PC Interface	USB, includes software
Power	3.6V Lithium battery
Dimensions	4.5 x 2.5 x 1.3" (114 x 63 x 34mm)

Complete with two Current sensor modules, two Voltage sensor modules, two sets of test leads, two sets of alligator clips, USB cable, Windows compatible software, universal AC Adaptor, 4 AAA batteries and two memory 2032 button batteries.

ORDERING INFORMATION

EX/DL160	Dual Input True RMS AC Voltage/Current Datalogger

AEMC AC Current Data Logger

- Two integral MiniFlex® flexible current probes measure from 0.5A to 1000A
- Dual range 100/1000A
- Programmable storage rates from 8 every second to 1 every day
- 3 user selectable storage modes
- Stores up to 240,000 measurements in non-volatile memory
- Lightweight, compact, fits anywhere
- 5 LED indicators quickly and clearly display logger status

SPECIFICATIONS

Inputs	Two captive MiniFlex® AC current flexible sensors
Range	0.5 to 100AAC, 5 to 1000AAC
Resolution	0.1A
Basic Accuracy	± 1% of Reading, 50/60Hz
Sample Rate	64 samples/cycle
Storage Rate	Programmable from 125ms to 1 day
Record Modes	Start/Stop, FIFO and Extended Recording Mode (XRM™)
Record Length	15 minutes to 8 weeks, programmable using DataView
Memory	Non-volatile storage of 240,000 measurements (512kB).
Communications	Optically isolated USB 2.0
Protection	IP40
Rating	600V CAT IV, 1000V CAT III
Operating Temp.	14° to 122°F (-10° to 50°C), <85% RH
Dimensions	4.95 x 2.75 x 1.28" (136 x 70 x 32mm) w/o Sensors
Sensor/Cable	Sensor: 6" (152mm) / Cable: 6 ft (2m)

* In XRM, each time the memory fills, every other of the oldest data samples is discarded to make room for new samples.

ORDERING INFORMATION

AE/2126.37	Simple Logger® II Model ML912 with two mini-flex probes, USB cable, batteries & Dataview software

AEMC Simple Logger® II Data Loggers

NEW

- Compact size, battery operated
- Easily installed, operational in seconds
- TRMS measurement for accuracy on distorted waveforms
- Programmable alarm setpoints & triggers
- 5 LED indicators display logger status
- Choice of data storage modes
- Stores >240k measurements in non-volatile memory
- DataView software displays & analyzes real-time data on a PC

L322 ▶

L562 ▶

◀ L642

MODEL	L101	L102	L111	L261	L322	L432
Channels	One	Two	One	One	One	Two
Input Connector	BNC		Recessed banana jacks		Removeable screw term block	
Measurement Range	0-1V AC (probe dependent)		0-1A AC (probe dependent)	0-600V AC/DC	±20mA DC	±100mV/±1V/±10V
Resolution	0.1mV		0.1mA	0.1V	0.01mA	0.1mV/1mV/10mV
Accuracy (50/60Hz)	10-50mV: ±0.5% of Rdg ±1mV 50-1000mV: ±0.5% of Rdg ±0.5mV		10-50mA: ±0.5% of Rdg ±1mA 50-1000mA: ±0.5% of Rdg ±0.5mV	5-50V: ±0.5% of Rdg ±1V 50-600V: ±0.5% of Rdg ±0.5mV	±0.25% of Rdg ±0.05mA	±0.5% of Rdg ±1mV
Sample Rate	64 samples/cycle				Max. 8 samples at storage interval	
Storage Rate	Programmable from 125mS to 1 day					
CAT III Rating	50V			300V	50V	

MODEL	L562	
Channels	Two	
	Current Channel	Voltage Channel
Input Connection	BNC	Banana jacks
Input Range*	0 to 1VAC (use current probes with a voltage output)	0 to 600VAC/DC
Resolution	0.1mA	0.1V
Accuracy (50/60Hz)	10-50mV: ±0.5% of Rdg ±1mV 50-1000mV: ±0.5% of Rdg ±0.5mV	5-50V: ±0.5% of Rdg ±1V 50-600V: ±0.5% of Rdg ±0.5V
Measurement Input	5Vrms (±7.07V pk-pk max)	1000V
Sample Rate	64 samples/cycle	
Storage Rate	Programmable from 125mS to 1 day	
CAT III Rating	600V	

MODEL	L642
Channels	Two
Input Connection	Mini TC
Measurement Range	°F (°C)
J	-346 to +2192 (-210 to + 1200)
K	-328 to +2501 (-200 to + 1372)
T	-418 to +752 (-250 to + 400)
N	-328 to +2372 (-200 to + 1300)
E	-238 to 1742 (-150 to + 950)
R	32 to 3212 (0 to 1767)
S	32 to 3212 (0 to 1767)
Resolution	0.1° C/F up to 1000° C/F, 1° above 1000° C/F
Accuracy	0.1% to 0.2% + 0.6° to 1°, depending on the range & T/C type
Sample Rate Max.	8 samples at storage interval
Storage Rate	Programmable from 5 sec to 1 day
CAT III Rating	50V

