Time Electronics
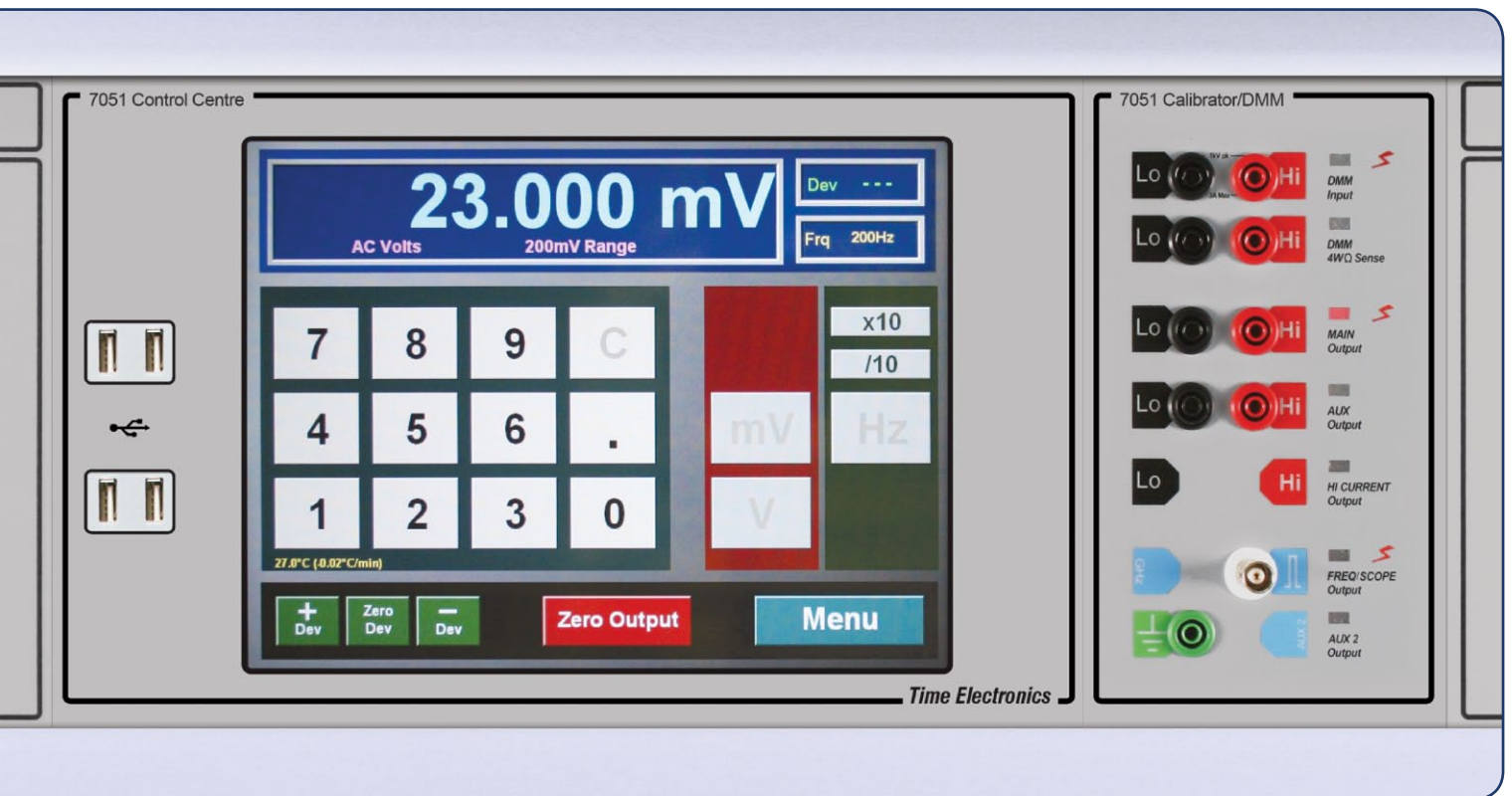## Calibration, Test and Measurement

CalBench

7051 Multifunction Calibrator and Bench Control Centre

7051 Multifunction Calibrator & Control Centre

Universal calibration and system control

Calibrates

Digital/Analog Multimeters	Process Calibrators	Clamp Meters	Oscilloscopes
Handheld/Bench DMMs	Voltage & Current Sources	Temperature Indicators	Decade Boxes
Frequency Meters	Transducers/Transmitters	R-C-L Meters	Data Loggers

And more

Calibrator / Multimeter / Touch Screen PC

Mounted centrally in the primary console the 7051 combines a precision multifunction calibrator, 6½ digit multimeter, and industrial touch screen PC. It is the principle module for on-site facilities that require high performance calibration and maximum functionality.

Calibrator: Provides a wide range of calibrated outputs for AC/DC voltage and current, RTD and thermocouple simulation, plus a range of resistance and frequency functions. Internal options can be added for increased capabilities. These include high voltage/current, capacitance/inductance, and oscilloscope calibration. Further enhancements can be made by additional side modules, adaptors, and benchtop instruments.

DMM: The integral 6½ digit multimeter measures DC voltage to 1000V, AC voltage to 750V, resistance to 100MΩ, and frequency to 300kHz.

PC Control Centre: The 7051 control centre is a PC with a 64 bit dual core processor, running Windows 8.1, with a 10.4" capacitive touch screen display. An optional PC upgrade with 12.1" display is available. The calibrator control software allows the wide range of functions to be easily selected using mouse, keyboard, or touch screen.

