

# 4600A SERIES ADVANCED MULTIPRODUCT CALIBRATOR



The 4600A Series is aimed at laboratories, manufacturers and design facilities requiring a wide range of outputs with accuracies up to 8ppm.

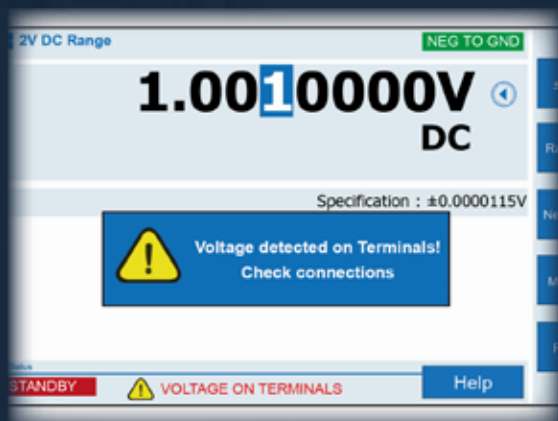
The 4600A Series builds on the trusted reliability of the 4000 series, offering an updated user interface accessed through a large 7" capacitive touch screen to enable advanced functionality, including inbuilt connection prompts to minimise errors.

The 4600A Series comes as standard with both fully variable and passive resistance and capacitance outputs for unrivaled flexibility. Variable outputs allows non decade values to be simulated, while passive outputs enables calibration of high accuracy measurement devices

## KEY FEATURES

- Extended AC Voltage and Current Frequency range
  - Variable 2 and 4 wire resistance to 1 GOhm
  - Variable capacitance to 100mF
- USB & GPIB (IEEE-488) Interfaces as standard
  - Remote command emulation mode
  - 7" Full Colour Touch Screen

# 4600A SERIES HIGHLIGHTS



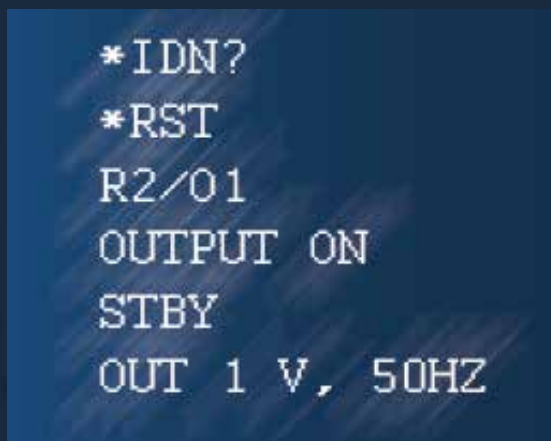
## INNOVATIVE PROTECTION CIRCUITRY

The 4600A Series is protected by Transmille's I-GUARD protection circuitry protecting the calibrator against accidental damage through wrong connections up to  $\pm 1000V$  RMS.

All Transmille calibrators have been protected by I-GUARD since 2006.

## LOW THERMAL BINDING POSTS

Fitted with low thermal, 5 way binding posts, the 4600A Series enables connection with 4mm banana jacks, spades and bare wire without the need for additional adapters.



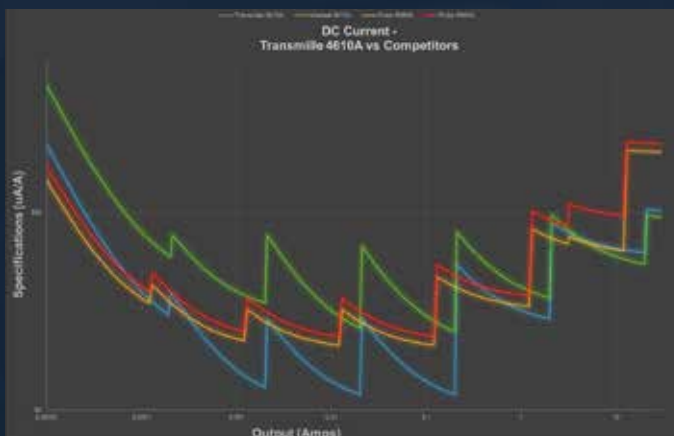
## SOFTWARE COMPATIBILITY

The 4600A Series features an advanced command set including emulation modes for popular remote languages. This enables the 4600A Series to be used with Legacy metrology software that does not yet support Transmille equipment.

As with all Transmille products, compatibility with ProCal calibration software is guaranteed.