SPECIFICATIONS

Memory	240,000 measurements (512KB)
Recording Length	15 minutes to 8 weeks, programmable using DataView®
Storage Modes	Start/Stop, FIFO and Extended Recording Mode (XRM™)
Communication	USB 2.0 optically isolated
Power	2 x 1.5V AA-cell Alkaline batteries
Battery Life	100 hrs to >45 days, depending on storage rate
Dimensions	5.38 x 2.75 x 1.28" (136 x 70 x 32mm)
Temperature	-10 to 50°C operating

ORDERING INFORMATION

AE/2126.02	Simple Logger ® II Model L101 (TRMS, 0 to 1VAC, 1 channel)
AE/2126.03	Simple Logger ® II Model L102 (TRMS, 0 to 1VAC, 2 channel)
AE/2126.04	Simple Logger ® II Model L111 (TRMS, 0 to 1AAC, 1 channel)
AE/2126.05	Simple Logger ® II Model L261 (TRMS, 0 to 600VAC/DC, 1 channel)
AE/2126.06	Simple Logger ® II Model L322 (4-20mA DC)
AE/2126.07	Simple Logger ® II Model L432 (±100mV,1V,10VDC, 2 channel)
AE/2126.35	Simple Logger ® II Model L562 (TRMS Voltage & Current)
AE/2126.08	Simple Logger ® II Model L642 (Thermocouple Temperature)
AE/2126.01	Simple Logger® II Model CL601 (Clamp-On, TRMS Current, 0 to 600A, 1.65" jaw opening)

ACCESSORIES

AE/1201.51	AC/DC Current Probe Model SL261 (10A@100mV/A, 100A@10mV/A, BNC)
AE/2115.82	AC Current Probe Model MN261 (24A@100mV/A, 240A@10mV/A, BNC)
AE/1200.72	AC Current Probe Model MR461 (60A@10mV/A, 600A@1mV/A, BNC)
AE/1200.73	AC Current Probe Model MR561 (150A@10mV/A, 1500A@1mV/A, BNC)
AE/2113.49	AC Current Probe Model SR661 (10A@100mV/A, 100A@10mV/A, 1000A@1mV/A, BNC)
AE/ 2110.90	AC Current Probe Model JM861 (30A@10mV/A, 300A@1mV/A, 3000A@0.1mV/A, BNC)
AE/2140.62	Test Lead Pair, 5 ft w alligator clips, 600V CAT IV, 15A

CLAMP-ON AC LOGGER

Simply clamp-on and start recording, no exposed wires to connect.

- 50/400/600A TRMS ranges
- One button operation
- Alarm function
- 5 LED indicators display logger status
- Optically isolated USB 2.0 output
- Includes DataView® software for data storage, real-time display, analysis & report generation
- 300V CAT IV, 600V CAT III

▲ CL601

Each Simple Logger® II includes USB cable, Dataview CD, batteries & manual.

Extech Thermal Imagers NEW

Affordable i5 InfraRed Camera

- Pocket sized and fully automatic
- 2% accuracy, 0.1°C sensitivity
- Large 2.8" color LCD
- 80 x 80 pixel image
- >4 hour continuous operation
- IP43 dust/splashproof housing
- MiniSD™ card stores up to 5000 images

i5 ▶

SPECIFICATIONS

Temperature Range	32-482°F (0-250°C)
Image Storage	5000 images (mini SD card memory)
Emissivity	Emissivity table; 0.1 to 1.0 adjustable
Field of View	17° x 17°
Focus Distance	0.6m (2 ft.) min., focus free
Detector Type	Focal plane array (FPA) uncooled microbolometer
Spectral range	7.5 to 13µm
Display	2.8" color LCD
Image Controls	Palettes (Iron, Rainbow, and Black/White)
Set-up Controls	Date/time, °C/°F, 21 languages
Measurement Modes	Spot (corrected for emissivity and reflected temperature)
Battery	4 hour Li-ion, rechargeable
Charging System	In camera, AC adapter; 3 hours to 90% capacity
AC Operation	AC adaptor 90-260VAC, 50/60Hz
Operating Temp	32-122°F (0-50°C), 20-80% RH, non-condensing
Dimensions	8.8x3.1x3.3" (223x79x83mm)
Weight	<12oz. (340g), including battery

Complete with 512MB miniSD™ Card, Li-Ion rechargeable battery, 100-260V AC adaptor/charger, QuickReport™ software, USB Mini-B cable, built-in manual lens shutter and hand strap.

