

# CERTIFICATE OF CALIBRATION

Issued By BSRIA Instrument Solutions

Certificate Number UK09037MN

Date of Issue 14 January 2014



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Approved Signatory

**Customer :** Gemini Data Loggers (UK) Ltd  
Scientific House, Terminus Road  
Chichester West Sussex. PO19 8UJ

Date Received : 07 January 2014

<b>Instrument -</b>	System ID :	84623	Job Number : H24970-1
	Description :	Energy Logger + clamps	
	Manufacturer :	Gemini	
	Model Number :	TGE-0001	
	Serial Number :	692391	
	Procedure Version :	PW312F1/N	

## Environmental Conditions

Temperature : 20°C +/- 4°C  
Relative Humidity : <70% +/- %

Mains Voltage : 240V +/- 10V  
Mains Frequency : 50Hz +/- 1Hz

## Comments

The TGE-0001 meter was fitted with the following ACS-0020 clamp on probes  
Phase A (Red): BIS16512, B (Yellow)= BIS16513, C (Blue) = BIS16514

Results recorded as received. No adjustment performed.

## Calibration Information

The instrument was calibrated against laboratory standards whose values are traceable to recognised National Standards. The uncertainty limits quoted refer to the measured values only, with no account being taken of the instruments ability to maintain its calibration.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Calibrated By : M. Newland

Date of Calibration : 14 January 2014

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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Test Title

Applied Value

Recorded Value

## CALIBRATION PROCEDURE

*The UUT was energised for a period of not less than 1hr using a mains supply voltage of 240 Volts 50 Hz.*

*The Instrument was connected to a fully independent reference Voltage and current source whose uncertainty is known and traceable.*

*Using the reference source the following values were applied to the instrument and its indicated reading reported.*

*Multiturn induction coils were used to produce the currents shown.*

*Unless otherwise stated all AC measurements were performed at 50 Hz using a sinusoidal waveform.*

*The instrument being calibrated results were taken from the LCD display.*

*The uncertainties shown refer to the certificate and are not intended to indicate any long term instrument performance.*

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## Uncertainties

AC Volt 45 to 450Hz	78 to 168V $\pm(0.10\% + 6\text{mV})$ , 168 to 336V $\pm(0.17\% + 12\text{mV})$ , 336 to 1kV $\pm(0.3\% + 35\text{mV})$
AC Amps (x50 coils)	7.5 to 10A; $\pm 0.91\%$ , 10 to 25A; $\pm 0.51\%$ , 25 to 50A; $\pm 0.51\%$ , 50 to 100A; $\pm 0.51\%$ 100 to 250A; $\pm 0.46\%$ , 250 to 500A; $\pm 0.76\%$ , 500 to 1050A; $\pm 0.77\%$ .
Phase Angle	$\pm 0.025^\circ$ ; Power Factor; $\pm 0.001$ .
AC Power using coils	Frequency Range 45 - 69Hz; 13W to 252kW; $\pm 0.55\%$ , 252 to 1058kW; $\pm 0.86\%$ .
Instrument Stability	An additional uncertainty of 1 lsd should be added to all values.

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Test Title	Applied Value	Recorded Value
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## CALIBRATION RESULTS

### SINGLE PHASE OPERATION

*The instrument was energised from a nominal 240.00 V, 50.00 Hz for all tests.*

Voltage	240.00V	239.9V
Current L1	10.000A	9.9A
Power Factor	1.000PF	1.00PF
Power	2.400kW	2.40kW
Current L1	250.00A	247.8A
Power Factor	1.000PF	1.00PF
Power	60.000kW	59.36kW
Current L1	700.00A	693.3A
Power Factor	1.000PF	1.00PF
Power	168.000kW	166.36kW
Current L1	1 000.00A	990.7A
Power Factor	1.000PF	1.00PF
Power	240.000kW	237.13kW