## SUPERIOR ACCURACY

Using precision components throughout, compared to competitive models the 4600A Series offers higher performance and wider workload for lower cost



## ACTIVE TERMINAL INDICATORS

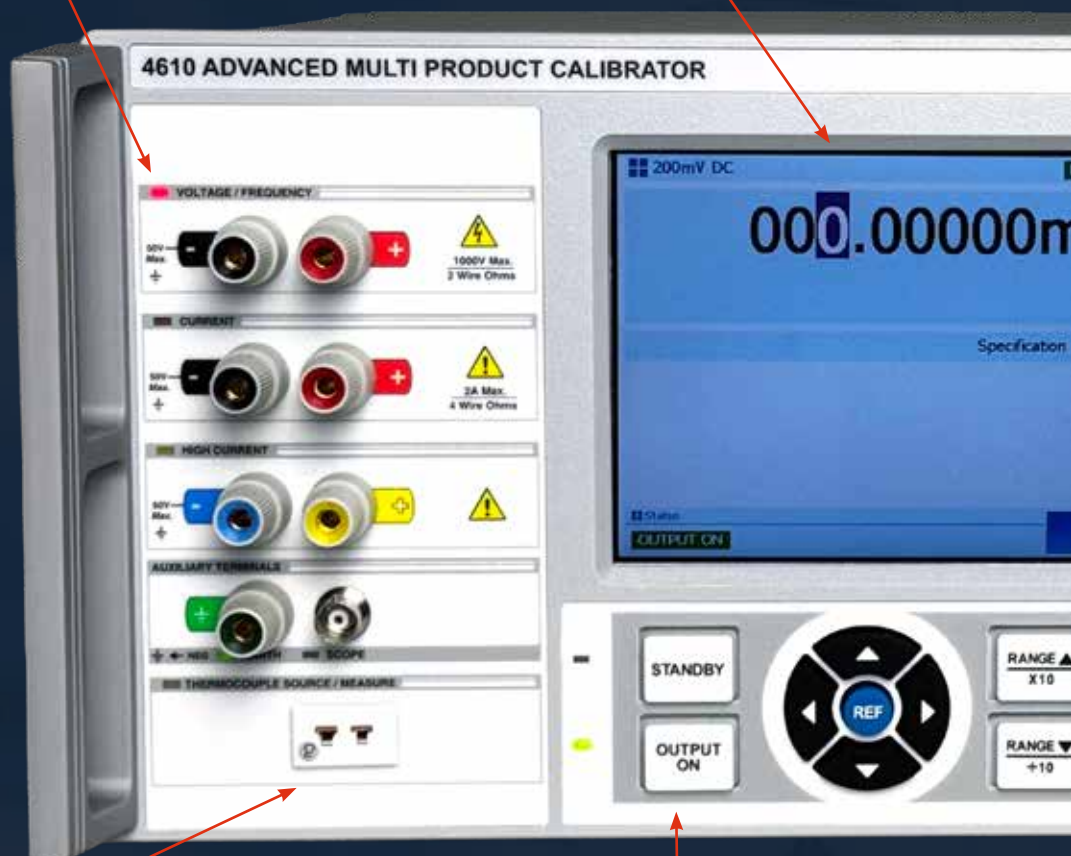
All Transmille calibrators offer active terminal indication to assist with making connections, combined with dynamic prompts

## 7" HIGH RESOLUTION TOUCHSCREEN

Clear, easy to read menus enable fast access to key functions, display dynamic output specification and user assistance prompts.

## CARRY HANDLES

Rugged handles protect output connections and assist movement around the laboratory



## FRONT PANEL MINI TC CONNECTOR

Directly connect Thermocouple meters and sources to the 4600A via the front panel Thermocouple Interface

## CLEAR CONTROLS

Operation of the 4600A Series is simple, with enlarged keys for key functions, and output status marked with LEDs

# EASY TO USE MENUS

Designed from the ground up to be easy to use through both touch and physical keys, menus and advanced functions of the 4600A Series feature intuitive controls. The 4600A Series interface is also fully translatable.



