3000 SERIES

MULTI PRODUCT CALIBRATORS

TRANSMILLE
SOLUTIONS IN CALIBRATION

www.TransmilleCalibration.com

THE VERSATILE SOLUTION

FOR LABORATORIES & SERVICE CENTERS

3000 SERIES THE FLEXIBLE SOLUTION FOR YOUR CALIBRATION WORKLOAD

TRANSMILLE SOLUTIONS IN CALIBRATION

Transmille : The Complete Solution

- The widest workload of any multi product calibrator - over 18 types of instruments with power to drive older analogue instruments and the accuracy to calibrate modern digital instruments
- Ideal for both laboratory and on-site use. Modern technology provides a fast warm up time and extremely portable design.
- Automate calibration with ProCal - the worlds easiest to use *multi discipline* calibration software for maximum calibration throughput
- The most cost effective calibration system on the market - 3 models to suit budget & accuracy requirements
- The wide range of options allows the calibrator to be tailored to meet your needs - expandable for the future
- Intuitive front panel design with large LCD display and ergonomic keyboard for ease of use
- Full output protection including I-GUARD system - prevents output being switched on when voltage detected on terminals
- Guaranteed reliability with 3 year warranty as standard

Comprehensive Instrument Calibration

Meeting Workload Requirements

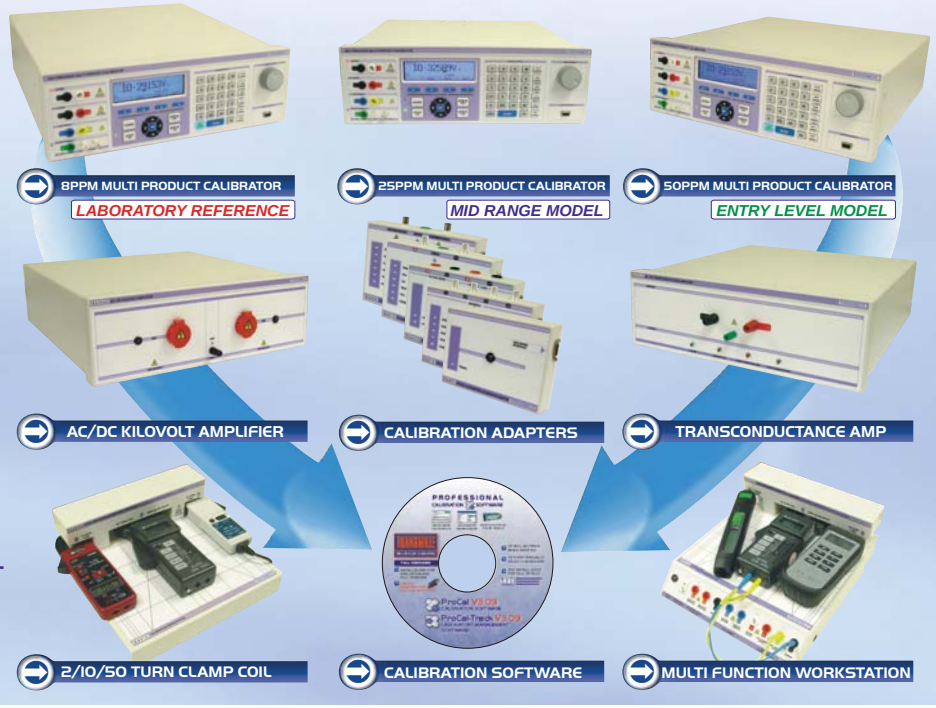
The 3000 Series calibration system has been designed to help you & your business, allowing a wide range of calibration work to be performed quickly, accurately & economically. Modern calibration is a competitive market, and cost effective equipment and software are key considerations.

Meeting the needs of today's quality systems including ISO9000 / ISO17025 require calibration traceable to national standards of a wide range of instrumentation. The 3000 Series calibration system provides the ideal platform to cover these calibration requirements, whether in the laboratory or on site. Every Transmille calibrator and adapter is supplied with UKAS calibration traceable to National standards, and are ready for use out of the box.

Offering the widest workload coverage of any calibration system presently available, the 3000 series is a true class leading solution. The unique concept of external calibration adapters combined with built-in measurement capability dramatically extends the range of instruments that can be cost effectively calibrated.

Automated Calibration & Management Software

ProCal is the genuinely easy to use calibration software which complements the 3000 Series calibration system to provide a complete laboratory solution. Maximum calibration throughput is achieved with multi discipline support. ProCal-Track adds laboratory management control with dynamic job tracking from goods inwards to despatch - streamlines laboratory operation.



CALIBRATES...

- UP TO 7½ DIGIT MULTIMETERS :: 3010
- UP TO 5½ DIGIT MULTIMETERS :: 3041
- UP TO 4½ DIGIT MULTIMETERS :: 3050
- DIGITAL OSCILLOSCOPES TO 600MHz
- CLAMP METERS
- WATT / POWER METERS
- RLC METERS / AC BRIDGES
- POWER SUPPLIES
- INSULATION TESTERS
- PROCESS CONTROL CALIBRATORS
- HIGH RESISTANCE MEASUREMENT
- ELECTROMETERS
- CURRENT SHUNTS
- DATA LOGGERS
- PRESSURE GAUGES
- HV PROBES
- TORQUE SCREWDRIVERS
- FREQUENCY COUNTER/TIMERS
- CHART RECORDERS
- AND MORE...

FOR RCD • LOOP • PAT TESTERS
See the Transmille 3200 Electrical Test Equipment Calibrator Brochure.

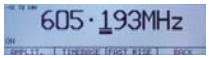
3000 SERIES THE FLEXIBLE SOLUTION FOR YOUR CALIBRATION WORKLOAD

TRANSMILLE SOLUTIONS IN CALIBRATION

- 8 PPM ACCURACY MODEL 3010
- 25 PPM ACCURACY MODEL 3041
- 50 PPM ACCURACY MODEL 3050
- V AC/DC VOLTAGE TO 1025V
- A AC/DC CURRENT TO 30A
- Ω 2&4 WIRE RESISTANCE TO 1GΩ
  PASSIVE & SIMULATED MODES
- F CAPACITANCE TO 10mF
  PASSIVE & SIMULATED MODES
- H INDUCTANCE TO 10H
- Hz FREQUENCY TO 10MHz
- RTD PRT RTD/PRT SIMULATION
- RS 232 RS232 INTERFACE BUILT IN
- GPIB USB GPIB / USB OPTIONS
- W AC/DC POWER CALIBRATION
  WITH POWER HARMONICS
- O OSCILLOSCOPE CALIBRATION
  250MHz • 350MHz • 600MHz OPTIONS
- BUILT IN ADAPTER INTERFACE
  INTEGRATED HIGH ACCURACY MEASUREMENT FUNCTION

THERMOCOUPLE SIMULATION ADAPTER
POWER SUPPLY CALIBRATION ADAPTER
HUMIDITY/TEMPERATURE SENSOR ADAPTER
OSCILLOSCOPE CALIBRATION TEST HEAD ADAPTER
PLUS...HIGH RESISTANCE / pA MEASUREMENT ADAPTER
PA SOURCE ADAPTER
OPTICAL TACHOMETER CALIBRATION ADAPTER
PRESSURE CALIBRATION ADAPTER
TORQUE CALIBRATION ADAPTER

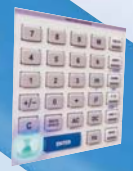
Clear presentation of calibrator outputs & status on a large graphic LCD display for safe & easy operation.