EasyCal: Enables automatic calibration to increase speed and efficiency of work. In addition EasyCal has features to manage and administrate both inventory and quality control. To complement the system a printer and connectivity kit is supplied as standard, for generation of certificates and reports.

Communication: Using EasyCal the operator can read back from compatible electrical, temperature, pressure, and loop modules within the bench. EasyCal can also be used with external instruments such as dry block calibrators and portable test instruments.

7051Plus Package: A comprehensive package including specific options to cover the calibration requirements for electrical and process applications. As a package it incorporates the full internal capabilities of the 7051, and is complemented by external adaptors for increased functionality. It is suitable for rapid multi product testing with automated test runs using EasyCal software. Further supplied accessories include a bar code reader for quick identification of devices in EasyCal, and label printer for creating 'Calibrated' labels to be placed on instruments.

Standard Features

Calibrator (source)	Range	Best 1 year Specification
Voltage DC	0 to ± 22V	± 15ppm of setting
Current DC	0 to ± 220mA	± 80ppm of setting
Voltage AC	1mV to 22V (10Hz to 20kHz, sine-wave)	± 300ppm of setting
Current AC	$10\mu A$ to 220mA (20Hz to 1kHz, sine-wave)	± 0.05% of setting
Decade Resistance	1Ω to 1GΩ (Fixed values, decade steps)	± 20ppm of setting
Simulated Resistance	10Ω to 40MΩ	± 0.02% of setting
Conductance	1s to 1ns (Fixed values, decade steps)	± 20ppm of setting
Thermocouple	-270 to 1820°C (Type J, K, R, T, S, B, E, N)	± 0.15°C
PT100 Simulation	-180 to 850°C	± 0.15°C
Frequency/Period	0.1Hz to 10MHz / 100nS to 10S	± 20ppm of setting

6.5 Digit Multimeter (measure)	Range	Best 1 year Specification
Voltage DC	0 to 1000V	35ppm of rdg + 6ppm of rng
Current DC	0 to 3A	500ppm of rdg + 50ppm of rng
Voltage AC	0 to 750V	0.06% of rdg + 0.04% of rng
Current AC	0 to 3A	0.1% of rdg + 0.04% of rng
Resistance	0 to 100MΩ	100ppm of rdg + 50ppm of rng
Frequency	3Hz to 300kHz	0.01% of rdg
Thermocouple	-270 to 1800°C (Type J, K, R, T, S, B, E, N)	± 0.5°C
PT100	-180 to 850°C	± 0.08°C

Internal PC	Specification/Details
Processor	64 bit, dual core (or equivalent)
RAM	4GB (or higher)
Hard Drive	60GB Solid State (or higher)
Ports	Front: 4 x USB / Rear of Console: 2 x USB, 2 x RS-232
Display	10.4" LCD, (Touch Screen)
Operating System	Windows 8.1
Pre loaded Software Programs	EasyCal Calibration Software
Upgrade Option	CC12A: Upgraded integral PC (16GB RAM, 120GB hard drive) and 12.1" touch screen
Supplied Hardware/Accessories	USB keyboard, Printer, DVD-RW, 4 port USB hub, Numeric key pad, USB Stick

Options (* denotes options that are included in the 7051Plus package)

Calibrator (internal)	Range/Values	Best 1 year Specification
High Voltage/Current (9782*)	220mA to 22A / 22V to 1050V AC/DC	DCI 250ppm. DCV 50ppm. ACI 0.2%. ACV 0.08%
Wideband AC Voltage (9771*)	20 to 200mV/300kHz. 0.2 to 2V/1MHz. 2 to 20V/100kHz	± 0.05% of setting
Capacitance (9798*)	1nF, 10nF, 100nF, $1\mu F$, $10\mu F$, $100\mu F$	± 0.25% of setting
Inductance (9798*)	1mH, 1.9mH, 5mH, 10mH, 19mH, 50mH, 100mH, 190mH, 500mH, 1H, 10H	± 0.1% of setting
Full Range Resistance (9787*)	1Ω to 120MΩ (Variable)	± 100ppm of setting
- PT100	-180 to 850°C	± 0.07°C
Oscilloscope Calibration (9770*)		
- Amplitude	6mV to 200V and 6mV to 2V 50Ω (square-wave or DC)	± 0.05%
- Frequency/Period	0.1Hz to 100MHz / 10ns to 10s	± 20ppm
- Duty Cycle	3 frequencies: 100Hz, 1kHz, 10kHz, settable from 0 to 100%	
- Fast-Rise	< 400ps. Bandwidth checking up to 400MHz	
Frequency Reference (9783*)	0.1Hz to 10MHz / 100ns to 10s	± 0.1ppm
Scope 2.2GHz Sweep (9769)	100MHz to 2.2GHz levelled sine-wave (0.5, 1, 1.5V pk-pk)	Amplitude ± 1%, Frequency ± 20ppm

Adaptors and Accompanying Bench Instruments (see page 7 for further details)

External Adaptors	Clamp meter adaptor (9780*), tacho adaptor (9773*)
External Instruments	Current transformers, bench/portable calibrators, attenuators, references
EasyCal Accessories	Bar code reader (9777*), Calibration & ID label printer (9778*), Job & address label printer (9779)

Supplied Accessories

Supplied as standard with the 7051. The printer and connectivity kit provides all the required components for use with the in-built PC. The test lead set has the necessary connections for virtually all test applications.

