



Time Electronics

Calibration, Test and Measurement



Decade Boxes



Portable Test Instruments



Multifunction Calibrators



Process Control Equipment



Calibration Benches



Calibration Software



Decade Boxes

Resistance, capacitance, inductance **3-4**



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Decade Boxes

Resistance, Capacitance and Inductance



1051 - 8 DECADE LOW OHM RESISTANCE BOX

Range: 0.01Ω to 1MΩ

Decade (Ω)	0.01Ω	0.1Ω	1Ω	10Ω	100Ω	1kΩ	10kΩ	100kΩ
Accuracy (%)	± 10%	± 5%	± 1%	± 0.5%	± 0.1%	± 0.1%	± 0.1%	± 0.1%
Max Current (A)	1A	1A	1A	0.3A	0.1A	33mA	10mA	3mA

Increment: 0.01Ω steps

Power Rating: 1 watt per resistor

Voltage Rating: Maximum 250V DC/AC RMS

End Resistance: Less than 90mΩ

Temperature Coefficient: 100ppm per °C

Features: Colour coded digits, safety terminals, and protective rubber boot



1040 - 8 DECADE WIDE RANGE RESISTANCE BOX

Range: 1Ω to 100MΩ

Decade (Ω)	1-9Ω	10-90Ω	100-900Ω	1-9kΩ	10-90kΩ	100-900kΩ	1-9MΩ	10-90MΩ
Accuracy (%)	± 1%	± 0.5%	± 0.1%	± 0.1%	± 0.1%	± 0.1%	± 0.1%	± 1%
Max Current (A)	0.5A	0.3A	100mA	30mA	3mA	0.3mA	30uA	3uA

Increment: 1Ω steps

Power Rating: 1 watt per resistor

Voltage Rating: Maximum 250V DC/AC RMS

End Resistance: Less than 250mΩ

Temperature Coefficient: 100ppm/per °C

Features: Colour coded digits, safety terminals, and protective rubber boot



1041 - 5 DECADE LOW OHM RESISTANCE BOX

Range: 0.01Ω to 1kΩ

Decade (Ω)	0.01Ω	0.1Ω	1Ω	10Ω	100Ω
Accuracy (%)	± 10%	± 5%	± 1%	± 0.5%	± 0.1%
Max Current (A)	1A	1A	1A	0.3A	0.1A

Increment: 0.01Ω steps

Power Rating: 1 watt per resistor

Voltage Rating: Maximum 100V DC/AC RMS

End Resistance: Less than 60mΩ

Temperature Coefficient: 100ppm per °C

Features: Colour coded digits, safety terminals, and protective rubber boot



1061 - 6 DECADE RESISTANCE BOX

Range: 1Ω to 1.2MΩ

Accuracy: ± 1%

Increment: 1Ω steps

Power Rating: 0.75 watt per resistor

Voltage Rating: Maximum 300V DC/AC RMS

End Resistance: 150mΩ

Features: Slimline design and front panel safety terminals

1067 - 6 DECADE PRECISION RESISTANCE BOX

Range: 10m Ω to 12k Ω
Accuracy: \pm 0.01%
Increment: 10m Ω steps
End Resistance: Less than 10m Ω . Less than 1m Ω variation
Power Rating: 0.35 watt per resistor
Stability: 20ppm/year (>1 Ω), 100ppm/year (<1 Ω)
Voltage Rating: Maximum 200V DC/AC RMS
Insulation: Case to resistance terminals 2kV / 50Hz maximum
Temperature Coefficient: 10ppm/per $^{\circ}$ C (20ppm/per $^{\circ}$ C below 1 Ω)
Contacts: Make before break – silver alloy



1065 - 6 DECADE POWER RESISTANCE BOX

Range: 0.1 Ω to 120k Ω
Accuracy: \pm 5% (0.1 Ω), \pm 1% (1 Ω - 120k Ω)
Increment: 0.1 Ω steps
Power Rating: 10 watt per resistor
Voltage Rating: Maximum 500V DC/AC RMS
End Resistance: Less than 20m Ω
Temperature Coefficient: 100ppm per $^{\circ}$ C
Features: Ventilated robust metal case and multi-wafer switches for low switch contact resistance



1070 – 7 DECADE CAPACITANCE BOX

1071 – 7 DECADE CAPACITANCE BOX

1070 Range: 100pF — 10 μ F
1070 Accuracy: 1%
1070 Residual capacitance: Less than 38pF
1071 Range: 10pF—100 μ F
1071 Residual capacitance: Less than 50pF
Accuracy: 1% (5% above 10 μ F)
Voltage Rating: Maximum 300V DC, 200V AC
Features: Bi-polar working, colour coded digits, safety terminals, and protective rubber boot



1053 – 4 DECADE INDUCTANCE BOX

Range: 1mH to 10H
Accuracy at 1kHz: 3% of setting
Voltage Rating: Maximum 30V AC
Maximum Current: 150mA
End Resistance: Less than 0.2 Ω
End Inductance: Less than 1 μ H
Features: Robust metal case and front panel safety terminals





Voltage and Current Test Equipment

Portable Calibrators, Simulators, and Sources



1006 DC MILLIVOLT SOURCE 1007 DC POTENTIOMETER AND CALIBRATOR

High accuracy handheld millivolt sources primarily used for voltage injection or potentiometric voltage measurement (1007). Applications include thermocouple simulation and calibration of A/D converters and chart recorders.

- 3 ranges up to 1V
- Accuracy 0.02%
- 20mA output current
- Best resolution 1 μ V
- Short circuit and overload protected
- Battery level indicator
- Safety terminals
- Removable protective boot
- LED null measuring facility (1007)
- Optional carry case



1010 DC VOLTAGE CALIBRATOR

A highly stable and accurate calibrator designed for applications requiring a precision voltage source of low internal resistance. Suitable for calibration, linearity, and gains stability measurements on DC amplifiers, voltmeters, data loggers, and chart recorders.

- 0.01 μ V to 10V in 5 ranges
- Accuracy 0.02%
- 10ppm/hr stability
- 30mA output current
- Safety terminals
- Battery or mains operation
- Battery level indicator
- Optional carry case



1024 DC CURRENT CALIBRATOR

A portable benchtop DC current source for calibration and test applications from nanoamp levels to 100mA. Applications include current transducer testing and calibration and linearity tests on digital and electronic current meters.