Separate outputs for Voltage, Low Current and High Current minimise lead changing when connecting. Dedicated BNC outputs for oscilloscope (Amplitude / Timebase / Freq. Sweep) and Frequency.

Soft keys provide direct access to the menu commands, unlocking the potential of the 3000 Series calibrators.

Large output on and standby buttons, and useful range up/down buttons also add to the ease of use.



Ergonomic calculator style keypad makes it easy to enter values. Intuitive function keys and key layout makes using the function control section second nature.

Adapter interface for power, control and measurement for the range of calibration adapters.

Built-in source and measurement capabilities incorporating a high linearity A/D converter.

Integrated Calibration Workstation
for clamp meter, insulation testers, process control calibrator, temperature meter & optical tachometer calibration

ADVANCED TECHNOLOGY

The 3000 series calibrators use the latest technology from the temperature stabilised reference to the sub ppm linearity D/A.

DDS (Direct Digital Synthesis) technology is used for generating stable, jitter free wideband AC waveforms. Custom waveforms for use in harmonics calibration are available with the 3041/3010 power options.

An ultra-linear VMOS power amplifer provides a ground breaking 30A capability with *continuous* output available up to 20A. A power efficient design with two-stage cooling has resulted in reduced internal thermal EMFs for superior short term stability whilst reducing fan noise for a more comfortable working environment.

I-GUARD intelligent output protection safeguards the calibrator by testing the output sockets for voltages applied accidentally when switching from *standby* to *output on* - protects your investment from accidental misuse.

PORTABLE

The ultra portable 3000 Series calibrators begin a new era in true on-site calibration. Using the soft, over the shoulder tailored travel case, your calibration system can be taken with you to the calibration work, whether it is in an aircraft hanger, on board a ship or oil rig.

A fast warm up time ensures the 3000 Series will be ready to work wherever you are. Connect to your laptop for a complete automated calibration system.

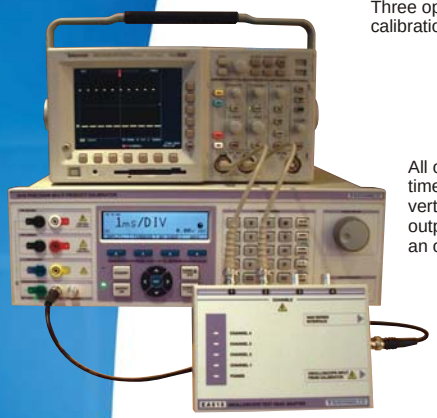
COMPLETE WORKLOAD CAPABILITY

The 3000 Series generates all the outputs required for multimeter calibration, plus options for :
Oscilloscope Calibration including amplitude, time base, fast rise and bandwidth up to 600MHz. A key feature is the ability to support the growing number of oscilloscopes with 50V/Div (300V Pk-Pk) ranges.
AC/DC Power Calibration uses simultaneous generated voltage to 1025V and current to 30A outputs to simulate power up to 30.6kW (1.5MW using the 50 turn coil). Phase angle control up to 359.9° is available.
Harmonics Calibration option available for 3041 & 3010 includes five preset waveforms and support for custom defined harmonics upload using a PC.

RCL Meters can be calibrated using the inductance option, unique to the Transmille 3000 Series.
The passive inductance, resistance & capacitance in the 3000 Series are suitable for measurement using any technique, including **AC Bridges**. For total flexibility simulated resistance and capacitance options are also available.
Frequency Meter calibration up to 10MHz is supported with accuracy to 1ppm
Using the external calibration adapters, **Power Supplies, Process Control Calibrators, Electrometers, Insulation Testers, Pressure Gauges and Transmitters, even Torque Screwdrivers** can be calibrated quickly and efficiently.

3000 SERIES OSCILLOSCOPE CALIBRATION OPTION

SCP250 / SCP350 / SCP600



Three options are available for the 3000 Series calibrators which are suitable for calibration of both analogue and digital storage oscilloscopes.

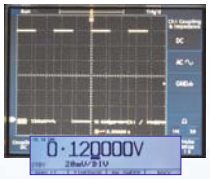
- **250MHz (SCP250) : 3050**
- **350MHz (SCP350) : 3041 / 3010**
- **600MHz (SCP600) : 3041 / 3010**

All options provide the calibration waveforms required for amplitude, timebase and bandwidth including gain and linearity of the horizontal and vertical deflection circuits. To minimise lead changing, the oscilloscope outputs are output from a single BNC connector - for automated calibration an optional 4 channel test head adapter is available.

- **Amplitude to 50V/Div (300V Pk-Pk) - 1,2,5 sequence**
- **Timebase to 2ns**
- **Separate trigger output**
- **All calibration signals from a single BNC**

AMPLITUDE

Easily selected using the softkeys, the calibrator produces either a precision 1kHz square wave or a DC level covering the range from 2mV/Div to 50V/Div in a 1,2,5 sequence. Deviation up to 10% in 0.01% steps can be applied using the digital potentiometer. The calibrator's wide range output, giving up to 300V pk-pk, can be used to directly calibrate the ever increasing number of oscilloscopes with amplitude ranges up to 50V/Div placing it in a class leading position.



TIMEBASE

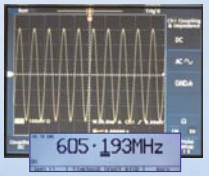
The timebase function of the oscilloscope option provides outputs from 2ns/Div to 5s/Div. Deviation up to 10% in 0.01% steps can be applied using the digital control. To use, simply align the time marker with the graticule display and read the deviation from the % display on the calibrator. The comb waveform used below 100ns is ideal for triggering on both analogue and digital oscilloscopes alike. For faster timebase calibration, a sine wave is produced which makes viewing on bandwidth limited oscilloscopes easier. The timebase output can be used either directly or into a 50 Ohm input.

FAST RISE

A fast rise output is available with a rising edge time of typically 1ns for evaluating overshoot, undershoot and ringing of oscilloscope attenuation and amplifier circuits.

LEVELED SWEEP

The leveled sweep output of the oscilloscope option provides a continuously variable sine wave from 5MHz to 620MHz. A 50kHz reference level waveform is also available to allow the oscilloscope controls to be set to give a 6 graticule height display.



SPECIFICATIONS

Voltage Amplitude	
Range	2mV/Div to 50V/Div
Sequence	1 • 2 • 5
Frequency	1kHz
Accuracy	0.01% ± 5uV
Time Markers	
Range	2ns to 5s
Sequence	1 • 2 • 5
Waveshape	Comb < 100ns
	Sine > 100ns
Accuracy	5ppm
Fast Rise*	1ns typical
** 3041 / 3010 only*	
Leveled Sweep	
Range (SCP250)	5MHz to 250MHz
Range (SCP350)	5MHz to 350MHz
Range (SCP600)	5MHz to 600MHz
Leveled Sweep	600mV into 50Ohms
Reference Level	50kHz
Accuracy	0.5dbm
50kHz Reference	
Frequency Accuracy	30ppm
Level Accuracy	0.5%

See extended specifications for full details

OSCILLOSCOPE CALIBRATION TEST HEAD

EA017

For automating oscilloscope calibration a 4 channel switching test head is available. Connect to the 3000 Series adapter interface and select channel required. For accurate calibration of 50Ohm input oscilloscopes up to 1V/Div a low impedance buffered amplitude output can be selected.