Printer and Connectivity Kit
- Keyboard and mouse
- Ink jet printer
- DVD-RW
- 4 port USB hub
- Numeric key pad
- USB memory stick

Premium Test Lead Set
- General purpose 4mm test leads
- 4 wire screened, 4mm test leads
- BNC test lead
- BNC to 4mm plug
- 4mm test lead couplers
- Low thermal 4mm test leads & clips
- 4mm to mini thermocouple
- 4mm to spade adaptors
- Thermocouple male to male CU
- Pair of 4mm test Clips

Adaptors

Various adaptors can be used with the 7051 for increased capabilities. Standard adaptors for clamp meters, tachometers and torque wrenches are available. Custom adaptors for user specific applications can be supplied upon request.

- Clamp meter adaptor x50 turn - AC/DC current up to 1100A (DC, 45 to 90Hz)
- Optical tacho adaptor – 6 rpm (0.1Hz) - 600,000 rpm (10kHz)
- Current probe adaptor (for 7051 with oscilloscope calibration option fitted)
- Torque wrench calibration adaptors (benchtop or module)
- Humidity and temperature sensor adaptors
- Picoamp source adaptors
- Customer specific adaptors

Accompanying Instruments

The 7051 can be complemented by several benchtop instruments that enhance capabilities and provide more functions. Also available are portable versions of modules for site calibration work.

- 100A AC current transformer (9790)
- Power calibrator: 0 to 20kW AC and DC (5077)
- Power amplifier: 60V AC, 90V DC – 100mA (9760 shown)
- Low noise attenuators: 100:1 and 1000:1 versions (9766 and 9767)
- Rubidium frequency reference (9762) for use with oscilloscope calibration option
- Dry block calibrators with EasyCal communication (see page 25)
- TE digital pressure gauges with EasyCal communication (see page 24)
- Additional instruments and modules for specific applications (see pages 23 to 25)

Easycal Software Accessories and Options

Several options are available for use with EasyCal calibration software. Items include a bar code reader which enables fast identification of devices in the pre-calibration stage, and label printers for tagging units after calibration.

- Bar code reader
- Calibration and ID label printer
- Job card and address label printer
- Durable over-laminate labels for field devices situated in harsh environments
- Cables, leads, and adaptors for interfacing EasyCal with separate computers
- Extra user licenses for additional computers
- EasyAdmin security add-on: set of user rights, access levels, and more
- WebCerts online certificate upload/retrieval add-on

7051 General Specification

Warm up	30 minutes to full accuracy
Settling Time	Less than 5 seconds
Interfaces	Front: 4 x USB / Rear of Console: 2 x USB, 2 x RS-232
Temperature Performance	Operating: 5 to 45°C. Full Spec: 22°C +/- 3°C. Storage: -10°C to 50°C
Operating Humidity/Altitude	<80% non condensing. Altitude: 0 to 3km. Non operating: 3km to 12km
Line Power	100 to 230V AC 50/60 Hz. 200W maximum
Dimensions	W425mm, H201mm (primary console fitting only)

7051 Ordering Information

7051 Multifunction Calibrator and Control Centre - Features and included items

- Precision Multifunction Calibrator
- AC/DC 22V / 220mA
- Decade Resistance 1Ω to 1GΩ
- Simulated Resistance 10Ω to 40MΩ
- PT100 Simulation (-180°C to 850°C)
- Thermocouple Simulation (J,K,R,T,S,B,E,N)
- 10MHz Frequency

- Internal Multimeter – 6.5 Digit (AC/DC 1kV/3A, 100MΩ, 300kHz)
- Internal PC – 10.4" colour LCD touch screen
- 7051 Calibrator/Multimeter Control software
- EasyCal Calibration Software (Full License)
- Printer and Connectivity kit
- Premium Test Lead Set
- User Manuals

7051Plus Package - For Comprehensive Electrical and Process Calibration

Includes all of the features and items listed above with selected options (*) shown below for maximum multi product calibration capabilities.

Internal Options

9782*	High Voltage/Current option AC/DC 1kV/22A (Multimeter Calibration)
9798*	Capacitance (1000pF to 100µF) / Inductance (1mH to 10H)
9787*	Full Range Resistance (1Ω to 120MΩ) including advanced PT100 simulation
9771*	Wideband AC Voltage (1MHz Max. 20mV to 20V)
9770*	Oscilloscope Calibration (1mV to 200V, 0.1Hz to 100MHz, bandwidth check to 400MHz)
9783*	Frequency Reference for timer/counter calibration (9770 option must also be fitted)
9769	Scope 2.2GHz Levelled Sine Generator
CC12A	7051 Control Centre Upgrade to CC12 PC with 12.1" touch screen

External Options

9762	Rubidium High Stability Frequency Reference (9770 scope calibration option must fitted)
9773*	Optical Tacho Adaptor
9780*	Clamp Meter Adaptor (1 and 50 turn coil)
9764	Current Probe Calibration Adaptor (oscilloscope calibration option must fitted)
9790	100 Amp AC Current Transformer
5077	Power Calibration (0 to 20kW AC and DC) - External Calibrator
9760	Power Amplifier (60V AC, 90V DC – 100mA)
9766	External Low Noise Attenuator 1000:1
9767	External Low Noise Attenuator 100:1
TE-TRQ	Torque Wrench Calibration Unit (module or benchtop with external transducers)
C165*	Factory Calibration Certificate (NPL traceable)
C134	UKAS Calibration Certificate (ISO 17025)

EasyCal Options

9777*	Bar Code Reader
9778*	Calibration and ID Label Printer
9779	Job and Address Label Printer
EC2FL	Additional Users License - For use on separate PC's
EAD5	EasyAdmin security add-on: Set user rights, access levels, and more (5 users)
EWC	WebCerts add-on: Online application for upload and retrieval of certificates and reports

* These options are included in the 7051Plus package.

