

TRANSPORTABLE TESTING



9000 SERIES

TRANSPORTABLE CALIBRATOR





TRANSPORTABLE TESTING



MULTI PRODUCT TEST SOLUTIONS
A WIDE RANGE OF TESTING CAPABILITIES...EXPANDABLE WITH ADD-ON ADAPTERS.

- | | | | | | | |
|-----------------------------------|---------------------------------|----------------------------------|---------------------------------------|----------------------------|--------------------------------|--|
|
DIGITAL MULTIMETERS |
POWER / CLAMP METERS |
DIGITAL OSCILLOSCOPES |
HARMONIC / POWER ANALYSERS |
RLC METERS |
POWER SUPPLIES |
PROCESS CONTROL CALIBRATORS |
|
HIGH RESISTANCE METERS |
ELECTROMETERS |
CURRENT SHUNTS |
DATA LOGGERS |
PRESSURE GAUGES |
HIGH VOLTAGE PROBES |
TORQUE SCREW DRIVERS |

The 9000 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 requires calibration traceable to national standards of a wide range of instrumentation. The 9000 Series calibration system provides the ideal platform to cover these requirements on site. Every Transmile 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 9000 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.

DESIGNED FOR INDUSTRIAL ENVIRONMENTS

The 9000 Series is designed for use within industrial environments including off shore, aerospace and military applications. The rugged enclosure with integrated castors and retractable handle lends itself to easy transportation to and from site. A fast warm up time ensures calibration can be performed quickly and accurately using the 9000 Series.



WIDE WORKLOAD CAPABILITIES

- 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**
- DEDICATED TRANSPORTABLE DESIGN IDEAL FOR INDUSTRIAL ENVIRONMENTS. 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 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 THE OUTPUT TERMINALS**



ProCal is the genuinely easy to use calibration software which complements the 9000 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.



9000 SERIES TRANSPORTABLE MULTI PRODUCT CALIBRATORS



GRAPHIC LCD DISPLAY INCORPORATING LED BACKLIGHT TECHNOLOGY FOR A CLEAR, BRIGHT PRESENTATION OF FUNCTIONS & SETTINGS

CLEAR LED INDICATION OF ACTIVE TERMINALS

OUTPUT TERMINAL CONFIGURATION DESIGNED TO MATCH DMM INPUTS

BUILT-IN INPUT PROTECTION



I-GUARD SYSTEM PREVENTS OUTPUT BEING SWITCHED ON WHEN VOLTAGE DETECTED ON TERMINALS

ADVANCED ADAPTER INTERFACE



EXPAND WORKLOAD CAPABILITIES WITH ADD-ON ADAPTERS

WORK SURFACE PLATFORM PROVIDES CONVENIENT WORK AREA IN CONFINED SPACES

RUGGED TRANSPORTABLE ENCLOSURE WITH BUILT-IN 3" CASTORS AND ROBUST RETRACTABLE HANDLES

ADVANCED ADAPTER INTERFACE TO EXPAND FUNCTIONALITY INCLUDING PRESSURE, TORQUE AND MORE.

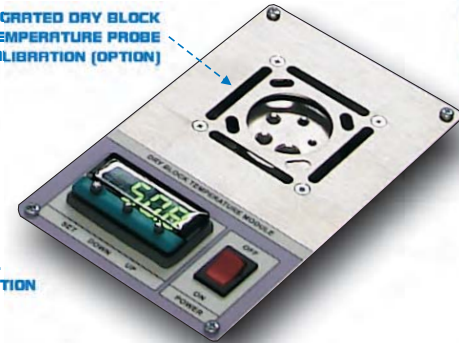
DIGITAL CONTROL FOR QUICK SELECTION OF RANGES & OUTPUTS

EASY MANUAL ENTRY OF TEST VALUES USING BUILT IN NUMERIC KEYPAD

TACTILE SOFT-KEYS LINKED TO ON-SCREEN FUNCTION-SPECIFIC MENUS FOR CLEAR, CONCISE USER OPERATION

INTUITIVE INTERFACE - DEDICATED BUTTONS FOR EACH FUNCTION

INTEGRATED DRY BLOCK FOR TEMPERATURE PROBE CALIBRATION (OPTION)