SPECIFICATIONS

Channels	
Input	1
Output	4
Output Impedance	
Direct	As Input
Buffered	Typically 0.2Ω

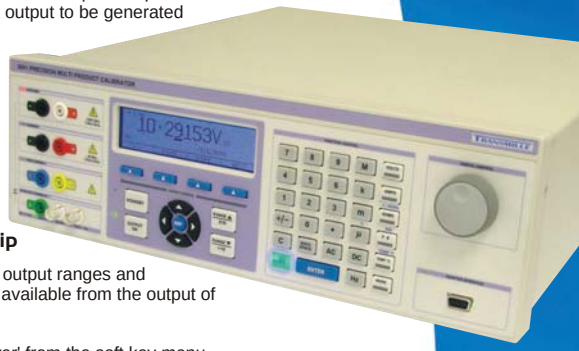
See extended specifications for full details

3000 SERIES POWER CALIBRATION OPTION

PWR50 / PWRSINE / PWRDDS

AFFORDABLE AC/DC POWER CALIBRATION

Three options provide cost effective calibration of power (Watts) and VA ranges on power meters, power/harmonics analysers & clamp meters. The power option for the 3000 series calibrators allows both voltage current output to be generated simultaneously (phantom load) with an adjustable phase angle relationship.

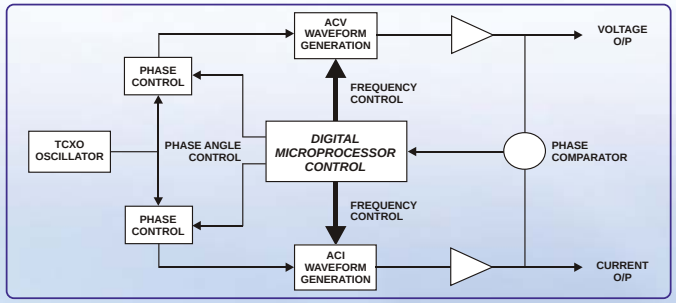


- **3050 : Sine power option (PWR50)**
- **3041/3010 : 2 options**
  PWRSINE : Sine & DC power
  PWRDDS : 5 waveforms+custom & DC
- **Up to 1.5MW (using 50 Turn Clamp Coil)**
- **0° to 359.9° adjustable phase relationship**

Any voltage up to 1025 Volts can be set using the normal output ranges and specification of the calibrator. Currents up to 30Amps are available from the output of the calibrator without the need for an external amplifier.

The power function is extremely easy to use - select 'Power' from the soft key menu, connect the power meter to both the voltage and current output terminals and enter the voltage, current and frequency. Phase angle can be adjusted using the softkeys with a resolution of 0.1°. Power output is calculated & displayed in kW.

The 3000 series calibrator dynamically controls the phase angle between the current and voltage waveforms eliminating errors caused by capacitive or inductive loading experienced when using clamp coils.



Extended Power Range Using The 2 / 10 / 50 Clamp Coil

Combined with the optional clamp coil adapter the power calibration option allows a current of 1500Amps to be simulated, and power to1.5Megawatt (1500Amps x 1000Volts).

Power Harmonics Analyser Calibration Using Programmable Waveforms (Option PWRDDS)

Option PWRDDS for the 3041 and 3010 calibrators allows generation of waveforms with harmonic content for calibrating power meters with power harmonics functions. This includes a set of five fixed waveforms, plus the capability to upload user defined waveforms from a PC allowing waveforms with custom harmonic content to be generated.

kWatt hour meter & Energy Calibration.

Using the 3000 Series VFP the Voltage, current, frequency, phase angle, time and the number of coil turns can all easily be set, click the energy button and the power is turned on for a set period making calibration of kWatt/hours and energy meters easy.

SPECIFICATIONS

DC Power (3041/3010)	
Voltage Range	0 to 1025V
Current Range	300mA to 30A
Resolution 300mA to 2A	200uA
2A to 30A	2mA
Accuracy 300mA to 2A	0.05% ± 0.35mW/Volt
2A to 30A	0.04% ± 3.5mW/Volt
AC Power	
Voltage Range	0 to 1025V
Frequency Range	40Hz to 1kHz
Resolution	
300mA to 2A	200uA
2A to 30A	2mA
Accuracy : 3041/3010	
300mA to 2A	0.05% ± 0.35mW/Volt
2A to 30A	0.05% ± 3.5mW/Volt
Accuracy : 3050	
300mA to 2A	0.1% ± 0.5mW/Volt
2A to 20A	0.1% ± 5mW/Volt
Phase Angle Resolution	0.1°
Phase Accuracy	0.1°

See extended specifications for full details

3000 SERIES INDUCTANCE CALIBRATION OPTION

OPTION IND (for 3041/3010)

By incorporating this useful and easy to use option the work load of the calibrator can be increased to allow calibration of RLC (Resistance, Inductance and Capacitance) meters and bridges and also allows calibration of DMMs with inductance measurement ranges.

Incorporates 8 fixed values, including 19mH and 29mH for '3' range meters to allow testing of these types of meters at points which can verify their linearity at near full scale points.

- **8 precision inductance values from ImH to IOH**
- **For calibration of RCL meters & bridges**
- **Cost effective option**
- **Automated Calibration Using ProCal Software**

SPECIFICATIONS	
Range	1mH • 10mH • 19mH • 29mH 50mH • 100mH • 1H • 10H
Accuracy	0.5%
Calibration frequency	1kHz

See extended specifications for full details

Measured Value Stored For Accurate Calibration

When the 3000 series inductance option is calibrated, the exact value of the inductor is measured as Ls up to 1H, Lp above at 1kHz and stored in memory. This value is recalled and displayed each time a specific inductor is selected, allowing accurate calibration to be performed.

3000 SERIES SIMULATED RES/CAP OPTION

OPTION SIMRC (for 3041/3010)

For dependable readings regardless of the measurement technique and the ultimate in performance the 3000 series uses precision passive resistors and capacitors, with calibrated values for both 2 and 4 wire connections. Using passive standards also allows confident calibration of AC bridges and removes any difficulty with tracability.

For the 3010 and 3041 an active simulated option provides for resistance calibration between cardinal points and gives a continuous resistance range from 30 ohms to 10Mohms, with decade capacitance points up to 10mF.

3000 SERIES RTD / PRT SIMULATION OPTION

OPTION PRT (for 3041/3010)

The PRT option makes the calibration of high accuracy resistance thermometers easy. Simply connect in place of the probe and compare the displayed value with the calibrated value from the 3000 series calibrator. Because the calibrator uses passive precision resistors, reliable readings are guaranteed regardless of the measurement technique used by the thermometer.

- **Ultra Accurate Resistance Value**
- **2, 3 or 4 Wire Simulation of Probe**
- **8 Passive Resistance Values**
- **Temperature Standard : EN60751:1996 / IEC 60751:1983**
- **Automated Calibration Using ProCal Software**

SPECIFICATIONS	
Range	-100°C • 0°C • 30°C • 60°C 100°C • 200°C • 300°C • 800°C
Nominal resistance value	60.25 • 100 • 111.67 • 123.24 138.5 • 175.84 • 247.04 • 375.51 Ohms
Accuracy	0.02°C to 0.08°C

See extended specifications for full details

Measured Value Stored For Accurate Calibration

When the 3000 series PRT option is calibrated, the exact temperature values on the ITS90 scale for Pt-385 resistors is stored in non volatile memory. This value is recalled and displayed each time a specific resistor is selected, allowing accurate calibration to be performed.