- 0 to 100mA output in 5 ranges
- Accuracy 0.02%
- 10ppm/hr stability
- 30ppm/ $^{\circ}$ C temperature coefficient
- Up to 15V output drive
- Null meter measures to 1 μ A resolution
- Safety terminals
- Battery level indicator
- Optional carry case
- Battery or mains operation



1021 MILLIAMPS SOURCE WITH NULL DETECTOR

A precision DC current source suitable for calibration and test applications from micro-amp levels up to 100mA. The 1021 is used to calibrate current sensitive transducers and their associated indicating and recording instruments.

- 0 to 100mA output in 3 ranges
- Accuracy 0.02%
- 25ppm/hr stability
- Up to 40V output drive
- LED null measuring facility
- Removable protective boot
- Safety terminals
- Battery level indicator
- Short circuit overload protected
- Optional carry case

1077 MILLIAMP TRANSDUCER AND SIMULATOR

A multi-purpose handheld test instrument that can be used as an adjustable current load, adjustable power supply, or precision current source. The 1077 is commonly used for the testing and simulation of milliamp transducer systems.

- 3 operating modes
- Accuracy 0.02%
- 100mA source & load
- 24V line mode
- Variable drive source 14-40V
- Short circuit and overload protected
- Safety terminals
- Removable protective boot
- Battery level indicator
- Optional carry case



1017 VOLTAGE/CURRENT/RESISTANCE CALIBRATOR

A portable multifunction calibrator with voltage, current, and resistance ranges. The 1017 is suitable for calibrating a wide range of instruments including thermocouples, transducers, transmitters, and platinum resistance thermometers.

- DC Volts 10nV to 100V
- DC Current 100nA to 100mA
- Resistance 10mΩ to 10kΩ
- Accuracy 0.005% (50ppm)
- 1ppm setting resolution
- Noise <2ppm (0.1 to 1Hz)
- Stability <5ppm/day, <25ppm/yr
- End resistance <200mΩ
- Deviation control - Voltage and Current
- Battery or mains operation



1030 VOLTAGE/CURRENT SOURCE

A simple operation pocket-sized calibrator suitable for voltage and current loop signal simulation as well as thermocouple simulation. A cost effective and popular instrument used in various applications across industries increases/decreases.

- 10mV, 100mV, 1V ranges
- 10mA, 100mA ranges
- Accuracy 0.1%
- Linearity 0.15%
- 0-8V available
- Precision 10-turn dial
- Battery level indicator
- 1kΩ resistor supplied
- Battery powered 9V PP3
- Supplied with carry case



1044 VOLTAGE/CURRENT CALIBRATOR

A precision handheld calibrator that can be used as a general purpose current and voltage source. High performance and ease of use make it suitable for test engineers, R&D, service, and calibration technicians.

- Measure voltage and current
- Source voltage and current
- 3 voltage ranges 0-20V
- 3 current ranges 0-20mA
- Accuracy 0.05%
- Battery powered 9V PP3
- Supplied with carry case
- Voltage/Current/Loop version 1048





Loop and Temperature Calibration Instruments

Handheld Loop Calibrators, RTD and Thermocouple Calibrators



1048 VOLTAGE/CURRENT/LOOP CALIBRATOR

A compact voltage, current, and process loop calibrator for engineering, manufacturing, test, and process control applications. The 1048 combines digital accuracy with simple analog control and is well suited to plant operations such as powering control loops.

- Source/measure voltage and current
- 3 source ranges: 0-22mA and 0-20V
- 3 measure ranges: 0-70mA and 0-50V
- Accuracy 0.02%
- Transmitter simulator/sink loop control
- Output steps and ramps
- Fine adjustment (inching)
- Battery powered 9V PP3



7005 VOLTAGE/CURRENT/LOOP CALIBRATOR

A handheld instrument for the calibration and simulation of voltage and current loops. The 7005 is a high accuracy compact calibrator with source and measure capabilities.

- mA measure 125mA, source 50mA
- Volts measure 25V, source 21V
- Accuracy 0.01%
- Resolution 1 μ A or 1mV
- Transmitter and square root functions
- Auto ranging
- Programmable steps and ramp
- Supplied with carry case



7006 LOOP-MATE 1: LOOP SIMULATOR AND SOURCE

A cost effective handheld loop simulator that provides 4 - 20mA or 0 - 10V loop signals. Features include manual and automatic step modes with audible indication that changes pitch as the output increase/decreases.

- 4 - 20mA or 0 - 10V ranges
- Set-Points: 0, 10, 25, 50, 75, 90, 100% of span
- Accuracy 0.1%
- TxSim or RxTest modes
- Internal loop supply, 25mA maximum
- Auto-stepping mode: up/down/up, 0.5, 1, 2, 4, or 8 sec/step
- Battery powered
- Supplied with carry case



7007 LOOP-MATE 2: LOOP SIGNAL INDICATOR

A simple operation portable loop signal indicator with LCD display. Suitable for use with the 7006 Loop-Mate 1.

- 4 - 20mA, 0 - 10V, 0 - 50V ranges
- LCD 4 digit display, mA, V, or % of span
- Accuracy 0.05%
- RxSim, TxTest, or 50mA/50V measure modes
- Internal loop supply, 25mA maximum
- Battery powered
- Supplied with carry case

1049 - CLASS A °C PT100 SIMULATOR

A handheld precision simulator for PT100 0.3850 platinum resistance elements used for accurate temperature measurement. High performance metal film resistors are used throughout which ensures a good temperature coefficient and long term stability.

- -200°C to +800°C with 23 set points
- Accuracy $\pm 0.3^{\circ}\text{C}$
- Less than 30ppm per °C temperature coefficient
- Based on ITS 90 EN60751
- Exceeds class A
- Passive resistance source
- Supplied with carry case
- °F version available – 1050



7000 RTD TEMPERATURE CALIBRATOR

A portable process control instrument that combines a precision digital thermometer (using RTD probes) with an RTD/Ohms Calibrator.

- Temperature – Accuracy 0.05°C (0.09°F). Resolution 0.01°C (0.02°F)
- Resistance – Accuracy 0.03Ω . Resolution 0.01Ω
- 2, 3, and 4 wire connections
- Measure and simulate °C, °F, °K, and Ohms
- Ramp and step
- PT100 plus 7 other RTD types
- User programmable
- Supplied with carry case



1090 PROCESS AND TEMPERATURE CALIBRATOR

A portable, key-press operation instrument that combines source and measurement functions for thermocouples, RTDs, mV and mA. The 1090 features a memory storage function that holds frequently used values.

- Measures/simulates 8 thermocouple types, PT100-RTD, mV and mA
- Displays units in °C, °F, uV/mV, or mA
- Automatic or manual cold junction compensation
- Inching and step functions with time configurable steps
- Process loops 4-20mA and 0-50mA
- 24V loop drive voltage
- Rechargeable battery power, 60+ hours use
- Supplied with carry case



7050 PROCESS AND THERMOCOUPLE CALIBRATOR

A process calibrator that combines the essential functions of measurement and simulation of volts, millivolts, milliamps, and ohms with the direct readout simulation of thermocouples and RTD's in °C or °F units.