## INPUT BY TOUCHSCREEN OR TACTILE SOFTKEYS

Data entry and menu selection is available through both touch screen and physical keys allowing flexible interaction based on user preference

## DEDICATED BUTTONS FOR KEY FUNCTIONS

Calculator style numerical entry with direct access to common units and multipliers accelerates manual entry of set points, saving time and minimising errors

## USB & GPIB REMOTE INTERFACES AS STANDARD

Transmille's ProCal software provides auto configuration for the 4600A Series when connected over the convenient USB interface, and the GPIB interface enables fast connection to Legacy systems

## FRONT PANEL POWER BUTTON

Easy access to true power off/on when integrated into systems and racks

## FRONT MOUNTED USB PORT

For data offload, updates and importing custom connection prompts

## EXTEND WORKLOAD COVERAGE THROUGH ACCESSORIES

Using external accessories workload coverage can be extended while minimising upgrade fees

# INTEGRATED CONNECTION PROMPTS

Using the touchscreen, dynamic connection prompts can be displayed for any output, showing a full colour connection diagram. For ease of use, the connection diagrams can easily be customised by users.



# THERMOCOUPLE SIMULATION & MEASUREMENT ADAPTER

OPTION EA001A



## SUMMARY SPECIFICATIONS

TYPE	RANGE
J	-210°C to 1200°C
K	-200°C to 1370°C
T	-250°C to 400°C
R	0°C to 1760°C
S	0°C to 1760°C
B	-600°C to 1820°C
N	-200°C to 1300°C
E	-250°C to 1000°C
L	-200°C to 900°C
U	-200°C to 600°C
C	-0°C to 2316°C

For the ultimate in accuracy, Transmille has designed a dedicated source/measure external adapter. 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, which also allows the signal to be as free from electrical noise as possible, while eliminating errors caused by heat generated by surrounding electronics.

The cold junction compensation (CJC) sensor is mounted in the thermocouple plug itself. By measuring the cold junction at the instrument's input, any type of thermocouple can be simulated without requiring the use of thermocouple compensation cables.

**SUPERIOR THERMOCOUPLE  
SIMULATION/MEASUREMENT**

**11 BUILT-IN TYPES  
(SEE SPECIFICATION TABLE)**

**THERMOCOUPLE MEASUREMENT  
USES NEUTRAL (COPPER) PLUG**

**CJC SENSOR BUILT INTO  
THERMOCOUPLE PLUG & SOCKET**

# OPTICAL TACHOMETER CALIBRATION ADAPTER

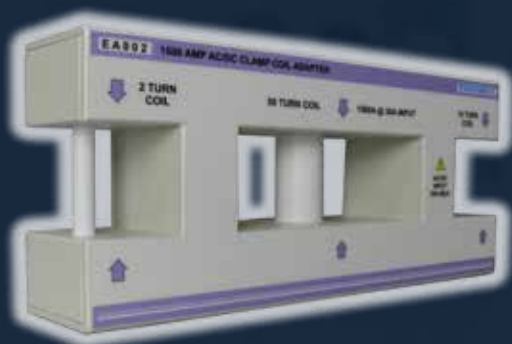
OPTION EA003



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. With a range of 60 - 60,000 RPM the EA003 can be used to calibrate a wide range of optical tachometers.

**60 - 60,000 RPM RANGE**

## 2 / 10 / 50 TURN COIL ADAPTER (1500A) OPTION EA002



### 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	30A
Duty Cycle @ 20A	70% On / 30% Off
Maximum RMS Voltage	4V
Frequency Range	DC to 400Hz
Accessories	Detachable Platform

**CALIBRATES CLAMP METERS  
UP TO 1500A**

**HIGH ACCURACY AC/DC  
BALANCED DESIGN**

**WIDE RANGE OF CLAMP  
SIZES COVERED**

**INCLUDES ALIGNMENT TABLE  
FOR REPEATABLE READINGS**

Designed for the calibration of both wound AC and magnetic field hall effect AC/DC clamp meters, the Transmille EA002 current coil offers several unique features.

A robust construction allows for years of hard use without risk of damage to the coil element, and an included alignment table ensures repeatable results.

## 2 / 10 / 50 TURN COIL ADAPTER (2000A) OPTION EA019



Designed for the calibration of both wound AC and magnetic field hall effect AC/DC clamp meters, the Transmille current coil offers several unique features.

The EA019 option allows for a 40A input, allowing for calibration up to 2000A when using the 50 turn coil when used in conjunction with the EA3012A Transconductance Amplifier.

# MULTI-FUNCTION WORKSTATION

## OPTION EA015



The Multi-Function Workstation provides a central work area with all connections routed conveniently to remote terminals mounted at the front of the adapter.