3000 SERIES PRECISION LEAD SET OPTION

OPTION 3000LEAD

- **Comprehensive 19 piece test lead & adapter set**
- **Low thermal gold/copper voltage leads (0.7uV)**
- **High current 32A leads**
- **All 4mm plugs with safety shrouds**

A comprehensive collection of test leads and adapters is provided to cover requirements from low level DC through to high current and high resistance measurements.

The leads and materials supplied in this measurement set have been carefully selected to minimise connection/lead errors. The safety of the leadset is ensured by the use of non-retractable shrouded connectors for the voltage test lead set.

The leads are stackable to allow connections to be commoned together where required.

QTY	USE	DESCRIPTION	SPECIFICATIONS
1 pair	Voltage	Black & White leads with low thermal 4mm non-retractable shroud safety plugs - gold plated	1m • 1000VAC/16A • 0.7uV thermals • Gold plated
1 pair	Current	Black & Red leads fitted each end with 4mm retractable shroud safety plugs	1m • 150VAC • 16A • Nickel plated brass
1 pair	High Current	Low resistance Blue & Yellow leads fitted each end with 4mm retractable shroud safety terminals.	1m • 150VAC • 32A • Nickel plated brass
1	Oscilloscope / AC	Coax lead fitted each end with BNC connectors	1m • 300VAC • 0.5A • Silver plated
4	Adapters	Low thermal Black & Red 4mm plug to spade adapters	Gold plated
4		Unshrouded open end adapters	Gold plated
2		4mm plug to cable adapters	Gold plated
2		BNC to 4mm adapters	

3000 SERIES THERMOCOUPLE SIMULATION ADAPTER

EA001

- **Superior Thermocouple Simulation Using External Adapter**

Temperature gradients / thermal EMFs which can be introduced by internally mounted thermocouple simulation methods are one of the greatest sources of error with thermocouple temperature calibration.

For the ultimate in accuracy, Transmille has designed a dedicated external unit. This keeps the electronics required to generate the low level signals used for thermocouple simulation as close as possible to the measuring input of the thermometer. This allows the signal to be as free from electrical noise as possible, and also eliminates errors caused by heat generated by surrounding electronics in the calibrator.

- **Direct Simulation of 8 Thermocouple Types**
- **Simulates any T/C type using Virtual Front Panel Software**
- **Temperature Standard - EN60584-I (1996) : Scale - ITS90**
- **Uses neutral (copper) thermocouple plug -** For simulation of any thermocouple type without the need for compensation cables, avoiding introduction of errors.
- **CJC sensor built into thermocouple plug** The ultimate in accurate CJC compensation - measures the temperature at the closest point to the cold junction.

Special care has been taken over the cold junction compensation - a common source of errors in thermocouple calibration. The cold junction compensation (CJC) sensor is mounted in the thermocouple plug itself. By measuring the cold junction at the instruments input allows any type of thermocouple to be simulated without using compensation cables.

SPECIFICATIONS		
Type	Range	Accuracy
J	-180°C to 150°C	0.05
	150°C to 750°C	0.30
K	-140°C to 200°C	0.10
	200°C to 1340°C	0.35
T	-250°C to 400°C	0.20
R	-50°C to 500°C	0.20
	500°C to 1700°C	1.00
S	-50°C to 1200°C	0.60
	1200°C to 1700°C	1.60
B	0°C to 1200°C	0.10
	1200°C to 1820°C	1.30
N	-270°C to 260°C	0.10
	260°C to 1300°C	0.40
E	0°C to 800°C	0.80

	3050			3041			3010		
FUNCTION	**RANGE**	**RESOLUTION**	**ACCURACY**	**RANGE**	**RESOLUTION**	**ACCURACY**	**RANGE**	**RESOLUTION**	**ACCURACY**
DC Voltage	±0 to 1025V	0.1uV	50ppm	0 to 1025V	0.1uV	25ppm	0 to 1025V	10nV	8ppm
Kilovolt Amplifier (EA3024)*	-	-	-	1 to 10kV	10mV	0.5%	1 to 10kV	10mV	0.5%
DC Current	±0 to 20A	100pA	0.01%	0 to 30A	100pA	50ppm	0 to 30A	10pA	50ppm
pA Source Adapter (EA013)*	-	-	-	0 to 100uA	0.1pA	200ppm	0 to 100uA	0.1pA	200ppm
Transconductance Amplifier (EA3012)	-			10 to 100A	100uA	0.08%	10 to 100A	100uA	0.08%
AC Voltage	0 to 1020V	1uV	0.035%	0 to 1020V	1uV	0.035%	0 to 1020V	100nV	150ppm
	10Hz to 100kHz			10Hz to 500kHz			10Hz to 500kHz		
Kilovolt Amplifier (EA3024)*	-	-	-	1 to 5kV	10mV	0.8%	1 to 5kV	10mV	0.8%
AC Current	0 to 20A	1nA	0.07%	0 to 30A	1nA	0.06%	0 to 30A	100pA	0.04%
	10Hz to 10kHz	-	-	10Hz to 10kHz			10Hz to 10kHz		
Transconductance Amplifier (EA3012)*	-	-	-	10 to 70A	100uA	0.08%	10 to 70A	100uA	0.08%
Resistance (Passive)	0Ω to 100MΩ	-	0.005%	0Ω to 1GΩ	-	40ppm	0Ω to 1GΩ	-	8ppm
Resistance (Simulated)*	-	-	-	30Ω to 10MΩ	100ppm	0.03%	30Ω to 10MΩ	100ppm	0.01%
Capacitance (Passive)	10nF to 1uF	-	0.4%	1nF to 10uF	-	0.25%	1nF to 10uF	-	0.25%
Capacitance (Simulated)*	-	-	-	100uF to 10mF	-	0.7%	100uF to 10mF	-	0.7%
Inductance (Option)*	-	-	-	1mH to 10H	-	0.50%	1mH to 10H	-	0.50%
Frequency (Std/HiAcc Option*)	10Hz to 10MHz	-	20ppm	1Hz to 10MHz	-	20ppm/1ppm	1Hz to 10MHz	-	20ppm/1ppm
Pulse Width / Duty Cycle	-	-	-	10 to 90%	-	1ppm	10 to 90%	-	1ppm