Deluxe Infrared Thermal Camera

- -4 to 662°F (-20 to 350°C) temperature range
- 3.5" (89mm) color LCD
- 120 x 120 pixel image resolution
- Picture in Picture (visual/thermal)
- Built-in laser pointer
- SD Memory Card (1000 images)
- Rechargeable 5 hour battery

Includes memory card, battery, power supply, QuickReport software, USB cable, hand strap, lens cap, hard case.

i40 ▶

ORDERING INFORMATION

EX/IRC40	EXTECH i5 Thermal Imaging Infrared Camera
EX/Flir i7	Flir i7 Thermal Imaging Camera (-20 to 250°C, 120x120 resolution, spot/area/isotherm measure-
EX/Flir i40	Flir i40 Deluxe Thermal Imaging InfraRed Camera

Simpson Elapsed Time Meters

112ET ▶

109ET ◀

2153ET ▶

55ET ◀

57ET ▶

1357ET ◀

- 6 Digit Readout
- No Reset Capability (Virtually Tamper-proof)
- Six Case Styles
- 1½" and 3½" sizes
- AC and DC Models
- Phenolic cases with glass windows

Accumulate running time and monitor life of AC or DC powered equipment. Synchronous motor provides accurate hour indication (to 99,999.9 hours). Connect in parallel with the equipment being monitored.

ORDERING INFORMATION

Model	Size	Catalog #	Voltage
109ET	1½"	SI/03618	10-80 VDC
112ET	1½"	SI/03622	120 VAC
55ET	3½"	SI/03580	120 VAC
57ET	3½"	SI/03590	120 VAC
1357ET	3½"	SI/03595	120 VAC
2153ET	3½"	SI/17720	120 VAC
55ET	3½"	SI/03600	240 VAC
57ET	3½"	SI/03610	240 VAC
1357ET	3½"	SI/03615	240 VAC
2153ET	3½"	SI/17721	240 VAC

AEMC Single-Phase Power Quality Analyzer

8230 PowerPad®Jr.

- Displays Min, Max and Average Volts and Amps, Crest Factor, Peak value and K-Factor
- Calculates and displays Watts, VARs and VA, Power Factor and Displacement Power Factor for single-phase and balanced three-phase
- Displays total harmonic distortion (THD-F and THD-R) for voltage and current
- Displays individual harmonic values and % for Volts and Amps through the 50th harmonic
- Captures, displays and stores inrush current waveforms and statistics
- Stores up to eight screen captures
- Stores up to 1MB of trend recorded data
- Configurable from DataView® software or front panel
- Captures up to 4096 alarm events using up to 10 different thresholds
- Displays and records up to 17 different power quality parameters
- Includes DataView® software for data storage, real-time waveform display, analysis and report generation

All models include current probe with 10 ft lead and black connector, black & red 10 ft voltage leads and alligator clips, optical USB cable, NiMH battery, US 120V power cord, DataView® software, carrying bag, soft carrying pouch and user manual.

DataView® Software included with Model 8230

- Display and analyze real-time or recorded data on the PC
- Configure all PowerPad® Jr. functions & parameters
- Customize views, templates and reports
- Create and store a complete library of configurations
- Zoom in and out and pan through sections of the graph
- Display waveforms, trend graphs, harmonic spectrums, text summaries, transients, event logs & stored alarms

SPECIFICATIONS

Electrical	
Voltage (TRMS)	660V Phase-to-Phase, 600V Phase-to-Neutral
Current (TRMS)	MN Clamp: 5mA to 120A or 2 to 240A MR Clamp: 10 to 1000AAC, 10 to 1400ADC SR Clamp: 3 to 1200A AmpFlex®: 10 to 6500A (Crest factor at 6500 = 1)
Frequency	40 to 70Hz
Other Measurements	kW, kVAR, PF, DPF, kWh, kVARh, kVAh, K-Factor, Flicker, Harmonic Phase Shift, Phase Rotation
Harmonics	THD-R, THD-F, V, A, VA 1st to 50th, Direction, Sequence
Sampling Frequency	256 samples/cycle
Data Storage	1.5MB partitioned for waveforms, alarms & trend
Power Source	NiMH AA rechargeable battery pack AC Supply: 120/230VAC (50/60Hz)
Battery Life	>Eight hrs with display on, >40 hrs with display off (recording mode)
Mechanical	
Communication Port	Optically isolated USB
Display	1/4 VGA (320 x 240) color LCD
Dimensions	8.3 x 4.3 x 2.4" (211 x 108 x 60mm)
Safety Rating	EN 61010, 600V Cat. III, Pollution Degree 2

ORDERING INFORMATION

AE/2130.82	PowerPad® Jr. Model 8230 w/MN93-BK (240A)
AE/2130.83	PowerPad® Jr. Model 8230 w/SR193-BK (1200A)
AE/2130.84	PowerPad® Jr. Model 8230 w/24" AmpFlex® 193-24-BK (6500A)
AE/2130.85	PowerPad® Jr. Model 8230 w/36" AmpFlex® 193-36-BK (6500A)
AE/2130.86	PowerPad® Jr. Model 8230 w/MR193-BK (1000AAC/1400ADC)
AE/2130.87	PowerPad® Jr. Model 8230 w/MN193-BK (6A/120AAC)

AEMC Power Quality Meter

8220

- Displays Min, Max and Average Volts and Amps, Crest Factor, Peak value and K-Factor
- Calculates and displays Watts, VARs and VA, Power Factor and Displacement Power Factor for single-phase and balanced three-phase
- Displays total harmonic distortion (THD-F and THD-R) for voltage and current
- Displays individual harmonic values and % for Volts and Amps through the 50th harmonic
- Captures and displays inrush current
- Calculates & displays phase rotation & RPM
- Displays °F or °C & resistance to 2000Ω
- Conducts continuity and diode tests
- Stores up to nine complete sets of readings for all volt, amp, power, harmonics and other measurements
- Configurable from DataView® software or front panel
- Operates off batteries or optional AC adapter
- Includes DataView® software for data storage, real-time waveform display, analysis and report generation

All models include current probe with 10 ft lead & black connector, black & red 10 ft voltage leads and alligator clips, optical USB cable, six 1.5V batteries, two safety test probes, DataView® software, carrying bag, soft carrying pouch and user manual.