- Measure (3 ranges) up to 400V, 400mA, 40k Ω
- Output voltage (3 ranges) up to 10V, 1uV resolution
- Output current (3 ranges) up to 20mA, 1uA resolution
- Output resistance: 0-400 Ω , 0.01 Ω resolution
- Thermocouple measure & simulate: J, K, T, E, R, S, B, N
- RTD measure and simulate: PT100
- Ramp function
- Battery or mains operation





Resistance and Electrical Test Calibrators

Portable Benchtop Calibrators for lab and field use



5068 INSULATION TESTER/MEGOHMMETER CALIBRATOR

A precision instrument for calibrating general purpose insulation testers and megohmmeters with test voltages up to 2.5kV. Rugged, compact, and portable it is ideal for site calibration.

- Insulation resistance from 100K Ω to 10G Ω
- Low ohm verification at 1 Ω , 10 Ω , 100 Ω , 1K Ω
- Basic accuracy 1%
- 2.5kV maximum
- Battery operation (over 150 hours between charges)
- Continuous connection - no arcing
- Fully shrouded safety connectors
- Display of open circuit voltage (0 – 1.999kV or 0 – 2.50kV)
- Display of short circuit current (0 - 2mA or 0 - 20mA)



5069 INSULATION TESTER/MEGOHMMETER CALIBRATOR

A high accuracy calibrator for insulation testers and megohmmeters with test voltages up to 9kV. Sturdy and transportable it is suitable for both lab and site calibration.

- Insulation resistance from 100k Ω to 100G Ω
- Basic accuracy 1%
- 9kV maximum
- Battery operation (over 150 hours between charges)
- Continuous connection - no arcing
- Fully shrouded safety connectors
- Display of open circuit voltage (0 – 2kV or 0 – 9kV)
- Display of short circuit current (0 - 2mA or 0 - 20mA)



5070 DUCTOR TESTER/MICRO-OHMMETER CALIBRATOR

The DuctorCal is a portable instrument suitable for calibrating high current ductor testers and micro-ohmmeters. It contains 5 sets of high current rating standard resistors that simulate the resistance being measured.

- Calibrate ductor testers and micro-ohm meters
- 0.2, 2, 20, 200, 2000m Ω
- 5 point calibration: 0, 25, 50, 75, 100%
- Gold plated terminals
- Low thermal emf connection
- Portable robust carrying case



5080 PORTABLE APPLIANCE TESTER CALIBRATOR

Designed to provide rapid high accuracy calibration of portable appliance testers and insulation/continuity testers. The 5080 has calibration functions for earth bond, insulation, leakage, touch leakage, and load test.

- Earth bond range 18 Ω - 20m Ω
- Earth bond currents up to 50A AC
- Load test currents up to 13A AC
- Voltage and current displayed on integral LCD digital meter
- Safety interlock feature
- Portable robust carrying case
- Battery powered (over 200 hours between charges)

Pressure Calibration Instruments

Portable Pressure Calibrators and Test Pumps

7040 DIGITAL PRESSURE/CURRENT CALIBRATOR

A versatile calibrator that combines a digital pressure gauge and current indicator in one handheld instrument. The 7040 is used for pressure testing and maintenance as well as process loop applications.

- 0.2, 2, 5, 10, or 20 bar version (vacuum available on 2 bar model)
- Pressure/vacuum calibration 0.04% accuracy
- Loop current calibration (displayed in mA, or as % of span, 4-20mA)
- 9 engineering units - bar, psi, KPa, inWg, cmWg, inHg, mmHg, Kg/cm², Atm
- Minimum/Maximum logging and leak rate functions
- 4.5 digit display
- RS232 serial interface



7010 SINGLE CHANNEL PRESSURE CALIBRATOR 7015 DUAL CHANNEL PRESSURE CALIBRATOR

Portable battery or mains powered pressure calibrators designed for both lab and field applications.

- Vacuum, 0.2, 2, 5, 10, 20, 35, 70, 100, 200, 400, or 600bar versions
- Accuracy 0.04% of full scale
- Pneumatic or hydraulic
- Up to 5 selectable engineering units per channel
- Loop current measure
- 24/36V loop power
- Over-pressure alarm
- Piezo - resistive pressure sensor



7016 REGULATED LOW PRESSURE CALIBRATOR 7018 DIFFERENTIAL PRESSURE CALIBRATOR

Portable battery or mains powered pressure calibrators suitable for pneumatic field instrumentation.

- 7016 - Regulated low pressure: Vacuum, 0.2, 2, 5, 10, or 20bar versions
- 7018 - Differential pressure: Vacuum, 0.2, 2, 5, 10 bar versions
- Pneumatic
- Up to 5 selectable engineering units
- Loop current measure
- 24/36V loop power
- Over-pressure alarm
- Piezo - resistive pressure sensor



7090 PNEUMATIC CALIBRATION PUMP 7095 HYDRAULIC CALIBRATION PUMP

Pneumatic and hydraulic calibration pumps that combine performance with rugged design. Features include contoured cushioned handles for comfort and control, protective caging for the vent valve/knob guarding against accidental damage, and dual o-rings on all pistons to ensure zero leakage.

- 7090 - Pneumatic pressure to 40bar, Vacuum to -950mbar
- 7095 - Hydraulic pressure to 700bar
- Non-oil based lubricant used on all moving parts
- Both supplied as kit with carry case, hoses, and fittings
- Digital pressure gauges available





5025 & 5051 Multifunction Calibrators

Precision calibration for wide workload coverage



EasyCal

MULTI INSTRUMENT CALIBRATION

The 5025 is a high performance multi-product calibrator that provides the foundation for cost effective calibration. Designed for a wide workload the 5025 calibrates both traditional and new test equipment quickly and accurately. Standard features include AC/DC voltage and current, digital frequency, decade resistance, conductance and thermocouple simulation. Further options include capacitance and inductance, wideband AC voltage, full range resistance (incorporating PT100 simulation), power calibration, and oscilloscope calibration. In addition external adaptors are available for clamp meter calibration, optical tachometer calibration and low noise attenuation.

SIMPLE OPERATION

Functions and ranges are easily accessed from the front panel. Increase and decrease keys per digit, are used to quickly set the output value. Deviation control then enables the user to finely adjust the output value as a percentage (+/-9.999%). All this information is shown on a clear, easy to read LED display.