Temperature	
Thermocouple Simulation (EA001)	Types: J, K, T, R, S, B, N, E • Accuracy 0.05°C • CJC: Auto & Manual - Accuracy 0.1°C • Connection Neutral (Copper) Thermocouple Plug
PRT/RTD (OPTION PRT) (3041/3010)	Range: -100°C to 800 °C • Accuracy 0.01%
Oscilloscope Calibration (SCP250/SCP350/SCP600)	
Ampltude	Range: 2mV/Div (12mV Pk-Pk) to 50V/Div (300V Pk-Pk) • 1kHz Square Wave or DC • Accuracy 0.01% ± 20uV
Timebase	Range: 5s to 2ns (Option SCP600) • 5s to 5ns (Option SCP350/SCP250) • Accuracy 5ppm
Leveled Frequency Sweep	Range: 50kHz, 5MHz to 250/350/600MHz (dependant on option installed) • Level : 600mV Pk-Pk into 50 Ohms • Accuracy 0.5dbm
Trigger Output	Dedicated BNC trigger output for timing & amplitude waveforms
Power Calibration (PWR50/PWRSINE/PWRDDS)	
AC Power	Power Direct / 50 Turn Coil: 20.8kW / 1.04MW (3050): 30.7kW / 1.53MW (3041/3010) • Accuracy 0.05% ± 3.5mW/Volt
Phase / Frequency Range	Range: 0 to 359.9° • Resolution 0.1° • Accuracy 0.1° • Frequency Range: 10Hz to 1kHz
DC Power	Power Direct / 50 Turn Coil: 30.7kW / 1.53MW (3041/3010) • Accuracy 0.04% ± 3.5mW/Volt
Optical Tachometer Calibration (3041/3010)	
Optical Tachometer Adapter (EA003)	Range: 60RPM to 60,000RPM • Accuracy 50ppm
Power Supply Calibration (3041/3010)	
PSU Calibration Adapter EA3023 (EA3025)	Voltage Measurement 0 to 63V (100V) • Current Load 0 to 3A (60A)
Pressure Calibration (3041/3010)	
Pressure Calibration Modules (TPA001 to TPA018)	Range: 25mBar to 700Bar (10,000PSI) • Accuracy From 0.04%
Torque Calibration (3041/3010)	
Torque Calibration Adapter (EA014)	Range: 0 to 20Nm : Accuracy 0.2%
pA / High Resistance Calibration (3041/3010)	
pA / High Resistance Measurement Adapter (EA008)	5 Ranges: 10nA to 100uA • Resolution 1pA • Accuracy 0.02% ± 3 Counts
pA Source Adapter (EA013)	5 Ranges: 10nA to 100uA • Resolution 1pA • Accuracy 0.02% ± 3 Counts
Clamp & Power Meter Calibration	
2/10/50 Turn Clamp Coil (EA002)	3 Coils: 2 • 10 • 50 Turn : Magnetically Balanced Design: 10mm (2/10 Turn) 25mm (50 Turn) Internal Dimensions: Accuracy: 0.24%
Multi Function Workstation (EA015) (3041/3010)	
Insulation Tester Calibration - Insulation Resistance	Range: 0 to 2GOhms • Resolution 10kOhm • Max. 1000V • Accuracy 0.2% to 5MOhm, 3% above
Continuity Resistance	Ranges: 1.9, 10, 19, 100, 190, 1kOhms • Accuracy 0.2% ± 50mOhms
Test Voltage Measurement	Ranges: 50V, 100V, 250V, 500V, 1kV @ 1mA Load • Accuracy 0.5% ± 2 Counts
Process Control Calibrators	
Voltage Measurement	Ranges(Resolution): 100mV(1uV), 1V(10uV), 10V(100uV) • Accuracy 0.02% ± 2 Digits
Current Measurement	Ranges: 30mA • Accuracy 0.03% ± 2 Digits
Voltage, Current & Temperature Source	See Calibrator Specifications
Clamp Meter / Temperature / Optical Tachometer	See Clamp Coil / Thermocouple / Tacho Adapter Specifications

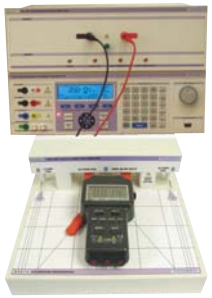
GENERAL SPECIFICATIONS			
Warm Up Time	Double the time since last turned on up to 20 minutes maximum		
Interface	RS232 • GPIB (option) • USB (option)	Safety	Designed to EN61010-1:2001
Line Power	110 / 230V (28Watts standby)		CE Marked
Dimensions / Weight / Warranty	45cm x 44cm x 14cm / 16.5kg / 3 Years warranty parts & labour cover	EMC	EN55011:1998
			EN61326:1998

For extended specifications contact your local representative or visit **www.transmille.com**

Best 1 year absolute accuracy including cal bration uncertainties : * Optional : Due to continuous development specifications may be subject to change.

3000 SERIES 2 /10 / 50 CLAMP COIL ADAPTER

EA002



Designed for the calibration of both wound AC & Magnetic field hall effect AC/DC clamp meters the Transmille current coil offers several unique features built in a robust construction, complete with alignment table for ease of use.

- **Calibrates Clamp Meters up to 1000A with 3050**
- **Calibrates Clamp Meters up to 1500A with 3041/3010**
- **Calibrates Clamp Meters up to 2000A with EA3012**
- **2 / 10 / 50 Turn Coils**
- **High Accuracy AC/DC Balanced Design**
- **Wide range of clamp sizes covered**
- **Includes alignment table for repeatable readings**

Innovative Closed Construction Design

Three coils in one provide the ability to calibrate a wide range of coils, from small lower clamps down to 10mm jaw diameter to larger current clamps. The low inductance, low resistance properties allow the calibrators to easily drive the coil, giving plenty of overhead for calibrating older clamps. The coils are fully enclosed in a strong, robust and compact plastic enclosure preventing mechanical damage. This rugged design is ideal for using the coil on-site and in harsh environments.

SPECIFICATIONS

Configuration	2 Turn (LHS) 10 Turn (RHS) 50 Turn (Centre)
Type	High Accuracy Balanced
Internal Dimensions	10mm (2/10 Turn) 25mm 50 Turn
Maximum Current	40A
Duty Cycle @ 20A	70% On / 30% Off
Maximum RMS Voltage	4V
Frequency Range	DC to 500Hz
Accessories	Detachable platform with alignment marks (Size 275x295x45mm)

See extended specifications for full details

3000 SERIES OPTICAL TACHOMETER CALIBRATION ADAPTER

EA003 (for 3041/3010)

- **High intensity LED light source**
- **Direct keyboard input in RPM**
- **Range : 60 to 60,000 RPM**

SPECIFICATIONS

Light source	High intensity LED
Range	60 to 60,000 RPM
Duty Cycle	20% on / 80% off
Accuracy	50ppm

See extended specifications for full details

Using a high intensity LED light source, optical tachometers can be calibrated quickly and easily. Simply enter the RPM value using the calibrator keypad or use with ProCal software for automated calibration.

3000 SERIES HUMIDITY & TEMPERATURE SENSOR ADAPTER

EA016 (for 3041/3010)

SPECIFICATIONS

Humidity Accuracy	10% to 90% 2%
Temperature Accuracy	0°C to 50°C 0.3°C

See extended specifications for full details

- **Humidity measurement 10% to 90%**
- **Temperature measurement 0°C to 50°C**

Ideal for monitoring laboratory environment allowing measurements to be made automatically and stored with calibration results.

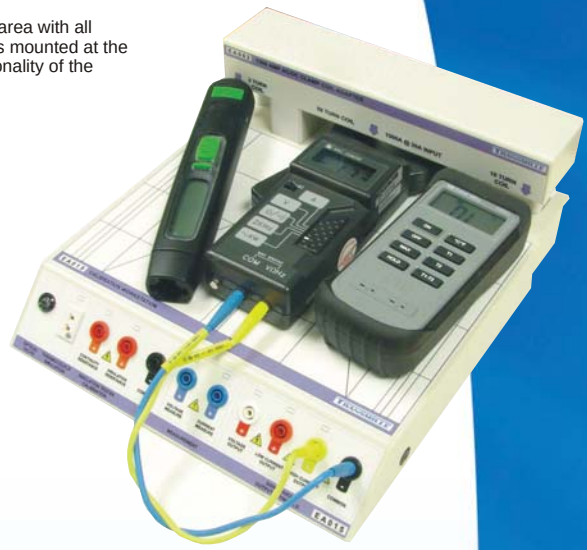
3000 SERIES MULTI FUNCTION WORKSTATION

(For 3041/3010) EA015

The calibration workstation provides a central work area with all connections routed conveniently to remote terminals mounted at the front of the adapter. The adapter extends the functionality of the calibrator to include :

- 2 / 10 / 50 TURN CLAMP COIL
- INSULATION RESISTANCE
- CONTINUITY RESISTANCE
- INS. TEST VOLTAGE MEASUREMENT
- CONTINUITY CURRENT MEASUREMENT
- OPTICAL TACHOMETER CALIBRATION
- THERMOCOUPLE SIMULATION
- VOLTAGE MEASUREMENT : 3 RANGES
- CURRENT MEASUREMENT TO 30mA
- CALIBRATOR OUTPUT ROUTING

VOLTAGE, CURRENT AND HIGH CURRENT TO DEDICATED WORKSTATION TERMINALS



Incorporating the advanced clamp coil, thermocouple simulation and tachometer calibration adapters as well as process control source / measure capabilities, this workstation adapter provides a versatile platform for efficient calibration of a wide range of equipment.

Clamp Meters

Using the built in 2, 10 and 50 turn coils, clamp meters can be accurately and quickly calibrated. Using a high accuracy balanced design both wound (AC only) & Magnetic field (hall effect) AC/DC clamp meters can be calibrated. Three coils in one provide the ability to calibrate a wide range of coils, from small lower clamps down to 10mm jaw diameter to larger 2000A clamps.

Insulation Testers

Insulation tester calibration is a common requirement and is now easy to perform using the workstation. Insulation to 2GOhms @ 1000V and continuity to 1kOhm is available from dedicated terminals. Using the measurement capabilities of the adapter interface, the workstation also provides insulation test voltage measurement to 1000V and continuity current measurement.

Process Control Calibrators

Source/measure process control calibrators are commonplace in industry and previously required several references to calibrate. The workstation integrates all the functions required to both source and measure the required signals.

Digital Thermometers

Digital thermometers can be easily calibrated accurately using the workstation's built in thermocouple simulation output with automatic cold junction compensation.

Optical Tachometers

Using a high intensity LED light source, optical tachometers can be calibrated quickly and easily using the workstation. Simply type in RPM value using the calibrator keypad or use with ProCal software for automated calibration.

SPECIFICATIONS

Clamp Meter Calibration	
Range	2 / 10 / 50 Turn Coil Up to 1500A
Insulation Tester Calibration	
Continuity Resistance	Up to 1kOhm
Insulation Resistance	Up to 2GOhms / 1000V
Continuity Current Measurement	Up to 300mA
Insulation Test Voltage Measure	Up to 1000V
Digital Thermometer Calibration	J, K, T, R, S, B, N, E
Process Control Calibration	
DCV Measurement	100mV/1V/10V Ranges
DCI Measurement	30mA Range
DCV/I Source From Calibrator	AC/DC 1000V • 30A
Optical Tachometer Calibration	
Range	60 to 60,000 RPM

See extended specifications for full details

3000 SERIES 3A POWER SUPPLY CALIBRATION ADAPTER
EA3023 (for 3041/3010)

An essential option for simplifying calibration of power supplies. The PSU adapter can measure the output voltage and also provides a precision electronic current load allowing volts, current and even output resistance to be calibrated by one compact unit. 4 wire connection ensures accuracy and repeatability.

MEASURING PSU OUTPUT VOLTAGE
The adapter measures the power supply's output voltage using the internal high accuracy A/D converter built into the 3000 Series.

CALIBRATING PSU CURRENT METER
The adapter provides a precision electronic load controlled by the calibrator. To calibrate the power supply output current meter, simply set the required load current and record the meter reading.

DETERMINING PSU OUTPUT RESISTANCE/VOLTAGE DROP
By measuring a power supply's on load / off load voltages, the output resistance of the PSU can easily be measured.

The operation is controlled using a PC running either the Virtual front panel program (supplied) or ProCal software. ProCal procedure wizard available for automatic procedure generation.

- **Measure Output voltage to 63 Volts**
- **Active Current load to 3 Amps**
- **Measures output Resistance**
- **Connects to Adapter Interface on calibrator**
- **Used with virtual front panel or ProCal Software**

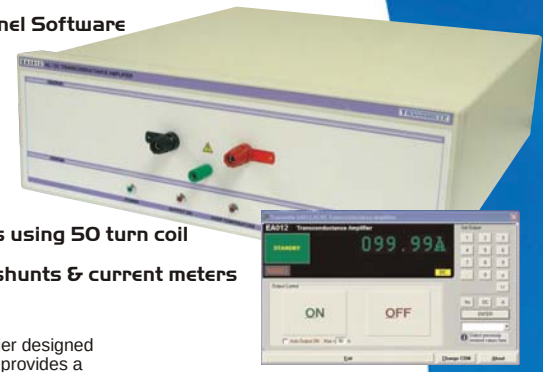
SPECIFICATIONS

Voltage Measurement Resolution Best 1 Year Accuracy	0 to 63V 10mV ±0.02% of Setting
Current Load Range Best 1 Year Accuracy	0 to 3A ± 0.05% of Setting
Notes	Virtual Front Panel (supplied) or ProCal Control

See extended specifications for full details

3000 SERIES AC / DC TRANSCONDUCTANCE AMPLIFIER
EA3012 (for 3041/3010)

- **Controlled by ProCal or Virtual Front Panel Software**
- **Stackable for higher currents**
- **0.08% Accuracy**
- **Low noise linear MOSFET technology**
- **Up to 100A DC • 75A AC Output**
- **Calibration of up to 2000A clamp meters using 50 turn coil**
- **Ideal for calibrating high power current shunts & current meters**



The EA3012 is a powerful linear transconductance amplifier designed exclusively for use with the 3000 Series calibrators which provides a cost effective solution to calibrating high currents instruments. Connecting to the 3000 Series calibrator using the feature connector, the EA3012 extends the output current range to 100A DC / 75A AC - higher currents are available by paralleling EA3012 amplifiers as required to give the current output needed.

Use of linear technology throughout gives a very low noise output completely free from switching spikes. The latest in high power MOSFET design ensures reliable and stable operation even into inductive loads. Long term accuracy is assured by using precision foil resistors and a custom manufactured internal shunt.

SPECIFICATIONS

AC Output DC Output AC/DC Accuracy Compliance Voltage Frequency	70A Maximum 100A Maximum 0.08% 6V Pk-Pk DC to 400Hz
Power Consumption Cooling	1kW Internal Fan

See extended specifications for full details

3000 SERIES 60A POWER SUPPLY CALIBRATION ADAPTER
EA3025 (for 3041/3010)

Extending on the capabilities of the EA3023, the EA3025 provides an easy to use solution for the calibration of high current power supplies. This adapter overcomes many of the problems associated with measuring higher output currents required

Traditional techniques of using high current low value load resistors and current shunts can result in unstable/inaccurate readings even with small voltage fluctuations from the power supply or variations in connection and lead resistance. The manual nature of this method of calibration is both time consuming and prone to accidental damage of the load resistor and measurement equipment.

The three advantages of using the EA3025 are :

1) Provides an accurate, stable electronic current load regardless of the power supply output voltage and lead/ connection resistances.

2) Removes the need for high power load resistors of appropriate values

3) Allows automation for more efficient calibration

- **Measure Output voltage to 100 Volts**
- **Active Current load to 60 Amps**
- **Measures output Resistance**
- **Applications include Battery & UPS testing**
- **Connects to Adapter Interface on calibrator**
- **Used with virtual front panel or ProCal Software**

SPECIFICATIONS

Voltage Measurement Resolution Best 1 Year Accuracy	0 to 100V 10mV ±0.02% of Setting
Current Load Range Best 1 Year Accuracy	0 to 60A ± 0.05% of Setting
Notes	Virtual Front Panel (supplied) or ProCal Control

See extended specifications for full details

3000 SERIES AC / DC KILOVOLT AMPLIFIER
EA3024 (for 3041/3010)

The EA3024 kilovolt amplifier provides the solution to the calibration of high voltage probes and dividers. The amplifier/calibrator combination is used with Virtual Front Panel (supplied) or ProCal software.

- **DC Output 1 to 10 kVolts**
- **AC Voltage 1 to 5 kVolts**
- **Controlled by ProCal or Virtual Front Panel Software**

Connect for DC or AC output is via independent sockets, with each socket having an individual LED indicator. The ground connection is a 4mm terminal post.

SPECIFICATIONS

AC Output DC Output AC/DC Accuracy Output Current Frequency	5kV Maximum 10kV Maximum 0.5% 100uA DC / 40 to 60Hz

See extended specifications for full details

3000 SERIES PRESSURE MEASUREMENT MODULES

TPM001 to TPM018 & OPTION PUMP (for 3041/3010)

The 3041 and 3010 support pressure calibration using a range of 17 available pressure modules, which connect directly to the calibrator. The pressure modules cover the range from 25mBar to 10000Bar. A 5psi differential module and a ± 1Bar vacuum module are available. A hand pressure/vacuum pump is available as an option to generate pneumatic pressure up to 60Bar and vacuum down to -0.95Bar.

- **Pressure measurement from 25mBar to 10,000PSI.**
- **Accuracy to 0.04% (dependant on pressure module)**
- **Optional Hand Pressure/vacuum pump available.**
- **Direct connection to Calibrator adaptor interface**
- **Use with VFP software or ProCal**
- **Supports all pressure units**

SPECIFICATIONS	
Pressure Range	25mB to 10,000 PSI (Dependant on Transducer)
Accuracy	From 0.04%
Hand Pump	-0.95 Bar to 60 Bar

See extended specifications for full details

Pressure modules are supplied with calibration coefficients, up to 3 coefficients can be stored into the calibrator to allow direct display of pressure. An unlimited number may be stored in the VFP or ProCal software. Calibration of a pressure gauge can easily be performed by connecting the hand pump to both the pressure module and the gauge under test, apply pressure and compare readings from the gauge against the reference pressure module for both rising and falling pressure.

3000 SERIES TORQUE CALIBRATION ADAPTER

EA014 (for 3041/3010)

- **Accuracy 0.2%**
- **Easy to Use with Virtual Front Panel or ProCal Software**
- **Supports different units e.g. mNm, ftlb, etc.**

By connecting a torque calibration adapter to the 3000 series calibrator torque calibration can be performed. Housing an external transducer for torque calibration allows torque screwdrivers up to 20Nm to be calibrated.

Operation is controlled from the interface using either the Virtual front panel program or ProCal software. The software reads back the voltage signal from the transducer which is converted to torque units and displayed on the PC screen.

SPECIFICATIONS	
Torque Range	0 to 20Nm
Accuracy	0.2%

See extended specifications for full details

3000 SERIES CARRY CASE / TRANSIT CASE

OPTION SOFTCASE / OPTION TRANCASE

Soft carry case - for on site calibration

Designed for carrying the 3000 Series calibrators when working on-site, the soft carry case includes side pockets, a large top pocket and carry strap.
The lightweight design of the calibrator allows easy carrying of the unit.

Robust transit case - suitable for shipping

Designed for transporting the 3000 Series calibrators this rugged transit case is suitable for shipping the 3000 series as well as protecting the calibrators in particularly harsh environments (oil rigs etc.). The hard wearing design includes extra corner protection and a locking mechanism.

TRANSMILLE 3000 SERIES HIGH RESISTANCE/pA MEASUREMENT ADAPTER

EA008 (for 3041/3010)

- **Accurate current measurement down to pico amp levels**
- **Ideal for high value resistance measurement to ITOhm**
- **Five ranges from IOnA to IOOuA**
- **Supplied with VFP Software**

The high resistance / pA measurement adapter eliminates the need for a separate electrometer instrument. The low cost EA008 provides 5 current measurement ranges down to 10nA with a resolution of 1pA and incorporates a 'virtual ground' input, avoiding errors due to input impedance.

Using the high voltage output from the 3000 Series calibrator together with the current measurement capability of the EA008 allows high accuracy resistance measurements to be made at any voltage up to 1000V.

The virtual front panel program supplied as standard with the adapter provides a familiar user interface with all the features such as null, filter and auto range.

Using the popular ProCal calibration software, the EA008 adapter can be used with automated procedures for comprehensive calibration of pA signals or high resistances.

SPECIFICATIONS	
Ranges Resolution	10nA • 100nA • 1uA • 10uA • 100uA 1pA • 10pA • 100pA • 1nA • 10nA
Accuracy	0.5%
Operation	Virtual front panel or ProCal software

See extended specifications for full details

3000 SERIES PICOAMP SOURCE ADAPTER

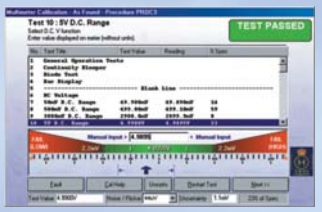
EA013 (for 3041/3010)

- **Ideal for calibrating electrometers**
- **Source accurate current down to pico amp level**
- **Low open circuit compliance voltage**
- **Safe to use on sensitive input circuits.**
- **Supplied with VFP Software**

Provide accurate calibration of sensitive electrometers and low level pico amp meters safely & quickly with this purpose designed option.

A unique and ingenious circuit designed to convert the accurate voltage output from the calibrator into low noise precision currents without the use of the destructive high voltages and unstable high value resistors often used. Yet another example of Transmille's pioneering ideas and designs for providing solutions to some of the common problems faced by calibration laboratories everywhere.

Automate Electrometer Calibration with ProCal software



SPECIFICATIONS	
Ranges Resolution	10nA • 100nA • 1uA • 10uA • 100uA 1pA • 10pA • 100pA • 1nA • 10nA
Accuracy	0.5%
O/C Compliance	10V
Operation	Virtual front panel or ProCal software

See extended specifications for full details

PROFESSIONAL CALIBRATION AND LABORATORY MANAGEMENT SOFTWARE

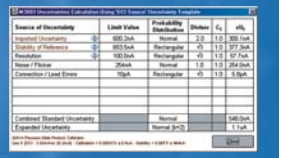
AUTOMATED CALIBRATION WITH EASY TO USE SOFTWARE FOR WINDOWS® 98/ME/XP

TRANSMILLE
SOLUTIONS IN CALIBRATION

THE COMPLETE CALIBRATION SOLUTION

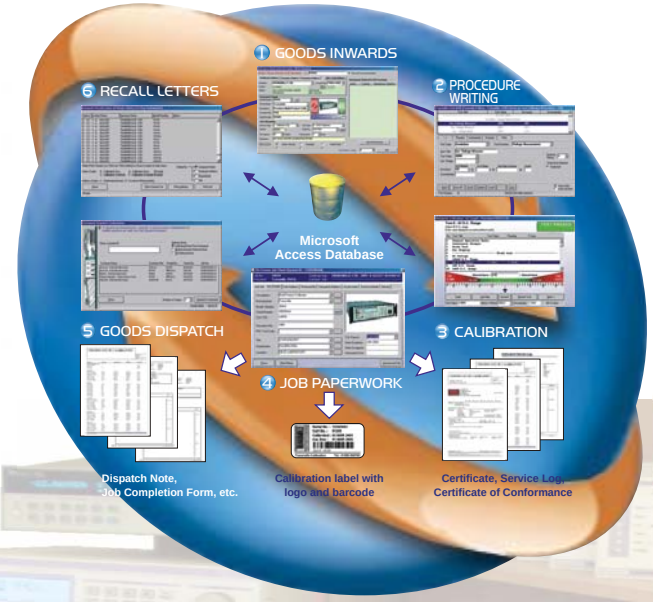
LABEL PRINTING & BARCODE SUPPORT

GRAPHICAL MEASUREMENT SCREENS



ACCREDITED (ISO17025) / TRACEABLE / CONFORMANCE / SAFETY CERTIFICATES, TEST REPORTS WITH COLOUR LOGOs

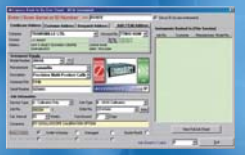
FLEXIBLE UNCERTAINTY CALCULATION METHODS



TOTAL LABORATORY MANAGEMENT

LABEL PRINTING & BARCODE SUPPORT

COMPREHENSIVE VIRTUAL JOB SHEET



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- CONTROLS A WIDE RANGE OF INSTRUMENTS USING GPIB / RS232 INTERFACE
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3000 Series Virtual Front Panel

The Virtual Front Panel allows full control of all calibrator functions from a P.C.

Expands the functionality of the 3000 Series calibrators (with optional adaptors).

The World's most portable calibration system

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- MULTI LANGUAGE

TRANSMILLE :: THE CALIBRATION SPECIALISTS

Transmille has over a decade's experience in calibration and instrumentation design & manufacture. Our products are in use throughout the world in both commercial and military laboratories, service centers and production facilities. Our reputation for innovation, reliability & value is second to none with complete solutions including instrumentation, software, support & training.

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UKAS CALIBRATION
0324

ORDERING INFORMATION

3010	**3010 MULTI PRODUCT CALIBRATOR (8ppm) + UKAS Calibration Certificate**	
3010-SYS	**3010 MULTI PRODUCT CALIBRATOR (8ppm) + UKAS Calibration Certificate** WITH PWRSINE, PRT, EA001(THERM) AND SIMULATED RESISTANCE/CAPACITANCE OPTIONS INC. UKAS	
3041	**3041 MULTI PRODUCT CALIBRATOR (25ppm) + UKAS Calibration Certificate**	
3041-SYS	**3041 MULTI PRODUCT CALIBRATOR (25ppm) + UKAS Calibration Certificate** WITH PWRSINE, PRT, EA001(THERM) AND SIMULATED RESISTANCE/CAPACITANCE OPTIONS INC. UKAS	
INTERNAL OPTIONS	OPTION PWRSINE	AC (SINE) / DC POWER CALIBRATION OPTION
	OPTION PWRDDS	AC/DC DDS SYNTHESISED POWER OPTION
	OPTION SCP350	350MHz OSCILLOSCOPE OPTION
	OPTION SCP600	600MHz OSCILLOSCOPE OPTION
	OPTION PRT	PRT/RTD SIMULATION OPTION
	OPTION IND	INDUCTANCE CALIBRATION OPTION
	OPTION FRQ	1ppm HIGH STABILITY CRYSTAL REFERENCE
	OPTION SIMRC	SIMULATED RESISTANCE & CAPACITANCE OPTION
EXTERNAL OPTIONS	OPTION EA001	THERMOCOUPLE SIMULATION ADAPTER
	OPTION EA002	2/10/50 TURN CLAMP COIL + ALIGNMENT PLATFORM + STD Cert
	OPTION EA003	OPTICAL TACHOMETER CALIBRATION ADAPTER
	OPTION EA008	HIGH RESISTANCE / pA MEASUREMENT ADAPTER*
	OPTION Ea013	pA SOURCE CALIBRATION ADAPTER*
	OPTION EA014	TORQUE CALIBRATION ADAPTER* + STD Cert
	OPTION EA015	MULTI FUNCTION WORKSTATION
	OPTION EA016	HUMIDITY & TEMPERATURE SENSOR + STD Cert
	OPTION EA017	4 CHANNEL OSCILLOSCOPE TEST HEAD
	OPTION EA3012	AC/DC TRANSCONDUCTANCE AMPLIFIER)*
	OPTION EA3023	3A/63V POWER SUPPLY CALIBRATION ADAPTER*
	OPTION EA3024	AC/DC KILOVOLT AMPLIFIER*
	OPTION EA3025	60A/100V POWER SUPPLY CALIBRATION ADAPTER*
	OPTION TPA001 to TPA018	PRESSURE CALIBRATION MODULES - SEE WEB SITE FOR LIST
	OPTION PUMP	PRESSURE HAND PUMP

* Supplied complete with VFP software. All products supplied with UKAS certificate unless otherwise specified.

3050	**3050 MULTI PRODUCT CALIBRATOR (50ppm)** **Complete with THERMOCOUPLE ADAPTER & UKAS Calibration Certificate**	
INTERNAL OPTIONS	OPTION SCP250	250MHz OSCILLOSCOPE OPTION
	OPTION PWR50	AC/DC POWER CALIBRATION (SINE) OPTION
EXTERNAL OPTION	OPTION COIL	2/10/50 TURN CLAMP COIL WITH ALIGNMENT PLATFORM

ACCESSORIES

OPTION SOFTCASE	SOFT CARRY CASE
OPTION TRANCASE	HARD TRANSIT CASE
OPTION 3000LEAD	PRECISION LEAD SET
OPTION USB	RS232 TO USB CONNECTION LEAD
OPTION GPIB	GPIB INTERFACE OPTION
OPTION RACK	19inch RACK MOUNT KIT

SOFTWARE

3000VFP	3000 SERIES VIRTUAL FRONT PANEL
PC-SU	PROCAL PROFESSIONAL CALIBRATION SOFTWARE
MCD	MULTIMETER CALIBRATION PROCEDURE CD
ECD	ELECTRICAL TEST EQUIPMENT CALIBRATION PROCEDURE CD
SCD	OSCILLOSCOPE CALIBRATION PROCEDURE CD
PCT-SU	PROCAL-TRACK LABORATORY MANAGEMENT SOFTWARE

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TRANSMILLE - 158 Brentwood Drive, Colchester, Vermont 05446

phone: **+1-802-846-7582** fax: **+1-802-863-8125**

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www.TransmilleCalibration.com