Three-line backlit digital display with custom icons

SPECIFICATIONS

Voltage (TRMS)	660V Phase-to-Phase, 600V Phase-to-Neutral
Current (TRMS)	MN Clamp: 5mA to 120A or 2 to 240A MR Clamp: 10 to 1000AAC, 10 to 1400ADC SR Clamp: 3 to 1200A AmpFlex®: 10 to 6500A (Crest factor at 6500 = 1)
Frequency	40 to 70Hz
Other Measurements	kW, kVAR, PF, DPF, VA, Harmonics, Phase Rotation, Temperature, RPM, Resistance, Continuity, Diode Test
Sampling Frequency	256 samples/cycle
Data Storage	Stores nine sets of readings
Power Source	Six 1.5V AA Alkaline batteries (>8hr life with display on) AC Supply: 120/230VAC (50/60Hz) – optional
Communication Port	Optically isolated USB
Dimensions	8.3 x 4.3 x 2.4" (211 x 108 x 60mm)

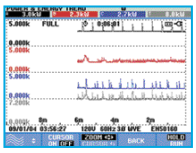
ORDERING INFORMATION

AE/2130.91	Power Quality Meter Model 8220 w/MN93-BK (240A)
AE/2130.92	Power Quality Meter Model 8220 w/SR193-BK (1200A)
AE/2130.93	Power Quality Meter Model 8220 w/24" AmpFlex® 193-24-BK (6500A)
AE/2130.94	Power Quality Meter Model 8220 w/36" AmpFlex® 193-36-BK (6500A)
AE/2130.95	Power Quality Meter Model 8220 w/MR193-BK (1000AAC/1400ADC)
AE/2130.96	Power Quality Meter Model 8220 w/MN193-BK (6A/120AAC)

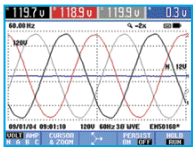
Fluke Three Phase Power Quality Analyzers

The Fluke 435 and 434 three-phase power quality analyzers help locate, predict, prevent and troubleshoot problems in three-phase and single-phase power distribution systems. The new IEC standards for flicker, harmonics and power quality are built in.

- Analyzer trends using cursor & zoom tools even while background recording
- Seven hours operating time per charge on NiMH battery pack
- Transfer data files to your PC for reporting and analysis using FlukeView® software



- Automatic transient capture: never miss an event
- Auto Trends: don't waste time setting up recordings



- Four voltage and four current channels capture waveform data on all phases simultaneously
- Meter display of phase readings

435 Includes: Hard carrying case with rollers, four flexible current probes (i430-flex), five test leads and clips, battery charger, FlukeView software, Power Log software, optical USB cable, color localization set, Getting Started manual, Users manual.

434 Includes: Hard carrying case, four current probes (i400s), five test leads and clips, battery charger, FlukeView software, optical USB cable, color localization set, Getting Started manual, Users manual.

3 Year warranty

ORDERING INFORMATION

Fluke 435	3Ø Power Quality Analyzer
Fluke 434	3Ø Power Quality Analyzer

Feature	435	434
Measure voltage, current, dips, swells, interruptions, harmonics, inter-harmonics, flicker, power, energy, transients, frequency, unbalance, inrush, EN50160 overview	●	●
Logger function with multiple parameters	●	Optional*
Mains signalling	●	Optional*
Current probes	3000A flexible (4)	40/400A clamp (4)
Memory	16MB	8MB
Software	Power Log & FlukeView	FlukeView
IEC61000-4-30 Class A compliance	●	●
Safety rating	CAT IV 600 V/CAT III 1000 V	
Battery life	Up to 7 hours/charge	

*Optional function can be added with upgrade kit.

SPECIFICATIONS

System Configuration	1Ø+neutral, 1Ø split phase, 1Ø IT no neutral, 3Ø WYE, 3Ø Δ, 3Ø IT, 3Ø hi leg, 3Ø open leg, 3Ø 2-element, 3Ø 2½-element
Voltage Inputs	Four (3 phases + neutral), dc coupled
Maximum	1000V rms, 6kV maximum peak measured
Bandwidth	>10kHz, up to 100kHz for transient display
Accuracy (ac+dc)	435: ±0.1% of nominal voltage, 434: ±0.5% of nominal
Current Inputs	Four ((3 phases + neutral), dc coupled
Range	Determined by clamp-on probes used
Nominal Frequency	40-70Hz, BW >10kHz
Accuracy (ac+dc)	435: ±0.5%±20d, 434: ±1%±5d (with supplied probes)
Watts (VA, VAR)	1.0-20.00MW (resolution 0.1 to 1 kW)
Accuracy	435: ±1%±10d, 434: ±1.5%±10d
Sampling	16 bit resolution. 200k samples/second max
Logger Function	Captures up to 10000 events, 100 parameters/phase
Display	4.5" x 3.4" Color LCD, 320x240 pixel
Power	115/230V ac or battery, built-in battery charger