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.

## INSULATION TESTERS

Insulation to 2GOhms @ 1000V and continuity to 1kOhm is available from dedicated terminals.

## PROCESS CONTROL

Integrates all required functions to both source and measure the required signals for process control calibration.

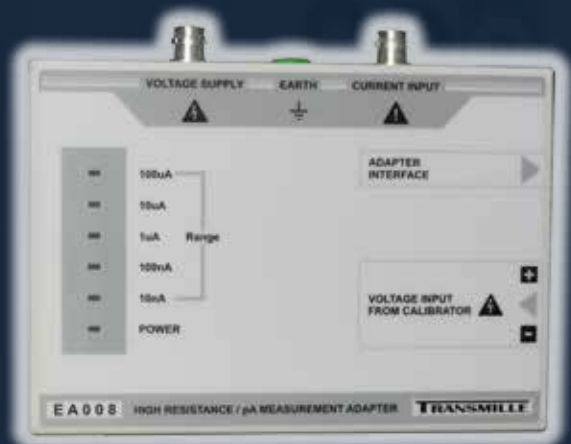
## DIGITAL THERMOMETERS

Easily calibrate digital thermometers with the built in thermocouple simulation output with automatic cold junction compensation.

## OPTICAL TACHOMETERS

Using a high density LED light source, optical tachometers can be calibrated quickly and easily.

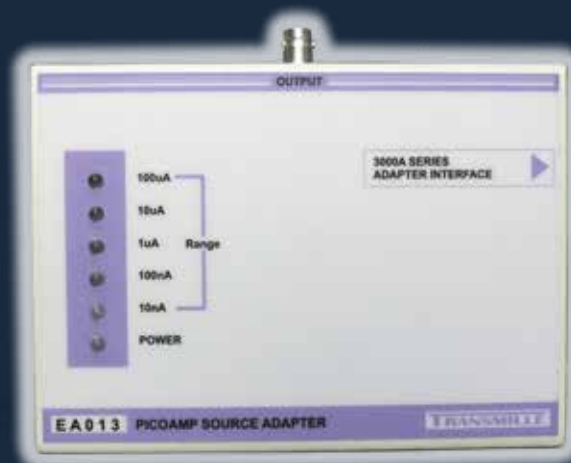
## HIGH RESISTANCE/pA MEASUREMENT ADAPTER OPTION EA008



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 input impedance errors.

Using the high voltage output from the 4600A series calibrators together with the current measurement capability of the EA008 allows high accuracy resistance measurements to be at any voltage up to 1000V.

## PICOAMP SOURCE ADAPTER OPTION EA013



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 input impedance errors.

Using the high voltage output from the 4600A series calibrators together with the current measurement capability of the EA008 allows high accuracy resistance measurements to be at any voltage up to 1000V.

**IDEAL FOR CALIBRATING  
ELECTROMETERS**

**SOURCE CURRENT ACCURATE  
DOWN TO PICO AMP LEVEL**

**LOW OPEN CIRCUIT  
COMPLIANCE VOLTAGE**

**SAFE TO USE ON SENSITIVE  
INPUT CIRCUITS**

**SUPPLIED WITH VFP SOFTWARE**



## TEMPERATURE & HUMIDITY MONITORING ADAPTER

OPTION EA016



### HUMIDITY MEASUREMENT

10% TO 90%

### TEMPERATURE MEASUREMENT

0°C TO 50°C

The EA016 adapter provides the ability to measure the local temperature and humidity for recording on certificates and test reports.

Essential for on-site work to maintain accurate calibration records and avoids requiring expensive humidity/temperature probes.

## 4-CHANNEL OSCILLOSCOPE TEST HEAD ADAPTER

OPTION EA017



### 4 CHANNELS FOR AUTOMATING OSCILLOSCOPE CALIBRATION

### CHOOSE BETWEEN DIRECT OR BUFFERED OUTPUTS

For automation of oscilloscope calibration, Transmille provide a 4-channel switching test head.

For accurate calibration of 50 Ohm input oscilloscopes, up to 1V/Division, a low impedance buffered amplitude output can be selected.

## PRECISION ANALOGUE LEAD SET OPTION

OPTION 46XXLEAD



### LOW THERMAL GOLD/COPPER VOLTAGE LEADS (0.7uV)

### HIGH CURRENT 32A LEADS

### ALL 4mm LEADS WITH SAFETY SHROUDS

Provided in a carry case for storage, the Precision Analogue Lead Set provides a comprehensive set of leads for making connections to typical test equipment.