Full 7051 technical specifications and further information on EasyCal licenses and options available at www.timeelectronics.com

EasyCal Calibration Software

The comprehensive solution to calibration work and management

Manage, Automate and Optimise the Calibration Process

About Easycal

EasyCal is a complete software package with features covering all aspects of calibration work and management. It is designed to reduce workload, improve efficiency, and provide the essential platform for companies looking to create and sustain an effective calibration program. The comprehensive features simplify the administration process from reminder reports through to despatch. With a familiar and intuitive user interface all operators can quickly learn and navigate through the applications. This allows fast, straightforward implementation and integration of the software.

Communication and Control

EasyCal is supplied as standard with the 7051 control centre module or can be installed and used on separate computers in the test facility. User friendly features and controls aid the process to decrease calibration times. EasyCal can also read back values and data from compatible pressure, process and electrical modules, and can be used with external instruments such as dry block calibrators.

For Multiple Industries and Disciplines

EasyCal is a versatile solution to multi-device calibration with the comprehensive functionality that is required across industries. It is globally used as the principal software in both calibration businesses and companies with on-site test facilities.
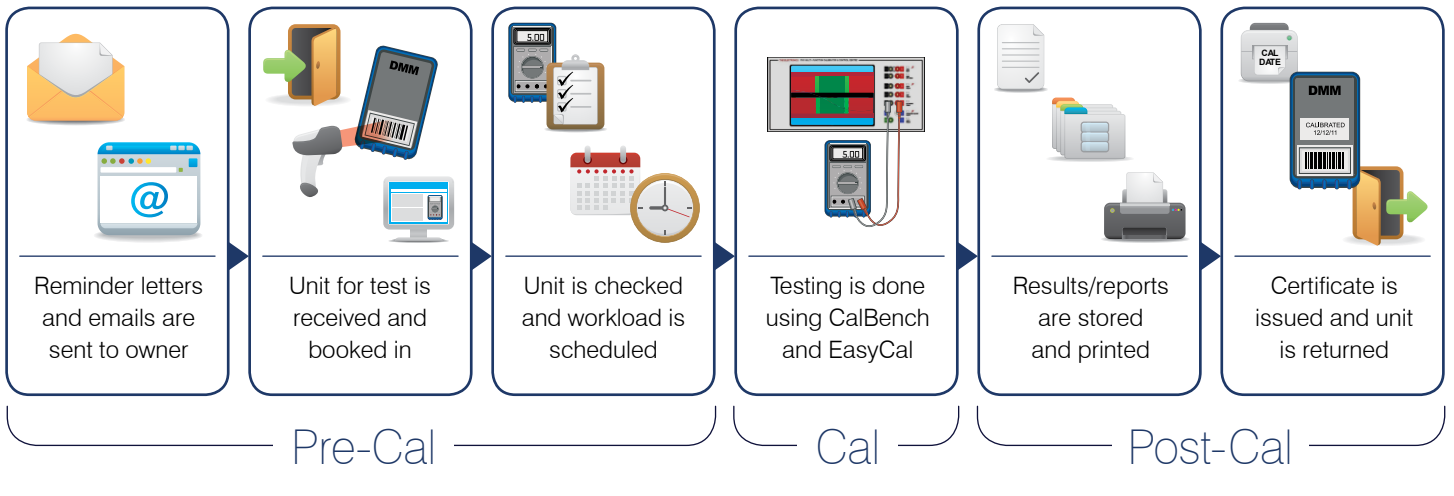
EasyCal is also designed for universal testing applications and can cover a wide range of disciplines. Users can calibrate and verify various instruments and devices: electrical and electronic; level, pressure, and flow; temperature and loop; mechanical and dimensional.

Features

- Supplied as standard with the 7051 control centre module
- Communicate with compatible CalBench modules
- Automated planning and scheduling
- For use with multiple devices and instruments
- Print/email/store certificates and reports
- Network compatible
- Produce calibration labels
- Quickly generate procedures using templates
- 1200+ pre-written test procedures included
- Calibration due reminder system
- E-mail reminder letters and lists
- Customise reports and certificates
- Create PDF reports and certificates (PDF engine)
- Print and read bar codes
- Universal instrument control
- HART and Foundation Fieldbus communication
- Secure user log in and electronic signatures
- Create uncertainty tables for laboratory & site
- WebCert feature for online certificates

Automating the Calibration Process with EasyCal

Reminder letters and emails are sent to owner	Unit for test is received and booked in	Unit is checked and workload is scheduled	Testing is done using CalBench and EasyCal	Results/reports are stored and printed	Certificate is issued and unit is returned

Pre-Cal — Cal — Post-Cal

EasyCal: For the Calibration Process

Automating the calibration process brings important benefits and provides increased speed of calibration and consistency of results.

Pre-Calibration: The calibration management features of EasyCal make the planning and organisation of instrumentation calibration simple. A recall/reminder system informs the user of upcoming jobs, and search functions allow the user to quickly identify a unit for test.