Fluke Power Quality Analyzer

- Voltage, current and power harmonics up to 51st
- Total harmonic distortion (THD)
- Phase angle of individual harmonics
- Watts, power factor, displacement power factor, VA and VAR
- Voltage and current waveforms
- Calculates 3Ø Power on Balanced Load from 1Ø Measurement
- Use cursors to read time and date of sags and swells.
- Catch voltage transients and waveform distortion
- See current at the instant of voltage events
- Catch and save up to 40 transients
- Correlate the cause of distortion with time and date stamps
- 3 Year Warranty

The Fluke 43B includes a hard case, voltage and current probes, FlukeView® PC software and cable, line voltage adapter/battery charger, applications manual, power quality video and user's manuals.

ORDERING INFORMATION

Fluke 43B	Power Quality Analyzer

The Fluke 43B Power Quality Analyzer performs the measurements you need to maintain power systems, troubleshoot power problems and diagnose equipment failures. All in a rugged handheld package.

Function	Measurement	Accuracy/Selection
Volts	5.000V-600V RMS (AC & DC)	
Amps	50.00A-50.00kA RMS (AC & DC)	±(1%+10d)
Mains Frequency	40.0-70.0Hz	±(0.5%+2d)
Watts, VAR, VA	250W-2.5MW	±(4%+4d)
PF, DPF	0.25-1.00	±0.04
Sags & Swells	Voltage and Current	4 min-16 days selectable
Transient Capture	40 ns pulse width Up to 40 transients	Select 20/50/100/200% above or below line voltage
Thrush Current	1A to 1000A	1s to 5 min selectable
Ohms	500.0Ω to 30.00MΩ	±(0.6%+5d)
Capacitance	50.00nF to 500.0µF	±(2%+10d)
Scope	Dc, ac, ac+dc, peak, peak-peak, Hz, duty cycle, phase, pulse width, crest factor	Sampling rate: 25MS/sec Bandwidth: Voltage BW (Channel 1): 20MHz Current BW (Channel 2): 15kHz
Screen Saves	All functions	10 screens
Recording	V/A/Hz, Power, Harmonics, Ω/Cap, Temperature, Scope	4 min-16 days selectable parameters in each display mode

Battery life: Rechargeable Ni-Cd pack (charger included), 6 hrs typical (continuous)

OPTIONAL ACCESSORIES

i200s	240A AC current probe
80i-1000s	1000A AC current probe
i2000flex	2000A flexible AC current probe
80TK	Thermocouple module
80T-IR	Non-contact infrared temperature probe
PAC91	Parallel printer adapter

Hioki Megohm Testers

3455

- Tests insulation on transformers, cables & motors
- Calculates PI (Polarization Index) and DAR (Dielectic Absorption Ratio)
- Temperature measurement & compensation
- Step voltage testing
- Leakage current display

- Insulation and low resistance modes – comparator, hold
- Insulation resistance modes – auto discharge
- All measurement modes – battery indicators
- Live wire warning
- Low resistance zero adjust

3454-11

SPECIFICATIONS

Insulation Resistance:	
Test voltage:	250V, 500V, 1kV, 2.5kV, 5kV DC
Manual adjust:	25V step (<1kV), 100V step (>1kV)
Resistance:	0.00MΩ - 5TΩ in 7 ranges (±5% rdg. ±5d for test current >100nA)
Leakage current:	1.00nA-1.2mA in 6 ranges (±2.5% rdg. ±5d above100nA)
Voltage Measure:	50-750V AC, 50/60Hz; 50-1000V DC (±5% rdg. ±5d)
Temperature:	-10.0 to 70.0°C (±1.5°C)
PI, DAR test:	Times are user programmable.
Step voltage test:	500V-2.5kV in 500V steps, 1kV-5kV in 1kV steps
Compensation:	Displays the resistance based on reference temperature. Compatible to 10 insulation materials
Timer:	30s to 30min
Data memory:	Manual recording: 100 data Interval recording: 360 times x 10 data
Energy discharge:	Automatic discharge after measurement
Display LCD:	Digital and bargraph display, with backlight
Display Info:	Time, date, test voltage, timer, battery level
PC software:	For USB data transfer and report editing
Power supply:	6 AA batteries
Standards:	CAT IV 600V, CAT III 1000V
Dimensions:	10.2"W x 9.9"H x 4.7"D (260 x 251 x 119mm)