## TPMXX PRESSURE MODULES

TPM001 to TPM018



**PRESSURE MEASUREMENT FROM  
25mBAR TO 10,000 PSI**

### OPTIONAL HAND PUMP AVAILABLE

A modern calibration laboratory must calibration in multiple disciplines to remain competitive. To assist, Transmille have a range of pressure modules to add pressure measurement capability to our products.

Select from a range of pressure modules that connect directly to our products and provide read-back directly on the screen.

OPTION	PRESSURE
<b>PSI Gauge</b>	<b>Accuracy 0.04%</b>
TPM001	1 PSI
TPM002	5 PSI
TPM003	10 PSI
TPM004	50 PSI
TPM005	100 PSI
TPM006	500 PSI
TPM007	1000 PSI
TPM008	5000 PSI
TPM009	10000 PSI
<b>Bar Gauge</b>	<b>Accuracy 0.04%</b>
TPM011	350 mBar
TPM012	1 Bar
TPM013	10 Bar
TPM014	35 Bar
TPM015	100 Bar
<b>Bar Gauge (Vacuum)</b>	<b>Accuracy 0.04%</b>
TPM016	-1 to +1 Bar
<b>Bar Gauge (Displacement)</b>	<b>Accuracy 0.04%</b>
TPM017	5 PSI

## TORQUE CALIBRATION ADAPTER

OPTION EA014



By connecting the EA014 Torque Measurement adapter to a Transmille calibrator, torque calibration capabilities can be added to your laboratory in a cost-effective manner.

Housing an external torque transducer allows torque screwdrivers up to 10Nm to be calibrated, with a range of available torque transducers from 1Nm to 1500Nm.

## AC/DC TRANSCONDUCTANCE AMPLIFIER

OPTION EA3012A



The EA3012A is a powerful linear transconductance amplifier designed for use with Transmille calibrators to provide a cost-effective solution for generation of high currents.

Use of linear technology throughout gives a very low noise output, completely free from switching spikes. Long-term accuracy is assured by using precision foil resistors and a custom internal shunt.

Higher currents are available by paralleling multiple EA3012A amplifiers to reach currents in excess of 300A.

**LOW NOISE LINEAR MOSFET TECHNOLOGY**

**STACKABLE FOR HIGHER CURRENTS**

**CONTROL FROM FRONT PANEL OR THROUGH PROCAL SOFTWARE**

**IDEAL FOR HIGH POWER CURRENT SHUNTS & METERS**

## 3A/63V CALIBRATION ADAPTER

OPTION 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.

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 the virtual front panel software (supplied) or ProCal calibration software.

**MEASURE PSU OUTPUT VOLTAGE TO 63V**

**DETERMINE OUTPUT RESISTANCE/VOLTAGE DROP**

**ACTIVE CURRENT LOAD TO 3 AMPS**

**CALIBRATE POWER SUPPLY CURRENT METER**

## AC/DC KILOVOLT AMPLIFIER

### OPTION EA3024



The EA3024 kilovolt amplifier provides a simple and safe solution for the calibration of high voltage probes and dividers.

Using the advanced electronics inside the Transmille calibrators, the EA3024 provides a cost-effective solution for calibration of these common instruments.

The EA3024 is controlled via dedicated front panel software or via ProCal for safe calibration at high voltages.

**DC OUTPUT 1 TO 10 KILOVOLTS**

**AC VOLTAGE 1 TO 5 KILOVOLTS**

**CONTROLLED BY PROCAL OR  
VIRTUAL FRONT PANEL**

**INDEPENDENT SOCKETS FOR  
DC OR AC OUTPUT**

## 60A/100V POWER SUPPLY CALIBRATION ADAPTER

### OPTION EA3025A



The EA3025A provides an easy to use, low cost solution for the calibration of high current power supplies.

Overcoming many of the issues typically associated with measuring high current outputs, the EA3025A is an all-in-one solution that is easy to use.

An accurate, stable electronic load simulates current loading on power supplies and provides measurement of voltage and output resistance, while minimising the equipment required for calibration of these common devices.