CALIBRATION MADE EASY

Connect the 5025 to a PC/Laptop (via RS233, GPIB or USB) installed with Time Electronics EasyCal and automate the calibration process. Increase speed of calibration and consistency of results, produce calibration certificates and reports to ISO 9001 quality standards.

STANDARD FEATURES

	Range	Best 1 year Specification
Voltage DC	0 to ± 1050V	± 15ppm of setting
Current DC	0 to ± 22A	± 80ppm of setting
Voltage AC	1mV to 1050V (10Hz to 20kHz, sine-wave)	± 300ppm of setting
Current AC	10uA to 22A (20Hz to 1kHz, sine-wave)	± 0.05% of setting
Resistance	1Ω to 1GΩ (Fixed values, decade steps)	± 20ppm of setting
Conductance	1S to 1nS (Fixed values, decade steps)	± 20ppm of setting
Thermocouple Simulation	-270 to 1800°C (Type J,K,R,T,S,B,E,N)	± 0.15°C
10MHz Digital Frequency/Period	0.1Hz to 10MHz / 100nS to 10S	± 20ppm of setting

OPTIONS

	Range/Values	Best 1 year Specification
Wideband AC Voltage (9771)	20 to 200mV/300kHz. 0.2 to 2V/1MHz. 2 to 20V/100kHz	0.05% + 0.1mV
Capacitance (9798)	1nF, 10nF, 100nF, 1μF, 10μF & 100μF (100V Maximum)	± 0.25%
Inductance (9798)	1, 1.9, 5, 10, 19, 50, 100, 190, 500mH - 1H & 10H	± 0.1%
Full Range Resistance (9787)	1 to 120MΩ (Variable)	± 100ppm of setting
PT100 (9787)	-200 to 850°C	± 0.2°C
Power Calibration (9797)	22A, 1050V. Phase ± 90° 100A AC with CT. 1100A with clamp meter adaptor	ACV: 0.03%, DCV: 0.01%. ACI: 0.1%, ACV: 0.03% Phase: 0.3°
Oscilloscope Frequency/Period (9770)	0.1Hz to 100MHz / 100nS to 10S	± 0.1ppm of setting
Oscilloscope Duty Cycle (9770)	3 frequencies, 100Hz, 1kHz, 10kHz, settable from 0 to 100%	
Oscilloscope Amplitude (9770)	0mV to 200V & 0mV to 2V 50Ω (square-wave)	± 0.05%
Oscilloscope Fast-Rise (9770)	< 300ps. Bandwidth checking up to 600 MHz	
2.2 GHz Sweep (9769)	100MHz - 2.2GHz levelled sine-wave (0.5, 1, 1.5V pk-pk)	Amplitude ± 1%, Frequency ± 20ppm.

Calibrates

Digital/Analog Multimeters

AC/DC Millivoltmeters

Timer Counters

Handheld/Bench Multimeters

Thermocouple Indicators

Oscilloscopes

Frequency Meters

Clamp Meters

Decade Boxes

Ohm Meters

Temperature Indicators

Data Loggers

GENERAL SPECIFICATION

Warm up	30 minutes to full accuracy
Settling Time	Less than 5 seconds
Interfaces	GPIB (IEEE-488), RS-232, USB
Temperature Performance	Operating 5 to 45°C. Calibration: 15 to 28°C. Storage: -10 to 50°C
Operating Humidity	< 80% non condensing. Altitude 0 - 3km. Non operating 3Km - 12km
Line Power	100 - 230V AC 50/60 Hz. 200W maximum.
Dimensions	W 430mm, D 480mm, H 155mm, Weight: 16.5Kg

ADDITIONAL / EXTERNAL OPTIONS

9747	EasyCal Software and options (see page 19)	9767	External Low Noise Attenuator 100:1
9765	Printer and Connectivity Kit	9766	External Low Noise Attenuator 1000:1
9780	Clamp Meter Adaptor 1 and 50 Turns	9728	19" Rack Mount Kit
9773	Optical Tachometer Calibration Adaptor	9796	Test Lead Set
5065	6.5 Digit Bench Multimeter	9085	Carry Case
9790	100A AC Current Transformer	9159	Factory (NPL Traceable) Calibration Certificate
9760	Power Amplifier	9103	UKAS Calibration Certificate (ISO 17025)
9762	Rubidium Frequency Standard	9113	Extended Certificate (UKAS - ISO 17025)

Also available: 5025A Superior Specification Calibrator Package. AC/DC 1050V/22A, Variable Resistance 1-120M Ω . Capacitance and Inductance. Power Calibration 20kW, ACV 1MHz. Thermocouples (J,K,T,R,S,B,N,E,C,M,U,L). RTD (PT10,100,200,500,1000).

5051 MULTIFUNCTION CALIBRATION SYSTEM

The 5051 is a universal calibration system providing the same high specification, features, and options as the 5025. It is ideal for engineers requiring an all-in-one unit which can be used for both lab and site calibration work. The internal features include a 6.5 digit multimeter and industrial PC that can be preloaded with EasyCal software. In addition the 5051's touch screen user interface can speed up operation and helps maximise bench space.

The 5051 PLUS

A comprehensive package that provides a lab ready solution. It comes equipped with every item required for a complete calibration station: DMM; Oscilloscope Calibration; Capacitance and Inductance; Full Range Resistance; Clamp Meter Adaptor; Touch Screen; Test Lead Set; EasyCal; Factory Calibration Certificate; Carry Case; Printer & Connectivity Kit.

5051 Dimensions: W 430mm, D 538mm, H 202mm, Weight: 23Kg





Programmable Bench Calibrators and DMMs

Multi-purpose Calibrators and Digital Multimeters

5011 RESISTANCE/TEMPERATURE CALIBRATOR

A versatile, high accuracy calibrator that is primarily a programmable resistance/RTD source. Internal options such as DC voltage and thermocouple simulation, DC current, and 10MHz frequency can be added to increase capabilities.

- 1Ω to $120M\Omega$
- RTD simulation
- Thermocouple simulation
- DCV & DCI options
- 10MHz frequency option
- RS232/GPIB/USB interface
- Front panel operation
- PC/laptop control via EasyCal software
- Rack mount kit option

5018 PROGRAMMABLE DC-AC V-I CALIBRATOR

A high precision calibration instrument that can be configured as a simple benchtop DC voltage calibrator or advanced AC/DC voltage and current source controlled via PC, performing any number of tasks as part of a complex ATE test rig.