SPECIFICATIONS

Insulation Resistance	
Test Voltage:	250 / 500 / 1000V DC
Ranges:	4.000/40.00/400.0/500.0MΩ, 1000MΩ (1000V only)
Accuracy:	1st effective range: ±3% rdg. ±4d
Low Resistance	
Ranges:	40.00 / 400.0 / 4.000k / 40.00k / 400.0k / 4.000MΩ
Accuracy:	±3% rdg. ±6d (±5% rdg. ±6d at 400kΩ or higher)
AC Volts Measure	
Range:	0 to 750V, 50/60Hz
Accuracy:	±3% rdg. ±6d (up to 600V)
Live Wire Warning:	>70V ±10V across terminals
Power supply:	4 AA batteries
Dimensions:	7.0"W x 5.3"H x 2.2"D

ORDERING INFORMATION

HK/3455-01	5kV MΩ HiTester with 3m leads, USB cable, PC software
HK/3454-11	1kV MΩ HiTester with 1.2m leads
HK/9288	Breaker pin for 3454-11
HK/9289	Test probes, alligator clips for 3454-11
HK/9257	Connection cord for 3454-11
HK/9631-01	Temperature sensor for 3455 (1m)
HK/9750	10m Test Leads for 3455
HK/9459	Rechargeable Battery pack for 3455
HK/9753	AC adapter for 3455

Fluke MegOhmMeters

1507

Handheld MegOhmMeter

- Insulation resistance to 10GΩ (1507)
- Test voltages to 1000V
- Calculates Polarization Index & Dielectric Absorption Ratio (1507)
- AC/DC voltage measure to 600V
- Pass/Fail function for repetitive tests (1507)
- Remote probe for hard-to-reach tests

SPECIFICATIONS

Insulation Resistance:		
Ranges:	0.01 MΩ to 10 GΩ (1507)	0.01 MΩ to 4000 MΩ (1503)
Test Current:	1mA max.	
Test Voltage:	50, 100, 250, 500, 1000 V (500 & 1000 V on 1503)	
Basic Accuracy:	±(1.5% rdg + 5d) up to 2000 MΩ	
Resistance:	0.01 Ω to 20.00 kΩ	
Basic Accuracy:	±(1.5% rdg + 3d)	
Voltage:	0 – 600.0 V DC or AC (50-400Hz)	
Live Circuit Indicator:	Inhibits insulation resistance test if >30V AC/DC present	
Operating Temperature:	-20 to 55°C	
Rating:	CATIV-600V	

Includes test leads, test probes, alligator clips, protective holster & batteries.

ORDERING INFORMATION

Fluke 1503	1kV Handheld Insulation Resistance Tester
Fluke 1507	Deluxe 1kV Handheld Insulation Resitance Tester
Fluke 1550B	5kV MegOhmMeter

1550B

5kV MegOhmMeter

- Resistance to 1TΩ
- Ramp function
- DAR & PI calculations
- Auto-discharge
- 99 memory storage
- Live circuit voltage warning

SPECIFICATIONS

Insulation Resistance:	
250V	200 kΩ – 50 GΩ
500V	200 kΩ – 100 GΩ
1000V	200 kΩ – 200 GΩ
2500V	200 kΩ – 500 GΩ
5000V	200 kΩ – 1 TΩ
Step Size:	50V up to 1000V, then 100V
Leakage Current:	1 nA – 2 mA
Capacitance:	0.01 µF – 15.00 µF
Timer:	0 – 99 minutes
Power:	12V rechargeable battery
Charger:	85-250VAC
Operating Temperature:	-20 to 50°C

Includes test leads, 500V probes, alligator clips, interface adapter & cable, FlukeView® software, line cord & carrying case.

Megger® Insulation Resistance Testers

MJ15

MJ15 and BM15

The BM15 and MJ15 are compact 5-kV insulation testers that are simple to use and provide a quick, accurate reading of insulation resistance. Both instruments offer four test voltages (500 V, 1 kV, 2.5 kV, 5 kV), analog scales, and measurement sensitivity to 20 GΩ.

Both units include “pass/fail” display overlays for a rapid “go/no go” testing and trend analysis.

The BM15 is powered by 8 “AA” or rechargeable alkaline batteries while the MJ15 includes a hand-crank generator in addition to battery power.

MIT510 and MIT520 5kV Testers

NEW

This new generation of insulation testers offers increased measurement range, better accuracy, longer battery life, additional functionality and improved safety features.

MIT510/2

A rugged, portable tester designed for years of trouble free operation:

- Dual operation from AC line or rechargeable batteries, so testing can continue even when recharging is overlooked
- Resistance measurements to 15 TΩ, replacing ambiguous infinity readings with actual numbers than can be used for trending or predictive maintenance
- Capacitance measurements from 1 nF to 50 µF, providing additional equipment diagnostic information

MIT510/2

- Test lockout when an external voltage above 50V is present, for redundant safety
- Simple operator controls and a 'quick start' guide in the lid, for efficient use of test time

MIT520/2

All the features of the MIT510 plus expanded capabilities to afford the skilled operator more flexibility in analyzing and reporting the condition of capital equipment:

- Test voltage can be set in 10 V increments from 50 V to 1 kV, and in 25 V increments above 1 kV
- Test results can be downloaded via RS232 or USB ports
- Five industry standard tests can be programmed and run automatically
  - Insulation resistance (IR)
  - Step voltge (SV)
  - Dielectric absorption (DAR)
  - Dielectric discharge (DD)
  - Polarization index (PI)