**MEASURE OUTPUT VOLTAGE TO  
100 VOLTS**

**MEASURES OUTPUT RESISTANCE**

**ACTIVE CURRENT LOAD TO 60  
AMPS**

**APPLICATIONS INCLUDE  
BATTERY/UPS TESTING**

# OSCILLOSCOPE CALIBRATION



To expand the workload coverage of the 4600A Series calibrators a range of internal oscilloscope options are available.

Suitable for calibration of both digital and analogue oscilloscopes the oscilloscope options provide a flexible solution to calibrating a wide range of models.

## AMPLITUDE TO 300V PEAK - PEAK

Providing both square wave and DC Level, the oscilloscope output covers from 2mV/Division through to 50V/Division in a 1,2,5 sequence. Each level can be deviated up to 10% from nominal. With the wide output range of 300V pk-pk the 4600A Series can calibrate the full range of any modern oscilloscope.

Fitted with a precision frequency source, oscilloscope options for the 4600A Series offer a frequency accuracy of 5ppm with outputs available as a comb waveform below 100ns and a sine wave above to assist triggering.

## TIMEBASE FROM 2ns to 5s

## BANDWIDTH TO 3 GHz

A levelled sinewave output provides a continuously variable sinewave to verify the bandwidth of an oscilloscope. The amplitude can be varied from 2mV pk-pk to 2V to verify the full range of an oscilloscope

A Fast Rise signal is available for evaluating overshoot, undershoot and ringing of oscilloscope attenuation and amplifier circuits.

## < 500 ps FAST RISE OUTPUT

OPTION	MAXIMUM BANDWIDTH
SCP600	600 MHz
SCP1100	1.1 GHz
SCP3000	3 GHz

# POWER CALIBRATION



The PWR SINE option for the 4600A Series enables calibration of power meters, offering DC power output and AC power with variable phase between Voltage and Current outputs. Dynamic phase control enables calibration of both capacitive and inductive loads without additional error.

**DC POWER / AC POWER (TO 400HZ)**

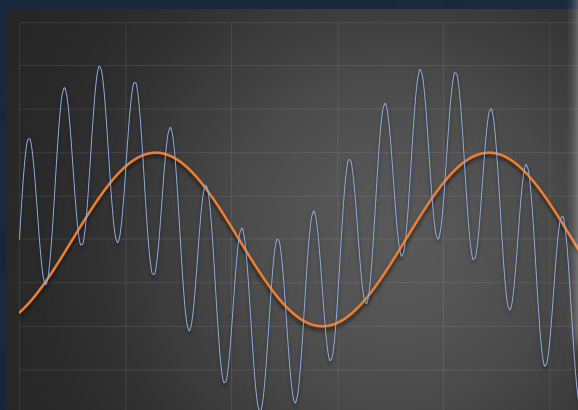
**SIMULATE UP TO 1.5MW WITH EA002 CLAMP COIL ADAPTER**

**DYNAMIC PHASE COMPENSATION WITH 0.1° RESOLUTION**

**0 ° TO 359.9 ° / POWER FACTOR 1 TO -1**

## PWRDDS OPTION

In addition to the standard Power option (PWR SINE), the PWR DDS option enables generation of distorted waveforms with both preset and user configurable waveforms, enabling simulation of harmonics, flicker and dropouts to calibration advanced power quality meters.



# ABOUT US

We truly believe in offering Solutions in Calibration, offering bespoke solutions for calibration laboratories and manufacturers across the globe. Our mission statement is not just a phrase, it is our design and support philosophy, offering support and advice that cannot be found elsewhere with a friendly atmosphere.

Transmille was founded in 1997 as a commercial calibration service, and soon after began to develop and manufacture a range of electrical calibration products and software to answer a growing requirement for solutions to common problems. Following this small beginning, Transmille has worked year on year to provide unique equipment and software to benefit calibration laboratories and manufacturers across the globe.

Ever since releasing the very first products Transmille have continued to innovate and develop new products for the metrology

community, from world first products such as the 2100 Electrical Test Equipment calibrator, through to the worlds lowest cost multi product calibrator the 1000 series.

Transmille now produce over 600+ calibration instruments per year, shipping instruments to customers ranging from National Standards Laboratories and manufacturers through to small calibration test houses around the world.

An unrivalled commitment to quality and innovation drives Transmille forwards, with a dedicated design and support team in house with a combined experience of over 60 years in manufacture and design of electrical calibration products and software.

With 3 offices (UK, USA and India) and local representatives around the globe we can offer exceptional support to users big and small.



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