Calibration: EasyCal controlled calibration significantly decreases testing times, meaning less instrument downtime and faster turnaround. This improves throughput meaning greater return on investment. EasyCal optimises the process by allowing the user to create procedures quickly and easily with the help of the included design wizards and pre-written templates.

Post Calibration: Easily produce calibration certificates and reports to ISO 9001, ISO 17025, and other quality standards. These can be printed, stored, or emailed as PDFs. EasyCal has a selection of preformatted certificate templates suitable for displaying typical calibration results.

The Core Benefits of using EasyCal

Achieve compliance with quality standards

- Automated document control ensures conformity and quality
- Establish procedures to maintain repeatability and monitor quality
- Schedule and maintain calibration intervals.
- Evidence of traceability to national standards
- Record calibration environmental conditions
- Produce calibration labels, maintain calibration history
- Reduce possibilities for errors or omissions
- Electronic record retention ensures integrity for successful audits

Create an efficient control and management system

- Reduce testing times
- Eliminate continual outsourcing calibration costs
- Full control over the calibration process
- Improve turnaround
- Quick and easy solution to instrument analysis when needed
- Internal scheduling for calibrations. No external factors
- Centralised document management
- On demand networked review of certificates and reports
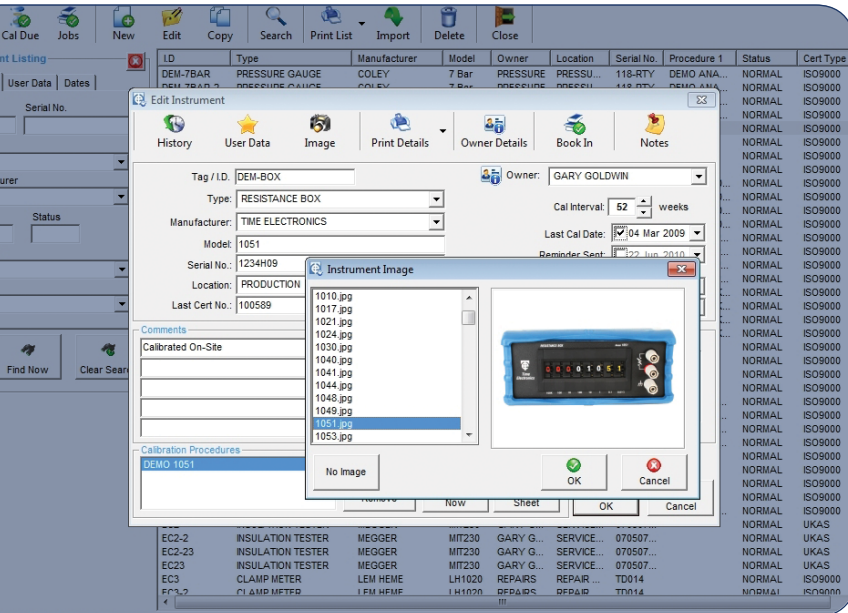
Inventory, Reminders, and Jobs

A comprehensive inventory database can be created and customised to company requirements. For internal calibration and quality management, departments and users can be specified. Alternatively EasyCal can be used as the controlling system for a calibration business based around customers and owners.

Search
A powerful search feature enables the user to enter specific criteria to quickly find the required data. When adding details the user is aided by drop-down lists, which automatically update when new information is added.

Input Fields
Used to add details such as ID and serial number, manufacturer and model, instrument status and service notes. In addition custom fields can be created to integrate with a company system. Images can be uploaded to provide further reference.
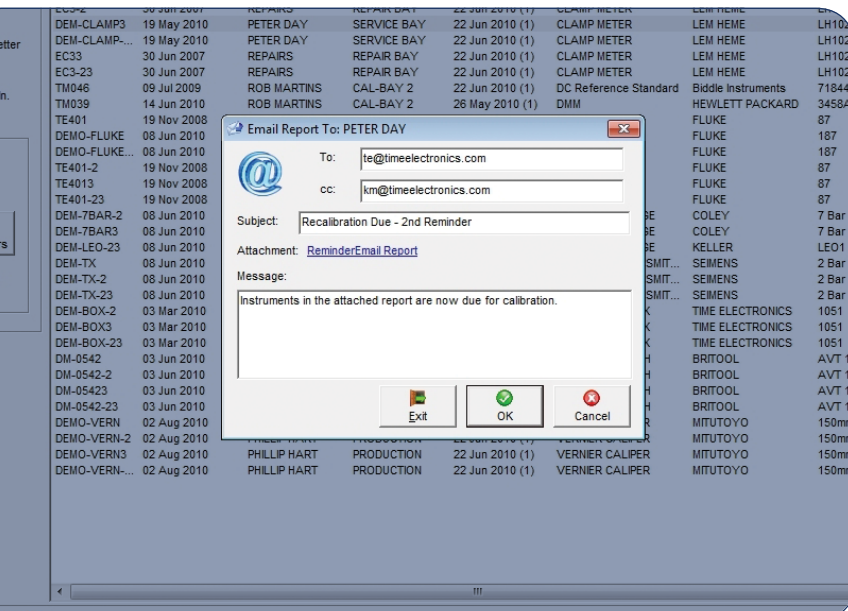
Instrument Recall and Reminder System
Instruments which are due for calibration are listed on screen. Reminder letters and lists can be printed or emailed directly to the customer or department. An advanced notice period can be set to bring forward the recall date allowing for response time.