MIT1020 10kV Insulation Tester

NEW

MIT1020/2

- Test voltage range from 50 V to 10 kV, in 10 V increments to 1 kV and 25 V increments above 1 kV
- Increased measurment range to 35 TΩ, for testing the best insulating materials
- Automatic performance of standardized tests, including Step Voltage, Dielectric Absorption Ratio and Dielectric Discharge
- Capacitance measurements from 1 nF to 50 µF, providing additional equipment diagnostic information
- RS232 or USB ports for downloading test results
- A 'quick start' guide in the lid to make field operation simple and user-friendly

MIT1020/2

IEEE43:2000 "IEEE Recommended Practices for Testing Insulation Resistance of Rotating Machinery" now recommends testing machines rated above 12kV at 10kV.

The Polarisation Index test is performed on equipment and cables to assess the general condition of the insulation before applying potentially destructive test voltages.

The new MIT 5kV & 10kV models easily perform both these tests.

ORDERING INFORMATION

Catalog No.	Test Voltage (V dc)	Resistance
ME/MJ15	500 1000	100 kΩ – 20GΩ
ME/BM15	2500 5 kV	
ME/MIT510/2	500 1000 2500 5 kV	10 kΩ – 15 TΩ
ME/MIT520/2	500 1000 2500 5 kV	10 kΩ – 15 TΩ
ME/MIT1020/2	500 1000 2500 5 kV 10 kV	10 kΩ – 35 TΩ

AEMC Ground Resistance Testers

Digital Ground Resistance Tester Models 4620 & 4630

- Measures soil resistivity (4-Point) method
- Measures ground resistance (2- and 3-Point) Fall-of-Potential method
- Step voltage tests and touch potential measurements
- Auto-Ranging: automatically selects the optimum range
- Designed to reject high levels of noise and interference
- Extremely simple to operate: connect – press – read
- LED on faceplate informs operator of high input noise, high auxiliary rod resistance and fault connections
- Large easy-to-read backlit display
- Battery powered (Model 4620)
- AC powered with rechargeable NiMH batteries (Model 4630)
- Rugged dustproof and rainproof field case
- Can also be used for continuity tests on bonding
- Color-coded terminals

▲ **4630**

Also available as full kits

Clamp-On Ground Resistance Tester Models 3711 & 3731

▲ **3731**

US Patent No. 362,639

- Simple and fast clamp-on operation – no leads, no auxiliary rods or spacing requirements
- Direct reading of ground resistance from 0.1Ω to 1200Ω
- Direct reading of continuity and ground loop resistance
- Direct reading of ground leakage or phase current from 1mA to 30Arms
- Jaw design with large 1.25" (32mm) window – accommodates up to 1000MCM cables
- Auto-Off for power management
- Alarm function with adjustable set point and buzzer for quick field checks (Model 3731)
- Memory function to store 99 field measurements for later retrieval and analysis (Model 3731)
- Meets EN 61010-1, Cat. III and CE Mark
- Rugged Lexan® head and body construction resists breakage
- Alarm settings and stored memory information saved during shutdown (Model 3731)
- Patented design

NEW

Multi-Function Ground Resistance Tester Models 6470B & 6472

- 2- and 4-Wire Bond Resistance/Continuity measurement
- 3-Point Fall-of-Potential measurement with manual/automatic frequency selection
- 4-Point soil resistivity measurement with automatic calculation of Rho & user selection of Wenner or Schlumberger method
- 3-Point earth coupling measurement
- Frequency scan 40-513Hz for testing in electrically noisy environments
- Selectable test voltage of 16 or 32V up to 250mA of test current
- Automatic recognition of all electrode connections & resistance
- Stores up to 512 complete test results
- Optically isolated USB communication
- Rechargeable NiMH batteries from wall charger or vehicle power
- Rugged dustproof and rainproof field case
- Includes DataView® software for remote operation, data storage, real-time display, analysis, report generation & system configuration

Model 6742 adds:

- Manual and automatic frequency scan to 5078Hz
- Measures Ground Resistance using the 2 clamp method (selective ground testing)
- Measures Ground Impedance up to 5kHz to test lightning strike protection

Tester includes meter, NiMH batteries, optical USB cable, DataView® software, external battery charger, power cord, user manual.

Kit includes Tester, test leads, 30 ft ground lead (green), auxiliary ground electrodes, spaded lugs, 100 ft tape measure, ground tester work-book CD, carrying bag for meter, carrying bag for kit.