- 15ppm accuracy/0.5ppm resolution
- 199999 full scale +10% over-range
- 20mV-200mV-2V-20V DC voltage
- Deviation control -9.999% to +9.999%
- Ramping feature
- RS232/GPIB/USB interface
- Ideal for ATE applications
- Front panel operation
- PC/laptop control via EasyCal software
- Rack mount kit option

5045 OSCILLOSCOPE CALIBRATOR

A precision benchtop calibrator capable of calibrating a wide range of oscilloscopes and frequency meters. It provides a wide range of outputs for amplitude, frequency, period, and bandwidth.

- 1mV – 220V square wave/DC
- Frequency 0.1Hz to 100MHz
- Time marker/period 15s to 10ns
- Fast rise <300ps
- Bandwidth check up to 600MHz
- Variable duty cycle
- Optional 2 GHz levelled sweep
- Rubidium frequency reference option
- Front panel operation
- Virtual front panel control software supplied as standard
- PC/laptop control via EasyCal software



5077 POWER CALIBRATOR

A high accuracy power calibrator suitable for calibrating watt-meters, power meters, and kW-Hr meters. Supplied with its own "Virtual Front Panel" software allowing the user full control via laptop or PC.

- Phase angle 90.0° to + 90.0°
- Power factor 0.00 to 1.00
- 0 to 1000V AC or DC
- 0A to 20A AC or DC
- 0 to 20kVA or 0 to 20kW
- 100A AC current transformer option
- 45 - 400Hz in 0.1Hz steps
- Rack mount kit option
- RS232/GPIB/USB interface
- Virtual front panel control software supplied as standard



5065 BENCH DIGITAL MULTIMETER

A versatile 6 1/2 digit bench multimeter with 19 measurement functions. Low cost, easy to use, stability, and high accuracy make the 5065 an ideal DMM for a variety of applications. With a comprehensive range of features the 5065 is suitable for test engineers, R&D, service, and calibration technicians.

- Resolution 6 1/2 digits
- Accuracy 0.005% DC voltage
- RS232 and USB interface
- Optional GPIB interface
- Temperature measurements
- SCPI command set
- High sample rate
- 10 Channel scanner card option
- PC/laptop control via EasyCal software



5075 PRECISION DIGITAL MULTIMETER

A benchtop digital multimeter that combines high performance with simple operation. The 5075 easily measures from nanovolts to 10kV, from picoamps to 30 Amps, from micro-ohms up to 1GΩ, from picofarads to 300μF, with up to 7 1/2 digit accuracy.

- 7 digit resolution
- 10nV to 10kV, 10pA to 30A
- Resistance, capacitance, frequency
- 18ppm accuracy/best 1 year
- 10 channel low thermal emf scanner option
- PC/laptop control via EasyCal software
- GPIB interface (USB adaptor available)
- Rack mount kit option





Calibration Benches

Comprehensive modular test benches and complete laboratory design



INTRODUCTION

CalBench is the ultimate multifunction calibration station from Time Electronics. Each bench is custom-made to meet specific customer requirements. Offering versatility and precision it is ideal for laboratories and workshops in need of multi-product testing that meets the highest industry standards. A wide range of modules can be fitted to the primary console creating a highly flexible system that is both functional and easy to use. Further expansion can be achieved by adding the secondary console, mounted under the primary.

Core modules cover electronic signal, temperature, loop, and pressure applications. Non-standard modules for special applications can also be incorporated into the bench consoles. Functions are clearly defined on each module and a competent technician will quickly master the operation of the system without training or constant reference to manuals.

Bench set up is fast and simple as the consoles are supplied complete, fully tested, and with the modules installed. The complete system requires only basic construction and once the mains power and line pressure is connected it is ready for use.

Each bench is heavy duty, constructed from mild steel throughout with side panels and console support arms welded to provide a reinforced frame. The worktop is a durable finish with rolled front edge. In addition a full range of fittings and accessories can be added to the bench as per customer requirement.

Dimensions:

Width 2000 x Height 1568 (or 1413) x Depth 850mm.
Weight 175Kg typical.

MODULE OPTIONS AND EXTRAS

Pressure: Calibrators, indicators, and control modules. Ranges from vacuum to 600bar.

Power: Variable AC mains, variable DC and fixed quad or dual DC supplies can be fitted.

Loop and Temperature: High accuracy loop calibrator modules with source, measure and sink functions. Temperature calibrators capable of measuring and simulating RTDs/thermocouples.

Multifunction Calibrator and DMM Modules: The 7051 provides high accuracy multi-product calibration with an internal 6 1/2 digit multimeter. Also available is the 5075 DMM module (7 1/2 digit).

Custom-Design Modules: User-specific modules incorporating various instruments for necessary applications can be fitted. These can be designed from Time Electronics' range of portable and benchtop test equipment, or from external instruments such as oscilloscopes, multimeters, and power supplies.

External Options: Pneumatic and hydraulic calibration pumps, pressure gauges, dry block calibrators with ranges from -25°C to 700°C, pressure test kits with hoses and connectors, test lead sets, solder stations, vices, and much more.

Bench Fittings: Various fittings can be added to CalBench to improve usability and create a more efficient workspace. These include under-worktop drawers, cabinets, cpu holders, and keyboard trays. Tool holders for the perforated back panel. Air preparation kits and other desktop mountable devices.

Workshop Design and Supply: Time Electronics offers a full laboratory configuration and design service to optimise workspace and increase efficiency. Using 3d software we create specific workshops for customer's requirements, generate images and videos of the layout, and supply all the necessary equipment and laboratory furniture.

Calibrates

Multimeters

Ohm Meters

Thermocouple Transmitters

AC/DC Signal Sources

Clamp Meters, Tacho Meters

Timer Counters

Signal Generators

Power Supplies

Frequency Meters

Oscilloscopes

Temperature Indicators, Sensors

Resistance Boxes

AC/DC Milli-Voltmeters

RTD Transmitters

Pressure Transmitters

Loop Signal Indicators

Pressure Transducers

Pressure Gauges

7051 MULTIFUNCTION CALIBRATOR AND BENCH CONTROL CENTRE

- 0-22V AC/DC, 0 – 220mA AC/DC
- 0 - 1G Ω - decade steps
- 10MHz frequency
- Thermocouple simulation/measure 10 types
- RTD simulation/measure
- Internal 6½ digit multimeter
- Simulated resistance 10 Ω to 40M Ω
- Pressure calibration control software
- HART/Fieldbus compatible
- EasyCal calibration software
- Touch screen
- Additional internal/external options (see 5051)



Mounted centrally in the primary console the 7051 acts as a control centre for the whole bench. It incorporates an industrial PC that is preloaded with the control programs and Time Electronics well established EasyCal calibration software. Full control of electrical, temperature, pressure, and loop signals, both in source and measure modes is available.

ON-SITE BENCH INSTALLATION, TRAINING, AND CALIBRATION

In addition to supplying calibration benches and workshop equipment Time Electronics offers comprehensive after-sales support packages for customers. Training and testing can be performed at Time Electronics UK or our calibration engineers can conduct site visits worldwide. The following services are available:

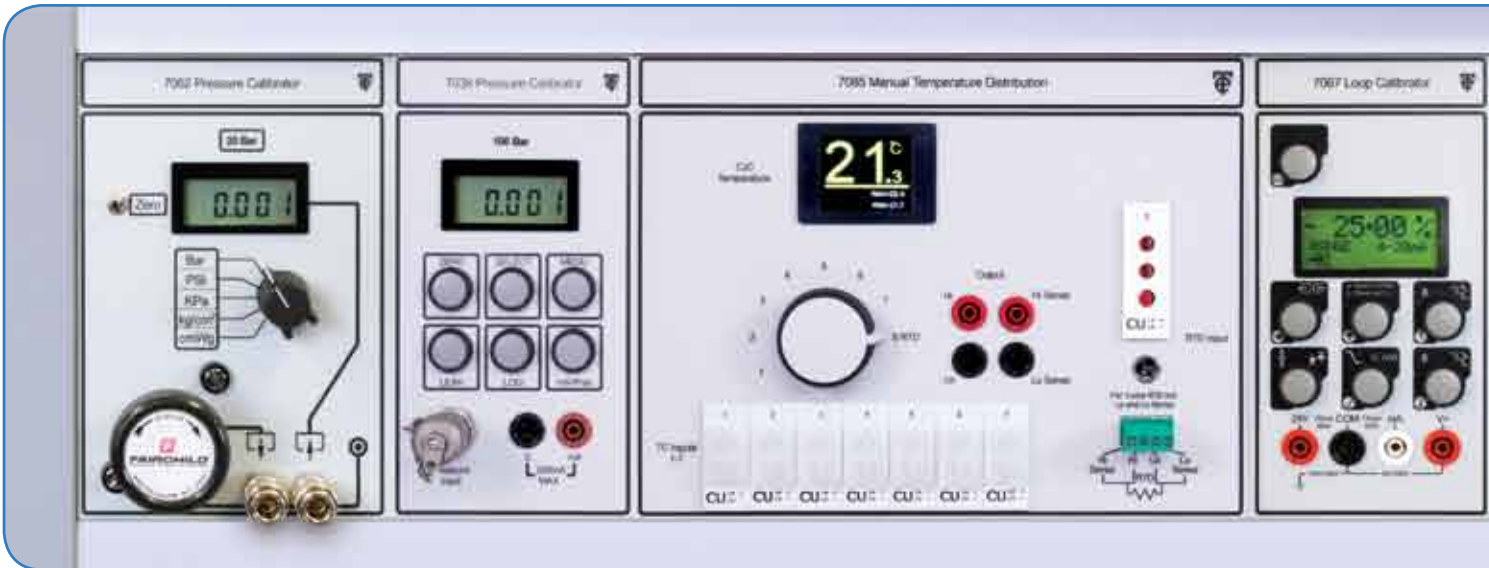
- On-Site bench and lab installation and commissioning
- On-Site bench training and demonstration
- On-Site annual calibration and maintenance service
- Online EasyCal Software training
- Factory Acceptance Testing & training at Time Electronics UK





Calibration Bench Modules

Power, Pressure, Temperature, Loop, and Custom-Design Modules



POWER MODULES

7082 Mains Power Controller: Fitted as standard in every bench. A single phase unit with 2 power sockets and digital voltage meter.

Protection: 16A overload for entire bench with RCBO. **Sockets:** 2 front panel, 4 under console. Type can be specified.

Switches: Power on/off switch for bench, separate switch for under console light.

Options: Isolated mains output sockets (7063), 110V 5A DC (separate module - 7075).

7083 Dual 24V DC Supply: Suitable for powering loop signal instrumentation.

Outputs: Two 24V, 2A, floating with respect to each other and ground. **Features:** Power on/off switch, fuses, and LED indicators.

7086 Adjustable DC Power Supply: 0 to 60V 3A (0 to 60V 6A with side panel option).

Large Dual LED Display: Voltage - 3 1/2 Digits/green. Current - 3 1/2 Digits/red. **Accuracy:** ±0.5% of rdg + 2 digits.

7087 Quad DC Power Supplies: 4 fixed independent floating supplies.

V & I Ratings: 6V(8A), 12V(8A), 24V(4A), 48V(3A). **Current Overload Protection:** Current roll back feature and individual fuses.

7088 Adjustable AC Power Supply: Maximum output voltage is 10% above line input voltage.

Meters: 2 analogue meters monitor the output voltage and current.

Power: Variable 0 to 265V 50Hz, 10A at 240V input. Variable 0 to 121V 50Hz, 10A at 110V input.

Features: Power on/off switch, output overload trip, and voltage output socket.

PRESSURE MODULES

Available Units of Measure: Bar, PSI, kPa, MPa, inWg, cmWg, inHg, mmHg, Kg/cm2, atm. Standard modules can have 5 selectable units.

Display: 4.5 digit on pressure calibrator and indicator modules.

Fittings: Under 20bar: Quick Release. Over 20bar: Minimesh.

Range	Vacuum	0.2	2	5	10	20	35	70	100	200	400	600
Resolution (bar)	.0001	0.01mb	.0001	0.001	0.001	0.001	0.01	0.01	0.01	0.01	0.1	0.1
Accuracy %	0.04	0.1	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.1	0.1	0.1

Module

Pressure Range Available (bar)

7062 Pressure Calibrator with self venting regulator	Vac, 0.2, 2, 5, 10, 20
7059 Vacuum and Pressure Calibrator with self venting regulator	Vac and 0.2, 2, 5, 10
7064 High Pressure Calibrator with self venting regulator	35, 70, 100, 200
7066 Differential Pressure Calibrator	0.2, 2, 5, 10
7032 Automatic Pressure Calibrator	0.2, 2, 5, 10
7065 Pressure Indicator	Vac, 0.2, 2, 5, 10, 20, 35, 70, 100, 200, 400, 600
7038 Pressure Indicator (9 selectable pressure units)	Vac, 0.2, 2, 5, 10, 20, 35, 70, 100, 200, 400, 600
7084 Pneumatic Line Pressure Controller with gauge	5, 35, 70



TEMPERATURE AND LOOP CALIBRATION MODULES

7085 Temperature Distribution Panel: Switches 7 thermocouple inputs and 1 thermocouple or RTD to a common output.

Optional: Automatic switching version 7085A (requires 7051).

Features: Cold junction temperature display with min max recording.

7068 Programmable RTD Temperature Calibrator: Precisely simulate and measure RTD probes.

Temperature: Accuracy 0.05°C (0.09°F). Resolution 0.01 °C (0.02°F). **Resistance:** Accuracy 0.03Ω. Resolution 0.01Ω.

Features: PT100 plus 7 other RTD types, measure and simulate °C, °F, °K, and Ohms, ramp and step.

7001 Class A °C PT100 Simulator (ITS90): A precision simulator for PT100 0.3850 platinum resistance elements.

PT100 Scale: -200°C to +800°C with 23 set points. Accuracy: ± 0.3°C. °F version also available.

7077 Temperature Calibrator: Source and measurement functions for thermocouples, RTDs, mV, and mA.

Measure/Simulate: 8 thermocouple types, PT100-RTD, mV and mA. **Displays units:** °C, °F, μV/mV, or mA.

Features: Automatic cold junction compensation, 10 point memory recall, inching and step functions, 24V process loop drive.

7061 Multifunction Process Calibrator: Comprehensive microprocessor controlled temperature and loop control calibrator.

Measure: 3 ranges up to 400V, 400mA, 40kΩ. **Outputs:** Voltage: 3 ranges up to 10V, 1μV res. Current: 3 ranges up to 20mA, 1μA res. Resistance: 0-400Ω, 0.01Ω res. **Features:** PT100 plus 8 other RTD types, measure and simulate °C, °F, °K, and Ohms, ramp function.

7067 Loop Calibrator: For the calibration of voltage and current loop signals.

3 Operating Modes: Loop V/I source, sink of loop current, measurement of loop current/voltage. **Accuracy:** 0.01%.

Resolution: 1μA or 1mV. **Features:** Programmable ranges, manual step, auto-step and ramp, square root functions for flow.

7069 V-I Loop Calibrator: A current, voltage, and process loop calibrator that can source & measure current and voltage.

3 Source Ranges: 0 - 22mA & 0 - 22V. **3 Measure Ranges:** 0 - 70mA & 0 - 50V. **Accuracy:** 0.02% of span. **Display Resolution:** 4.5 digits.

Features: Transmitter simulator/sink function, output steps and ramps, fine adjustment (inching).

7079 Loop Ancillaries Calibrator: Test and calibrate electrical process loop signals.

Measurement: 0 to 199.99mA. **Continuity Test:** Up to approximately 100Ω. **Output:** Separate isolated 24VDC supply.

CUSTOM DESIGN MODULES

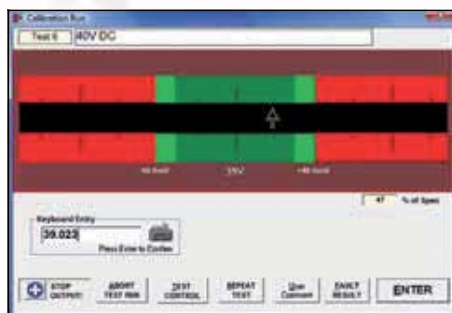
CalBench is not limited to just standard modules. Both the primary and secondary consoles can be fitted with various instruments specifically for customer requirements. Modules can be designed from the Time Electronics' range of decade boxes, calibrators, and dmm's. Multifunction Calibrator and DMM modules are fully compatible with EasyCal software.

Non Time Electronics equipment such as handheld multimeters, oscilloscopes, power supplies, pressure calibrators, and more can also be fitted into the bench consoles. This allows the user to integrate familiar instruments into the bench system. Switches, power controllers, and communicator modules can also be added.



EasyCal Calibration Software

The comprehensive solution to calibration work and management



FOR LABORATORY, OFFICE AND SITE CALIBRATION WORK, EASYCAL IS THE IDEAL SOLUTION.

Automating the calibration process brings important benefits and provides increased speed of calibration and consistency of results. Calibration certificates and reports are produced easily to ISO 9001, ISO 17025, and other quality standards. EasyCal also simplifies the administration process from reminder reports, through to despatch.

- Calibrate electrical, mechanical, process control devices, and more
- Print certificates, reports, calibration labels, and more
- Universal instrument control via GPIB/RS232/USB
- Quickly generate procedures using templates
- Over 1000 pre-written calibration procedures included
- Calibration due reminder system
- E-mail reminder letters and lists

EasyCal is powerful yet versatile software with features to cover all aspects of metrology work. It is designed for immediate implementation into systems where users require a complete software package that can be both simple to understand and work with. EasyCal's familiar user interface allows operators to quickly learn and navigate through the applications.

- Network compatible for multi-station and site calibration work
- Customise reports and certificates
- Print and read bar codes
- Generate PDF reports & certificates (built-in PDF engine)
- HART and Foundation Fieldbus communication
- Secure user log in and digital signatures
- Create uncertainty tables for laboratory and site
- Produce online certificates using EasyCal's WebCert feature
- Multilingual capabilities

EASYCAL NETWORKING:

With networking capabilities a multi-user installation can be implemented.

Goods In

- Scheduling is simplified by EasyCal's instrument recall and reminder system. Customers/owners return instruments after reminder letters/emails are received.
- When instruments arrive for calibration EasyCal starts to optimise the job process for fast turnaround time.
- Instruments are booked in, job sheets and labels can be produced. A search feature can locate the unit's data or a barcode reader can identify the item.
- Once uploaded on the system necessary parties can access/modify data for the job without the need for paperwork to be passed from station to station.

Calibration Lab

- Calibration and verification can be performed using a 5025 multifunction calibrator or similar unit.
- EasyCal can be used to automate the calibration process, create or edit test procedures, and enter in any 'on going' job information.
- Certificates can be created, issued, and signed off as required. PDF copies can be held on the server for web upload or email purposes.
- 'Calibrated' labels can be printed and placed on instruments before leaving the lab.

Site

- With the networking system in place the process of performing site calibrations is made faster and easier.
- The required information for a site job is transferred to a laptop or 5051 calibration system.
- Alternatively 'calibration test forms' can be produced for hand written entry.
- The data is imported to the central servers' database or entered into EasyCal back at base.

Calibration Manager

- Management can over-see the complete operation. The calibration standards and instruments used by the laboratory are also monitored on the system.
- Create, edit and sign off test procedures. View and issue reports and certificates.
- Create and update uncertainty information. Simulate calibration runs meaning procedures can be tested without the need for the calibrating instrument or unit under test.
- As the key user the manager can control user access to files and programs.