Job Management
When a unit for test is booked in the job process starts. Specific information about the job is entered; such as 'service required', 'sub contracted' 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'.
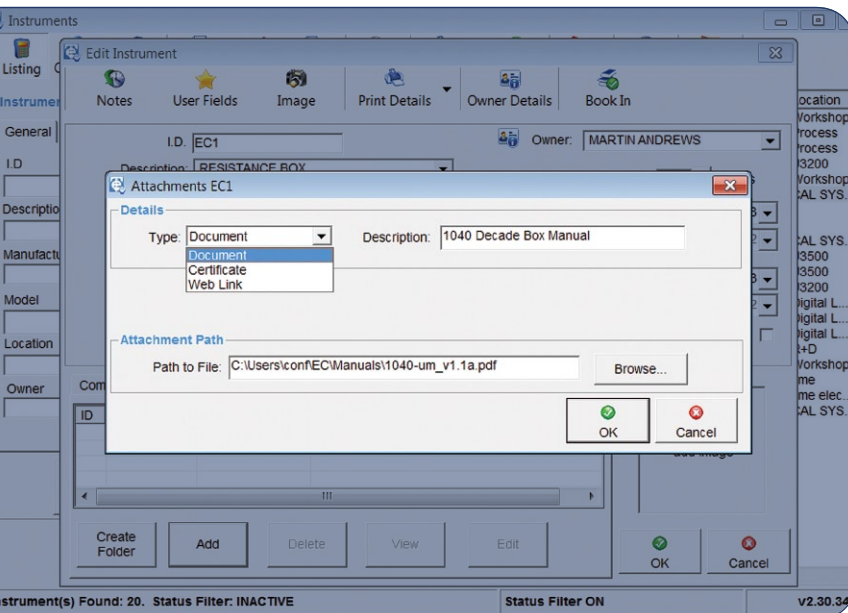
Attachments
Create links to technical files, specifications, web pages, word documents, videos, and more. These can be set to automatically display prior to the calibration run.

Devices and Standards used for Calibration
Traceability information for instruments and standards that perform the calibration work is stored and maintained by EasyCal.

Uncertainties
Uncertainty tables for laboratory and site can be created for each calibrating instrument. These are then automatically processed and applied to certificates as required.
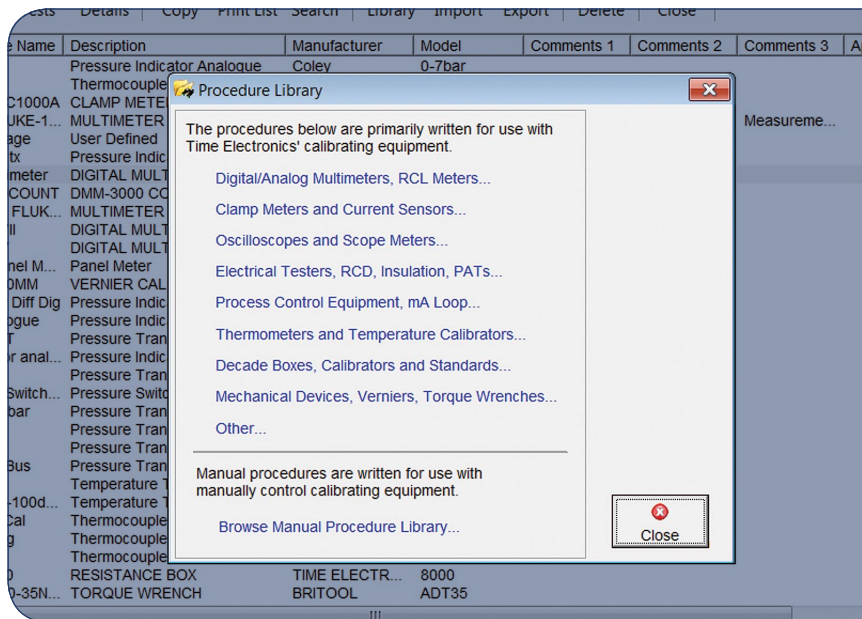
Procedure Writing and Editing

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

Procedure Library
A calibration library comprising of over 1200 procedures covering a wide variety of instruments and devices is included as standard.

Procedure Templates
Procedure templates for multimeters, clamp meters, decade boxes, insulation testers, and more can be used for creating any new procedures as required.

Fast Procedure Creation and Editing
Copy and paste multiple tests. Globally edit a group of tests. Colour coded listing helps sort and identify different test types.

Procedure Simulation
The Calibration Run Simulator enables a procedure to be tested without the need for a controlling instrument. To further assist with development of procedures a test can also be edited during the actual calibration run.