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### Uncertainties

AC Volt 45 to 450Hz	78 to 168V $\pm(0.10\%+6\text{mV})$ , 168 to 336V $\pm(0.17\%+12\text{mV})$ , 336 to 1kV $\pm(0.3\%+35\text{mV})$
AC Amps (x50 coils)	7.5 to 10A; $\pm0.91\%$ , 10 to 25A; $\pm0.51\%$ , 25 to 50A; $\pm0.51\%$ , 50 to 100A; $\pm0.51\%$ 100 to 250A; $\pm0.46\%$ , 250 to 500A; $\pm0.76\%$ , 500 to 1050A; $\pm0.77\%$ .
Phase Angle	$\pm0.025^\circ$ ; Power Factor; $\pm0.001$ .
AC Power using coils	Frequency Range 45 - 69Hz; 13W to 252kW; $\pm0.55\%$ , 252 to 1058kW; $\pm0.86\%$ .
Instrument Stability	An additional uncertainty of 1 lsd should be added to all values.

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Test Title	Applied Value	Recorded Value
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## CALIBRATION RESULTS CONTINUED

### Three Phase Operation

Voltage	240.00V	239.9V
Current L1	10.000A	9.9A
Current L2	10.000A	9.9A
Current L3	10.000A	9.9A
Power Factor L1	1.000PF	1.00PF
Power Factor L2	1.000PF	0.99PF
Power Factor L3	1.000PF	0.99PF
Power	7.200kW	7.11kW
Current L1	50.00A	49.4A
Current L2	50.00A	49.9A
Current L3	50.00A	49.2A
Power Factor L1	1.000PF	0.99PF
Power Factor L2	1.000PF	0.99PF
Power Factor L3	1.000PF	0.99PF
Power	36.000kW	35.470kW
Current L1	250.00A	247.5A
Current L2	250.00A	248.5A
Current L3	250.00A	247.5A
Power Factor L1	1.000PF	1.00PF
Power Factor L2	1.000PF	0.99PF
Power Factor L3	1.000PF	0.99PF
Power	180.000kW	177.48kW

### Uncertainties

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AC Amps (x50 coils)	7.5 to 10A; $\pm 0.91\%$ , 10 to 25A; $\pm 0.51\%$ , 25 to 50A; $\pm 0.51\%$ , 50 to 100A; $\pm 0.51\%$ 100 to 250A; $\pm 0.46\%$ , 250 to 500A; $\pm 0.76\%$ , 500 to 1050A; $\pm 0.77\%$ .
Phase Angle	$\pm 0.025^\circ$ ; Power Factor; $\pm 0.001$ .
AC Power using coils	Frequency Range 45 - 69Hz; 13W to 252kW; $\pm 0.55\%$ , 252 to 1058kW; $\pm 0.86\%$ .
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## CALIBRATION RESULTS CONTINUED

Current L1	250.00A	247.6A
Current L2	250.00A	248.7A
Current L3	250.00A	247.5A
Power Factor L1	0.866PF	0.85PF
Power Factor L2	0.866PF	0.87PF
Power Factor L3	0.866PF	0.86PF
Power	155.880kW	154.01kW

Current L1	250.00A	247.4A
Current L2	250.00A	249.1A
Current L3	250.00A	247.3A
Power Factor L1	0.500PF	0.48PF
Power Factor L2	0.500PF	0.50PF
Power Factor L3	0.500PF	0.50PF
Power	90.000kW	89.27kW

Current L1	700.00A	696.8A
Current L2	700.00A	697.8A
Current L3	700.00A	695.9A
Power Factor L1	1.000PF	0.99PF
Power Factor L2	1.000PF	0.99PF
Power Factor L3	1.000PF	0.99PF
Power	504.000kW	496.03kW

Current L1	1 000.00A	994.8A
Current L2	1 000.00A	995.0A
Current L3	1 000.00A	991.9A
Power Factor L1	1.000PF	0.99PF
Power Factor L2	1.000PF	0.99PF
Power Factor L3	1.000PF	0.99PF
Power	720.000kW	709.16kW

**End.**

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## Uncertainties

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Instrument Stability	An additional uncertainty of 1 lsd should be added to all values.