Office

- Office stations can keep track of job and customer information.
- Add necessary details to the customer database. Edit/update any changes to personnel, job requirements, and schedules.
- Print and issue hard copy job reports for internal use and documentation to accompany out-going instruments.
- Produce reminder reports, issue certificates, and send emails and letters to customers.

Online

- Customers or employees can use EasyCal's 'WebCerts', a web based application allowing certificate retrieval online.
- A secure log in feature allows access the user's private folder with their relevant documentation.
- Specific PDF calibration certificates can be located quickly and easily using WebCert's simple search function.
- The user can print calibration certificates for instruments as required. This is especially useful when certificates are lost or misplaced.



CENTRAL SERVER



EasyCal Calibration Software

The comprehensive solution to calibration work and management

INSTRUMENTS, CUSTOMERS, AND JOBS

A comprehensive database of instruments and customers (or owners) allows the operator to access any information required.

Instrument Database: A search feature enables the user to enter specific criteria to quickly find the instrument. When adding details the user is aided by comprehensive drop-down lists, which automatically update when a new detail is added.

Job Management: When an instrument is booked in the job process starts. Specific information about the job is entered; such as 'service required', 'service by' and 'accessories supplied'. A job sheet and label can be produced at this stage to accompany the instrument. As the job is put through the system these parameters can be updated for example 'quote price', 'job status' and 'invoiced'.

Instrument Recall and Reminder System: Instruments which are due for calibration are listed on screen. From here reminder letters and lists can be printed or emailed directly to the customer or department.

Calibrating Instruments, Standards and Uncertainties: Traceability information on calibrating instruments and standards is stored and maintained by EasyCal. Uncertainty tables for laboratory and site can be created for each calibrating instrument. These are then automatically processed and applied to certificates.



PROCEDURE WRITING AND EDITING

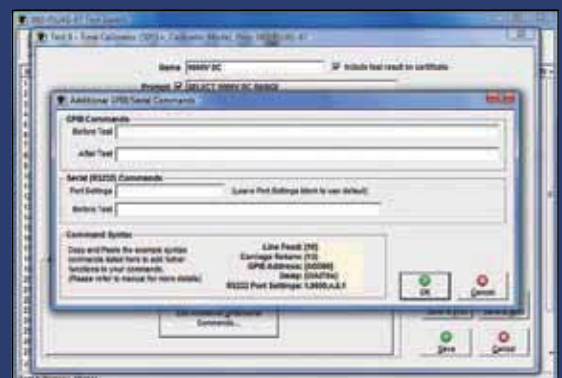
Creating and editing test procedures is made simple with intuitive, user-friendly windows. Editing test information can be done by replacing, adding, or copy/pasting. EasyCal keeps track of each time a procedure is edited.

Standard Procedures: A standard calibration library comprising of over 1000 procedures covering a wide variety of instruments is included as standard.

Procedure Templates: Can be used for creating any new procedures as required. EasyCal has templates for multi-meters, clamp meters, decade boxes, insulation testers, and more.

Conversion Tables: Conversion tables for thermocouples and RTDs are included; alternatively user-defined tables can be created. RS232 / GPIB Commands. For more complex instrument control GPIB / RS232 commands can be sent on a test-by-test basis or run as a script.

Remote Commands: For more complex instrument control GPIB / RS232 commands can be sent on a test-by-test basis or run as a script.



INSTRUMENT CALIBRATION

Selection of the instrument under test is quick and easy. With the use of a barcode scanner this selection becomes automatic.

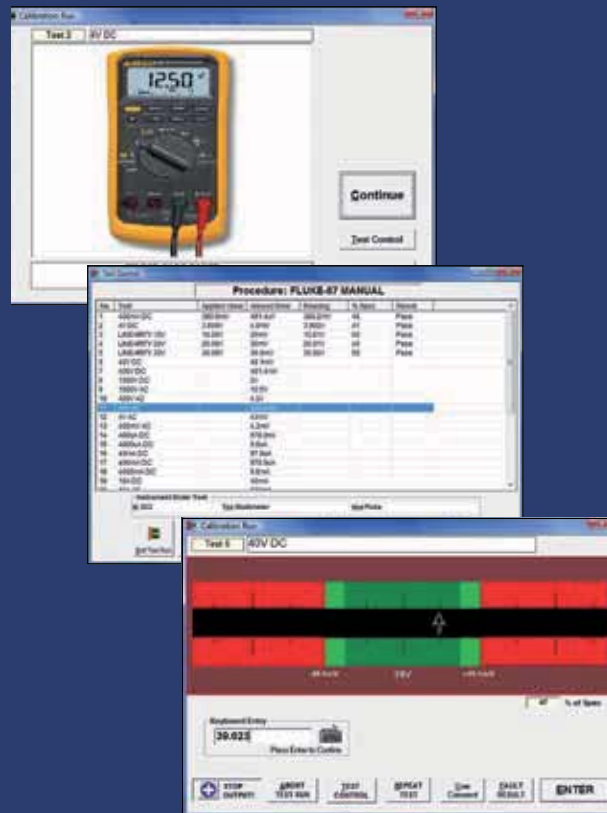
Calibration Prompts: Picture prompts are shown to aid the user with instrument range selection and connection.

Test Control: At any stage during the calibration run a summary of the results for the tests completed is displayed. The operator is able to move forward or backward through the procedure as required. A summary printout is also available from Test Control.

Graphical Test Screen: The calibration run is made simple and efficient by a graphical user-interface, which increases speed of data entry. Instruments, which cannot be automatically calibrated, can still have the results data entered manually. The entered value is compared with the required value as specified in the procedure.

End of Calibration Run: At the end of a calibration run the operator has the option to print a certificate and label. The ability to edit service information is also presented to the operator.

Calibration Test Forms: Alternatively 'calibration test forms' for hand written results are available. This data is then entered into EasyCal at a later date.



CERTIFICATES

Produce calibration certificates & labels on demand. The user can keep a record of instrument history and servicing. Simple search facilities help find the required certificate.

Customise: Using Crystal Reports (optional) certificates formats can be easily customised, or design a new certificate layout.

Import and Export Results: Exchange data from one system to another user via the import and export features. Certificate data can be converted in spreadsheet, CSV and HTML formats.

WebCerts: Enables the retrieval of pdf calibration certificates via a web based application. A simple user friendly interface means customers or employees can locate required data easily and quickly. Search criteria boxes allow the user to narrow the certificates list by entering the instrument serial number, certificate number, or approximate date of calibration performed.

A secure log in feature allows access the user's private folder with their relevant documentation. WebCerts can be used by calibration labs to give certificate access to their customers, or for companies that perform multi-site calibration work.