Format Certificates
Colour code and add borders to test group titles. Add column headers where a change of layout is required. A preview feature allows the user to check the certificate layout to determine if formatting is correct.
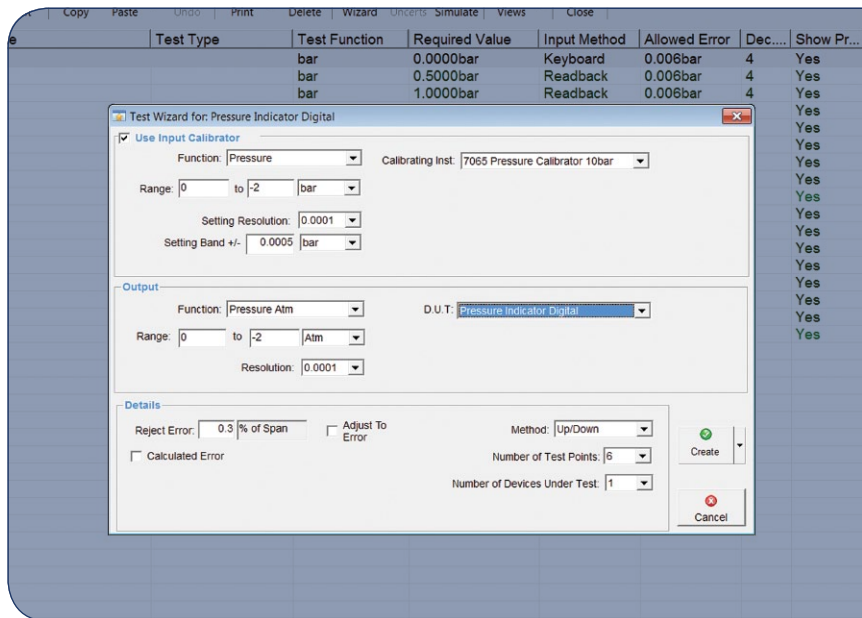
Conversion Tables
Conversion tables for thermocouples, RTDs, current transformers, and clamp meter adaptors are included. Alternatively user-defined tables can be created.
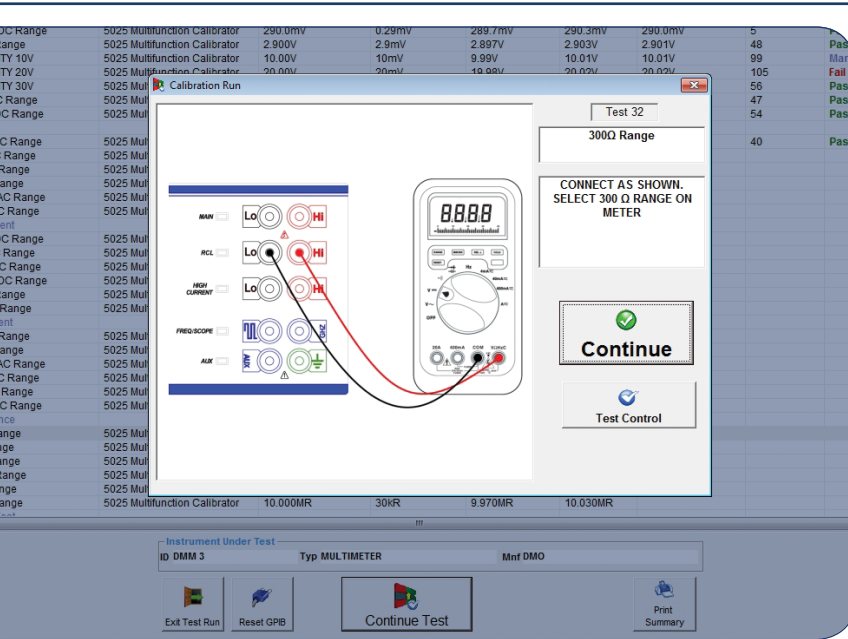
Remote Commands
For more complex instrument control, commands can be sent on a test-by-test basis or run as a script. Closed loop calibration is also achievable using the universal readback feature. This allows EasyCal to control third party calibration equipment and communicate with devices under test.
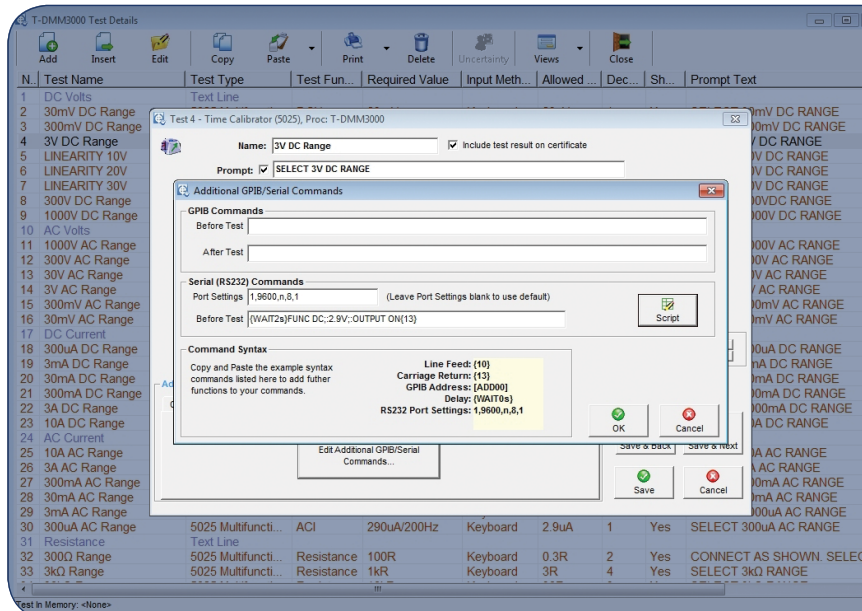
Instrument and Device Calibration

Automated calibration run provides fast and accurate collection of data, whether using direct instrument control or manual entry. EasyCal guides the operator through the procedure using graphical test screens and user prompts.