INTEGRATED BLACK BODY SOURCE FOR INFRA-RED TEMPERATURE CALIBRATION (OPTION)

ELECTRONIC 'COVERS ON' CALIBRATION VIA REMOTE INTERFACE



ELIMINATES TEMPERATURE GRADIENTS FOR THE ULTIMATE IN STABILITY

INCORPORATES THE LATEST IN HIGH PERFORMANCE PROCESSOR TECHNOLOGY



FOR ULTRA PRECISION & ADVANCED FUNCTIONALITY

FUNCTIONS AT A GLANCE

25PPM	25PPM ACCURACY MODEL 9041	Hz	FREQUENCY TO 10MHz
50PPM	50PPM ACCURACY MODEL 9050	PRT	RTD/PRT SIMULATION
V	AC/DC VOLTAGE TO 1000V	RS232	RS232 / USB[®] INTERFACE
A	AC/DC CURRENT TO 30A	SINE	SINE / DC POWER SIMULATION
Ω	2 & 4 WIRE RESISTANCE TO 1GΩ PASSIVE & SIMULATED MODES	DDS	HARMONIC POWER SIMULATION DIRECT DIGITAL SYNTHESIS WAVEFORM GENERATION
F	CAPACITANCE TO 10mF PASSIVE & SIMULATED MODES	V	OSCILLOSCOPE CALIBRATION 250/350/600MHz BANDWIDTH OPTIONS
H	INDUCTANCE TO 10H	I-GUARD	BUILT-IN ADAPTER INTERFACE EXTENDED WORKLOAD CAPABILITY WITH A WIDE RANGE OF ADD-ON ADAPTERS

ADVANCED TECHNOLOGY

The 9000 series calibrators use the latest technology from the temperature stabilised reference to the sub ppm linearity D/A.

DDS (Direct Digital Synthesis)
DDS 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 amplifier** 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 terminals for voltages applied accidentally when switching from *standby* to *output on* - protects your investment from accidental misuse.

COMPLETE WORKLOAD CAPABILITY

The 9000 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 (phantom power) up to 30.6kW (1.5MW using the 50 turn coil - phase angle control up to 359.9° is also available.

Harmonics Calibration option available for 9041 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 9000 Series. The passive inductance, resistance & capacitance in the 9000 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.

DRY BLOCK TEMPERATURE CALIBRATION MODULE

OPTION D8C



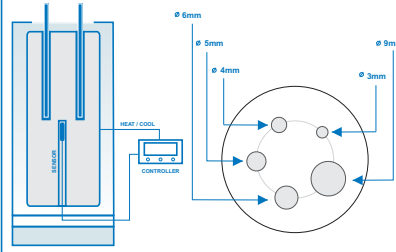
- ✓ Range : Ambient to 200°C
- ✓ Built-in digital temperature controller
- ✓ Multiple drilled insert - supports 5 probe sizes
- ✓ Supports °C and °F
- ✓ Integrated temperature sensor

INTEGRATED DRY BLOCK WELL

The 9000 Series dry block temperature calibration module provides an easy method for calibrating temperature probes. An accurate dry well coupled to a digital temperature controller provides a variable temperature source.

Support for best practice methods when calibrating probes is provided using a multiple drilled insert, allowing a reference probe to be measured and compared against the probe under test.

Module Configuration



BLACK BODY SOURCE TEMPERATURE MODULE

OPTION B8S

INTEGRATED BLACK BODY SOURCE

The 9000 Series black body source temperature module provides an easy method for calibrating infrared pyrometers / thermometers. The black body source is connected to a digital temperature controller allowing easy selection of the required temperatures.



Module Configuration & Use



Simply aim infra red thermometer at the black body source and record the temperature.

Use the optional EA001 Thermocouple Simulation adapter to check thermocouple inputs also found on these types of thermometers.

- ✓ Designed for infra red thermometers
- ✓ Built-in black body source
- ✓ Range : Ambient to 200°C
- ✓ Built-in digital temperature controller
- ✓ Supports °C and °F

OSCILLOSCOPE CALIBRATION OPTION

250MHz / 350MHz / 600MHz BANDWIDTH

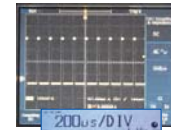


OSCILLOSCOPE OPTION OVERVIEW

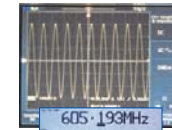
Three options are available for the 9000 Series calibrators which are suitable for calibration of both analogue and digital storage oscilloscopes. All options provide the calibration waveforms required for amplitude, timebase and bandwidth including gain and linearity of the horizontal and vertical deflection circuits. To minimise lead changing, the oscilloscope outputs are output from a single BNC connector.



AMPLITUDE



TIMEBASE



BANDWIDTH

AT A GLANCE

- ✓ 250MHz (SCP250) : 9050
 - ✓ 350MHz (SCP350) : 9041
 - ✓ 600MHz (SCP600) : 9041
-
- ✓ 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

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 control. 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.

EA017 :: OSCILLOSCOPE TEST HEAD ADAPTER

For automating oscilloscope calibration a 4 channel switching test head is available. Connect to the 9000 Series adapter interface and select channel required.

For accurate calibration of 500ohm 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

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 / 9041 / 3010	
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

POWER CALIBRATION OPTION

PWR50 / PWR5INE / PWRDDS



POWER OPTION OVERVIEW

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 9000 series calibrators allows both voltage and current output to be generated simultaneously (phantom load) with an 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 RANGE USING A CLAMP COIL

Combined with the optional clamp coil adapter the power calibration option allows a current of 1500Amps to be simulated, and power to 1.5Megawatts (1500Amps x 1000Volts).

HARMONIC ANALYSER CALIBRATION

Option PWRDDS for the 9041 calibrator allows generation of waveforms with harmonic content for calibrating power meters with power harmonics functions. This includes a set of six fixed waveforms, plus the capability to upload user defined waveforms from a PC allowing waveforms with custom harmonic content to be generated using the supplied ProWave software.

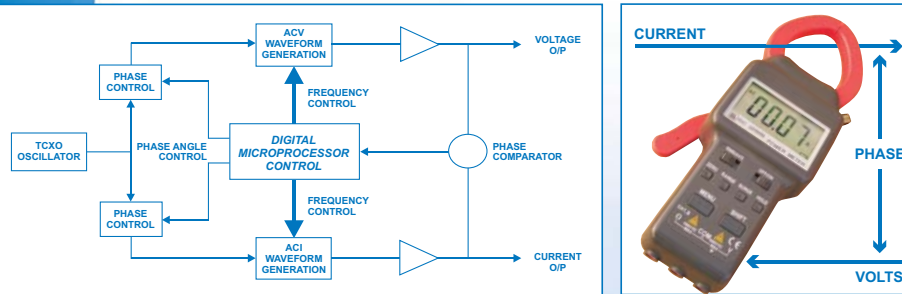
Waveforms	
Sine	5° 10%
Square	21° 10%
Triangle	User + Sine
3rd 10%	User

KW HOUR METER & ENERGY CALIBRATION

Using the 9000 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.

AT A GLANCE

- 9050 : SINE POWER OPTION (PWR50)
- 9041 : 2 OPTIONS
PWR5INE : SINE & DC POWER
PWRDDS : 6 WAVEFORMS + USER & SINE
- UP TO 1.5MW (USING 50 TURN COIL)
- 0° TO 359.9° ADJUSTABLE PHASE RELATIONSHIP



SPECIFICATIONS

DC Power (3041/3010)	
Voltage Range	0 to 1025V
Current Range	300mA to 30A
Resolution	200uA 2mA
Accuracy	300mA to 2A 2A to 30A
	0.05% ± 0.35mW/Volt 0.04% ± 3.5mW/Volt

AC Power	
Voltage Range	0 to 1025V
Frequency Range	40Hz to 1kHz
Resolution	200uA 2mA

Accuracy : 9041	
300mA to 2A	0.1% ± 0.5mW/Volt
2A to 30A	0.1% ± 5mW/Volt
Accuracy : 9050	
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

RTD / PRT TEMPERATURE SIMULATION OPTION

OPTION PRT



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 9000 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.

INDUCTANCE CALIBRATION OPTION

OPTION IND



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 values from 1mH to 10H
- Ideal for calibration of RCL meters / bridges
- Cost effective option
- Automated Calibration Using ProCal Software

MEASURED VALUE STORED FOR ACCURATE CALIBRATION

When the 9000 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.

SPECIFICATIONS

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

See extended specifications for full details

SIMULATED RESISTANCE & CAPACITANCE

OPTION SIMAC



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 allows confident calibration of AC bridges and removes any difficulty with traceability.

For the 9000 Series a simulated option provides for resistance calibration between cardinal points and gives a continuous resistance range from 2 Ohms to 10 MOhms, with decade capacitance points up to 10mF.

THERMOCOUPLE SIMULATION ADAPTER

OPTION ERA01



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.

- ✓ Superior Thermocouple Simulation Using External Adapter
- ✓ Direct Simulation of 8 Thermocouple Types
- ✓ Simulates any T/C type using Virtual Front Panel Software
- ✓ Temperature Standard - EN60584-1 (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 (°C)
J	-180°C to 150°C 150°C to 750°C	0.05 0.30
K	-140°C to 200°C 200°C to 1340°C	0.10 0.35
T	-250°C to 400°C	0.20
R	-50°C to 500°C	0.20
S	500°C to 1700°C -50°C to 1200°C	1.00 0.60
B	1200°C to 1700°C 0°C to 1200°C	1.60 0.10
N	1200°C to 1820°C -270°C to 260°C	1.30 0.10
E	260°C to 1300°C 0°C to 800°C	0.40 0.80

2 / 10 / 50 TURN CLAMP COIL ADAPTER

OPTION ERA02



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 9050
- ✓ Calibrates Clamp Meters up to 1500A with 9041
- ✓ 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) High Accuracy Balanced
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

See extended specifications for full details

MULTI FUNCTION WORKSTATION

OPTION ERA15



The multi function 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 OUTPUT
- ✓ CONTINUITY RESISTANCE OUTPUT
- ✓ CONTINUITY CURRENT MEASUREMENT
- ✓ OPTICAL TACHOMETER CALIBRATION
- ✓ THERMOCOUPLE SIMULATION
- ✓ 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

Source/measure process control calibrators are common place 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

OPTICAL TACHOMETER CALIBRATION ADAPTER

OPTION EA002



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.

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

SPECIFICATIONS

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

See extended specifications for full details

3A POWER SUPPLY CALIBRATION ADAPTER

EA3023



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.

MEASURE 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.

CALIBRATE POWER SUPPLY CURRENT METER

The adapter provides a precision electronic load controlled by the

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

See extended specifications for full details

PRECISION ANALOGUE LEAD SET OPTION

OPTION 3000LEAD

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.

- 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



PRESSURE MEASUREMENTS ADAPTERS

TPM001 to TPM018 · OPTION PUMP



The 9041 supports 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 10000 PSI. A 5 PSI 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 multiple 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.

TORQUE CALIBRATION ADAPTER

EA014



- 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 9000 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

TEMPERATURE & HUMIDITY MONITORING ADAPTER

OPTION EA016

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.



HIGH RESISTANCE / pA MEASUREMENT ADAPTER

EA008



- ✓ Accurate current measurement down to pico amp levels
- ✓ Ideal for high value resistance measurement to 1TOhm
- ✓ Five ranges from 10nA to 100uA
- ✓ 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	10nA • 100nA • 1uA • 10uA • 100uA
Resolution	1pA • 10pA • 100pA • 1nA • 10nA
Accuracy	0.5%
Operation	Virtual front panel or ProCal software

See extended specifications for full details

PICOAMP SOURCE ADAPTER

EA013

- ✓ 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	10nA • 100nA • 1uA • 10uA • 100uA
Resolution	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

AUTOMATED SOFTWARE CALIBRATION

EFFICIENT, COST EFFECTIVE SOFTWARE CONTROLLED CALIBRATION



EASY TO USE SOFTWARE FOR FAST & ACCURATE TESTING

Transmille ProCal software provides easy control of the 9000 Series with pre-set test points for each model of tester. The software takes care of setting the 9000 Series to the correct function and output - the user simply follows on-screen prompts and confirms measurements or enters readings from the tester.

ProCal software provides an easy to use package, with simple function select using drop down boxes and is focused on providing a complete solution for rapid on-site, workshop or laboratory testing, with an easy learning curve for new users ensuring rapid return on investment.



The use of software is the key to realising a cost-effective test solution, whether it is for in-house / maintenance support or for commercial calibration services. Built-in procedure wizards for each type of tester allow procedures to be created in minutes, with a library of procedures also available for popular testers. The software is fully network ready to allow multi-station calibration configuration to be achieved.

PROCAL : MULTI DISCIPLINE CALIBRATION SOFTWARE

- ✓ UNIVERSAL CALIBRATION SOFTWARE
- ✓ AUTOMATIC CONTROL OF 9000 SERIES CALIBRATORS
- ✓ FAST PROCEDURE CREATION - PROCEDURE WIZARDS
- ✓ CREATE & PRINT CERTIFICATES ON PLAIN PAPER
- ✓ M3003 / GUM UNCERTAINTIES
- ✓ SUPPORTS CRYSTAL REPORTS
- ✓ CALIBRATION PRICING



LABEL PRINTING



BARCODE SCANNING



GRAPHICAL CALIBRATION



PROCEDURE WIZARDS



PROCAL

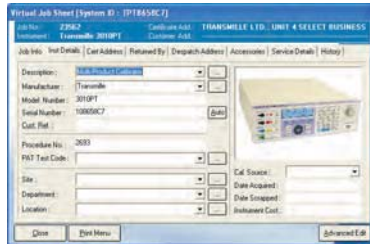
PROCAL

LABORATORY MANAGEMENT SOFTWARE

- > JOB CONTROL FROM **GOODS IN TO DESPATCH**
- > **VIRTUAL JOB SHEET :: DYNAMIC JOB TRACKING**
- > **GOODS INWARDS & ACCESSORIES MANAGEMENT**
- > **DESIGNED FOR OFFICE & LAB**
- > **SUPPORTS CRYSTAL REPORTS**
- > **BUILT-IN REPORTS & LABELS**



LABEL PRINTING



ON-SCREEN JOB SHEET



GOODS INWARDS



PROCESSING & DESPATCH

PROCAL-TRACK

PROCAL-TRACK

ON-SITE DATABASE MANAGEMENT

- > MANAGES DATA EXPORT TO A PORTABLE ON-SITE DATABASE
- > IMPORTS DATA INTO PROCAL MAIN DATABASE
- > SIMPLE AND EASY TO USE INTERFACE



EASY TO USE INTERFACE

PROSITE

PROSITE

ON-LINE WEB SERVICE MANAGEMENT

- > MANAGES CERTIFICATE PDF AND WEB DATABASE EXPORT
- > PREPARES FILES READY FOR UPLOAD TO WEB SPACE



PROWEB

FUNCTION	9041			9050		
	RANGE	RESOLUTION	ACCURACY	RANGE	RESOLUTION	ACCURACY
DC Voltage	0 to 1025V	0.1uV	25ppm	0 to 1025V	0.1uV	50ppm
DC Current	0 to 30A	100pA	50ppm	0 to 20A	100pA	0.01%
pA Source Adapter (EA013)*	0 to 100uA	0.1pA	200ppm	-	-	-
AC Voltage	0 to 1020V 10Hz to 500kHz	1uV	0.035%	0 to 1020V 10Hz to 100kHz	1uV	0.035%
AC Current	0 to 30A 10Hz to 10kHz	1nA	0.06%	0 to 20A 10Hz to 10kHz	1nA	0.07%
Resistance (Passive)	0Ω to 1GΩ	-	40ppm	0Ω to 100MΩ	-	0.005%
Resistance (Simulated)*	30Ω to 10MΩ	100ppm	0.03%	-	-	-
Capacitance (Passive)	1nF to 10uF	-	0.25%	10nF to 1uF	-	0.4%
Capacitance (Simulated)*	100uF to 10mF	-	0.7%	-	-	-
Inductance (Option)*	1mH to 10H	-	0.50%	-	-	-
Frequency (STD/HIACC*)	1Hz to 10MHz	-	20ppm/1ppm	10Hz to 10MHz	-	20ppm
Pulse Width / Duty Cycle	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
 PRT/RTD (Option PRT) (9041) Range: -100°C to 800 °C • Accuracy 0.01%

Oscilloscope Calibration (SCP250/SCP350/SCP600)

Amplitude 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 (SCP600) • 5s to 5ns (SCP350/250) • Accuracy 5ppm
 Leveled Frequency Sweep 50kHz, 5MHz to 250/350/600MHz • Level 600mV Pk-Pk/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 (9050): 30.7kW / 1.53MW (9041)
 Accuracy 0.05% ± 3.5mW/Volt
 Phase / Frequency Range Range: 0 to 359.9° • Resolution 0.1° • Accuracy 0.1° • Frequency :10Hz to 1kHz
 DC Power Power Direct/50 Turn Coil: 30.7kW / 1.53MW (9041) • Accuracy 0.04% ± 3.5mW/Volt

Optical Tacho Calibration (9041)

Optical Tachometer Adapter (EA003) Range: 60RPM to 60,000RPM • Accuracy 50ppm

Power Supply Calibration (9041)

PSU Calibration Adapter EA3023 Voltage Measurement 0 to 63V (100V) • Current Load 0 to 3A (60A)

Pressure Calibration (9041)

Pressure Calibration Modules Range: 25mBar to 700Bar (10,000PSI) • Accuracy From 0.04%

Torque Calibration (9041)

Torque Calibration Adapter (EA014) Range: 0 to 20Nm • Accuracy 0.2%

pA / High Ohms Calibration (9041)

pA / High Ohms 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 (9041)

Insulation Tester Calibration

Insulation Resistance 0 to 2GOhms•Resolution 10kOhm • Max.1kV • 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 Range(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 / Tacho 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 • USB (option)
Line Power	110 / 230V (28Watts standby)
Dimensions / Weight / Warranty	60.5cm x 51.1cm x 24.6cm / 20kg / 1 Year warranty

FOR EXTENDED SPECIFICATIONS CONTACT YOUR LOCAL REPRESENTATIVE OR VISIT WWW.TRANSMILLE.COM



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.

UKAS calibration is available for all Transmille products as an optional service.



0324



The 9000 Series Transportable calibrator complements the 8000 Series range of multimeters, 3000 Series range of multi product calibrators, 3200 Series Electrical Test Equipment Calibrator and the 3000 Precision range of reference standards. This comprehensive range of Queen's award winning instrumentation combined with the ProCal calibration software provides a complete solution for the modern calibration laboratory.

**PROCAL
REFERENCE
SUPPORT :
AUTOMATE
CALIBRATION
USING PROCAL**



ORDER DETAILS : 9041

9041	TRANSPORTABLE CALIBRATOR (25ppm) + UKAS Calibration Certificate	
9041-SYS	TRANSPORTABLE CALIBRATOR (25ppm) + UKAS Calibration Certificate WITH PWR/SINE, PRT, EA001(THERM) AND SIMULATED RESISTANCE/CAPACITANCE OPTIONS INC UKAS	
MODULAR OPTIONS	OPTION DBC OPTION BBS	DRY BLOCK TEMPERATURE CALIBRATION MODULE BLACK BODY SOURCE TEMPERATURE CALIBRATION MODULE
INTERNAL OPTIONS	OPTION PWR/SINE OPTION PWR/DDS OPTION SCP350 OPTION SCP600 OPTION PRT OPTION IND OPTION FRQ OPTION SIMRC	AC (SINE) / DC POWER CALIBRATION OPTION AC/DC DDS SYNTHESISED POWER OPTION 350MHz OSCILLOSCOPE OPTION 600MHz OSCILLOSCOPE OPTION PRT/RTD SIMULATION OPTION INDUCTANCE CALIBRATION OPTION 1ppm HIGH STABILITY CRYSTAL REFERENCE SIMULATED RESISTANCE & CAPACITANCE OPTION
EXTERNAL OPTIONS	OPTION EA001 OPTION EA002 OPTION EA003 OPTION EA008 OPTION EA013 OPTION EA014 OPTION EA015 OPTION EA016 OPTION EA017 OPTION EA3023 OPTION TPA001 to TPA018 OPTION PUMP	THERMOCOUPLE SIMULATION ADAPTER 2/10/50 TURN CLAMP COIL + ALIGNMENT PLATFORM OPTICAL TACHOMETER CALIBRATION ADAPTER HIGH RESISTANCE / pA MEASUREMENT ADAPTER* pA SOURCE CALIBRATION ADAPTER* TORQUE CALIBRATION ADAPTER* MULTI FUNCTION WORKSTATION HUMIDITY & TEMPERATURE SENSOR 4 CHANNEL OSCILLOSCOPE TEST HEAD 3A/63V POWER SUPPLY CALIBRATION ADAPTER* PRESSURE CALIBRATION MODULES SEE WEB SITE FOR LIST PRESSURE HAND PUMP

9050

9050	TRANSPORTABLE CALIBRATOR (50ppm) + UKAS Calibration Certificate	
MODULAR OPTIONS	OPTION DBC OPTION BBS	DRY BLOCK TEMPERATURE CALIBRATION MODULE BLACK BODY SOURCE TEMPERATURE CALIBRATION MODULE
INTERNAL OPTIONS	OPTION SCP250 OPTION PWR50	250MHz OSCILLOSCOPE OPTION AC/DC POWER CALIBRATION (SINE) OPTION

SOFTWARE

AUTOMATE CALIBRATION WITH PROCAL SOFTWARE SEE SOFTWARE BROCHURE FOR FULL DETAILS

9000VFP PC-SU PROSITE PROWEB PCT-SU	9000 SERIES VIRTUAL FRONT PANLE SOFTWARE PROCAL PROFESSIONAL CALIBRATION SOFTWARE ON-SITE DATABASE MANAGEMENT SOFTWARE FOR PROCAL WEB SERVICE DATA EXPORTER FOR PROCAL PROCAL-TRACK LABORATORY MANAGEMENT SOFTWARE
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EVALUATION VERSIONS OF ALL SOFTWARE PACKAGES ARE AVAILABLE FROM www.transmille.com



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