6470B ▶

ORDERING INFORMATION

AE/2130.43	Ground Resistance Tester Model 4620 (4-Point, Digital, Battery Powered)
AE/2130.44	Ground Resistance Tester Model 4630 (4-Point, Digital, Rechargeable Battery)
AE/2130.45	Ground Resistance Tester Model 4620 Kit
AE/2130.46	Ground Resistance Tester Model 4630 Kit
AE/2117.60	Ground Resistance Tester Model 3711 (Clamp-On)
AE/2117.61	Ground Resistance Tester Model 3731 (Clamp-On with memory and alarm)
AE/2135.01	Ground Resistance Tester Model 6470B
AE/2135.02	Ground Resistance Tester Model 6470B 3-point Kit – 150 ft leads
AE/2135.04	Ground Resistance Tester Model 6470B 4-point Kit – 500/100 ft leads
AE/2135.51	Ground Resistance Tester Model 6472
AE/2135.52	Ground Resistance Tester Model 6472 3-point Kit – 150 ft leads
AE/2135.54	Ground Resistance Tester Model 6472 4-point Kit – 500/100 ft leads
AE/2135.71*	AC Current Probe Model MN82 for use with Model 6472
AE/2135.72*	AC Current Probe Model SR182 for use with Model 6472

*2 probes required for two clamp testing method.

Megger® Clamp-on Testers

NEW

Ground Resistance Testers

- Easy, fast clamp-on operation – No rods or cables needed
- Measure ground resistance from 0.05Ω to 1500Ω
- Measure ground leakage or phase current from 0.5mA to 35A
- Auto ranging with high & low alarms
- Automatic self calibration
- Data storage & USB interface

◀ **DET24C**

APPLICATIONS

- Measure resistance and continuity of grounding loops around pads, poles and buildings.
- Check multi-grounded systems without disconnecting the ground rod/stake under test.
- Measure leakage current flowing to ground or circulating in ground systems.
- Use on cell towers, RF transmitters and telecom sites.
- Inspect and verify lightning protection systems.
- Test consumer installations, including pools, spas, etc.

FEATURES

- Backlit LCD display can be read in bright sunlight.
- Large 39 x 55mm jaw with 39mm (1.5") opening.
- Noise filter for stable readings in noisy environments.
- Hold function for difficult to reach installations.
- 24 hour battery life with auto-off to save on battery power.
- Two alarms with adjustable threshold & audible indication.
- Stores 2000 test results (DET24C).
- Calibration check loop insures proper operation.
- CAT IV 600V safety rating.

Range	Resolution	Accuracy
0.05 - 0.99Ω	0.01Ω	±1.5% ± 0.05Ω
1.00 - 9.99Ω	0.01Ω	±1.5% ± 0.1Ω
10.0 - 99.9Ω	0.1Ω	±2% ± 0.5Ω
100.0 - 199.9Ω	0.1Ω	±5% ± 1Ω
200 - 400Ω	1Ω	±6% ± 5Ω
400 - 600Ω	1Ω	±10% ± 10Ω
600 - 1200Ω	10Ω	±20%
1200 - 1500Ω	10Ω	±35%

Range	Resolution
0.5 - 0.99mA	0.01mA
1.00 - 9.99mA	0.01mA
10.0- 99.9mA	0.1mA
100 - 999mA	1mA
1.00 - 9.99A	0.01A
10.0 - 35.0A	0.1A

TRMS reading, CF<5, 50-400Hz
Basic Accuracy 2% @ 50/60Hz

Model DET24C includes USB interface, IrDA dongle and software for downloading test data. Both models include batteries, carrying case, carrying strap & calibration loop.

ORDERING INFORMATION

ME/DET14C	Digital Earth Test Clamp-on Meter
ME/DET24C	Digital Earth Test Clamp-on Meter with USB

Hioki Battery Testers

◀ **3554**

- Test without disconnecting the batteries
- Three level indication: Pass, Warning, Fail
- Audible beeper (3555)
- PC Interface & software (3554)

Get an instantaneous check of battery condition based on internal resistance and voltage.

Model 3554 for medium and high capacity lead-acid batteries.

Model 3555 for compact storage batteries used in portable telephones and similar applications.

SPECIFICATIONS

	3554	3555
Measurement Ranges:		
Ohms:	3μΩ-3Ω	300μΩ-30Ω
# Ranges	4	3
Best resolution	1μΩ	100μΩ
Accuracy	0.8% rdg +6d	0.8% rdg +6d
Test Current	150mA-1.5mA	5mA-50μA
DC Volts	±6V, ±60V	±3V, ±30V
Best resolution	1mV	1mV
Accuracy	0.08% rdg +6d	0.1% rdg +6d
Temperature	-10 to +60°C	--
Resolution	0.1°C	--
Test Frequency	1kHz	1kHz
Max. Input	60V DC	50V DC
Comparator	Hi & low ohm limit, low volt limit (both models)	
# Limit Sets	200 stored	10 stored
Data Memory	4800 data/limit sets	--
Alert	LCD icon	LED & Beeper
Batteries	9 x AA	6 x AA
Life	up to 10 hrs	up to 18 hrs
PC Interface	USB	--
Operating Temp.	0-40°C, <80% RH non-condensing	
Dimensions	7.7 x 5.1 x 2.2" (196x130x55mm)	

SUPPLIED ACCESSORIES

3554	Pin-type test leads, USB cable, data management sofware, carrying case, zero adjust board, batteries, spare fuse
3555	Pin-type test leads, batteries.

ORDERING INFORMATION

HK/3554	Battery Tester (lead-acid batteries)
HK/3555	Battery Tester (portable batteries)
HK/9382	Carry case for 3555
HK/9453	4-terminal lead set
HK/9466	Remote Control Switch for 3554