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

Calibration Prompts
Text and graphical prompts aid the user with instrument range selection and connection. So even the most complex calibrations can be performed with relative ease.
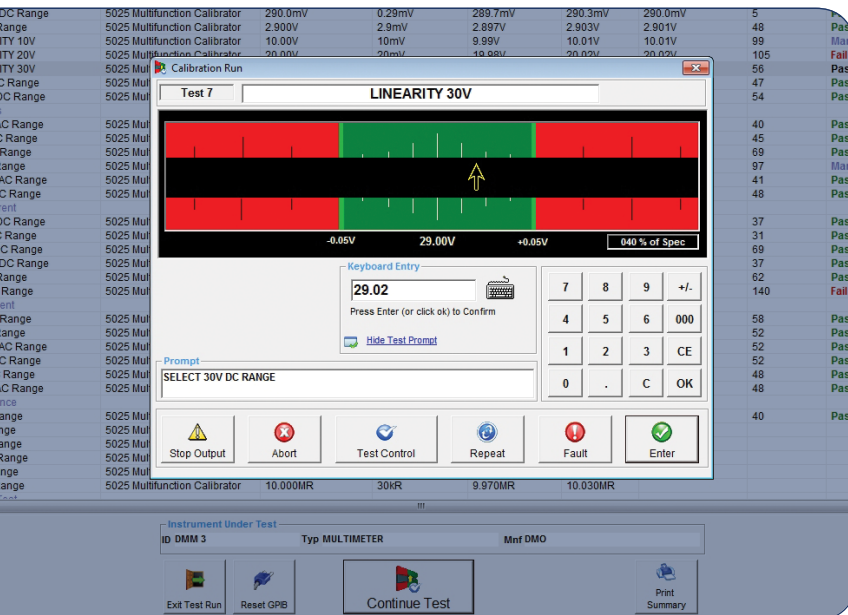

Graphical Test Screen
The calibration run is made simple and efficient by a graphical user-interface, which increases speed of data entry. The colour coded indication bar displays the test limits. This allows the operator to easily identify out of tolerance results.

Test Control
At any stage during the calibration run a summary can be displayed, this includes both completed and remaining tests. Colour coding indicates tests passed or failed. The operator is able to move forward or backward through the procedure as required.
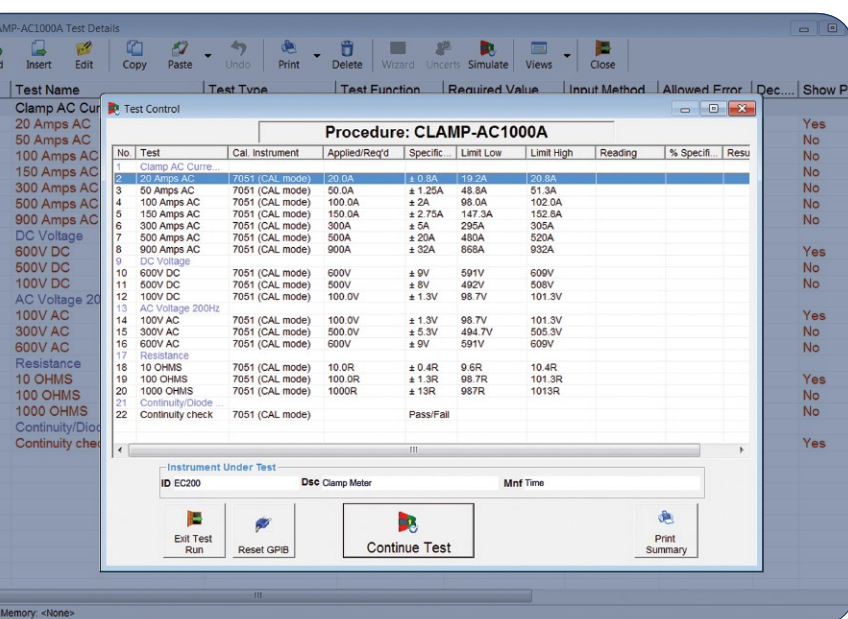
End of Calibration Run
Data for every test is stored, including a snap shot of the procedure used. If required calibration comments and service history can be updated. The operator is able to print the certificate, produce a calibration label and/or store the results to be issued as required.

Recovery Mode
If for any reason a calibration run is interrupted, EasyCal's recovery mode allows the user resume the test run from the point of termination.

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

Certificates/Reports/Data Management

Produce, print, and store calibration certificates, reports, and labels. Simple search facilities enable the user to locate any data on demand. Keeping track of instrument history and servicing is made easy.

Certificate Templates

A range of pre-formatted templates are available for immediate use. A company logo can be added without the need for 3rd party software.

Electronic Signatures

Password protected electronic signatures allow management to approve certificates. In addition a scanned image of the signature can automatically be inserted, eliminating the need to print certificates.

Built-in PDF Engine

Generate PDF reports and certificates ready for emailing and universal review.

Calibration Reports

Documented traceability provides a recorded audit trail. Reports showing calibration duration times can assist with costing and assessments.

Archive

The results database can be streamlined by using the archive feature. This improves data organisation and management. Archives are quickly retrieved, giving instant access to historical certificate data.

Import and Export

Exchange data from one system to another using the import/export feature. This method is ideal for site and field calibration work, where data is recorded externally then uploaded to the main database upon return.

Customise

Crystal Reports (optional) allows full modification of certificate, label, and report layouts. Design custom reports using queries, formulas, and running totals.

Add-Ons

EasyAdmin is an optional add-on that enables advanced security for EasyCal via user rights and access levels. It provides a central administration point for calibration instruments, certificate information and user fields.

WebCerts is a web based application that enables EasyCal users to upload and retrieve certificates and reports online. A secure log in feature allows access the user's private folder with their relevant documentation.

Time Electronics
Calibration, Test and Measurement

For more information please contact your local Time Electronics representative: