# Schedule of Accreditation

**issued by**

**United Kingdom Accreditation Service**

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

---

## Seaward Electronic Ltd

**Issue No:** 015  **Issue date:** 18 December 2015

<table>
<thead>
<tr>
<th>Laboratory location</th>
<th>Address</th>
<th>Local contact:</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location details</td>
<td>South West Industrial Estate Peterlee SR8 2SW United Kingdom</td>
<td>Malcolm Steele Tel: +44 (0) 191 586 3511 Fax: +44 (0) 191 586 0227 E-Mail: <a href="mailto:MalcolmS@seaward.co.uk">MalcolmS@seaward.co.uk</a> Website: <a href="http://www.seaward.co.uk">www.seaward.co.uk</a></td>
<td>Electrical calibration Pressure calibration</td>
</tr>
</tbody>
</table>

**Calibration performed by the Organisation at the locations specified**

**Locations covered by the organisation and their relevant activities**

**Laboratory location:**

<table>
<thead>
<tr>
<th>Location details</th>
<th>Activity</th>
<th>Location code</th>
</tr>
</thead>
<tbody>
<tr>
<td>South West Industrial Estate Peterlee SR8 2SW United Kingdom</td>
<td>Malcolm Steele Tel: +44 (0) 191 586 3511 Fax: +44 (0) 191 586 0227 E-Mail: <a href="mailto:MalcolmS@seaward.co.uk">MalcolmS@seaward.co.uk</a> Website: <a href="http://www.seaward.co.uk">www.seaward.co.uk</a></td>
<td>Peterlee</td>
</tr>
</tbody>
</table>

**Site activities performed away from the location listed above:**

<table>
<thead>
<tr>
<th>Location details</th>
<th>Activity</th>
<th>Location code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customers' sites or premises</td>
<td>Malcolm Steele Tel: +44 (0) 191 586 3511 Fax: +44 (0) 191 586 0227 E-Mail: <a href="mailto:MalcolmS@seaward.co.uk">MalcolmS@seaward.co.uk</a> Website: <a href="http://www.seaward.co.uk">www.seaward.co.uk</a></td>
<td>Electrical calibration</td>
</tr>
</tbody>
</table>

---

The customers' site or premises must be suitable for the nature of the particular calibrations undertaken and will be the subject of contract review arrangements between the laboratory and the customer.
Seaward Electronic Ltd

Issue No: 015  Issue date: 18 December 2015

Calibration performed by the Organisation at the locations specified

### DETAIL OF ACCREDITATION

<table>
<thead>
<tr>
<th>Measured Quantity Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ((k = 2))</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
</table>

#### ELECTRICAL CALIBRATION

**DC VOLTAGE**

**Generation**
- 0 mV to 200 mV: 32 ppm + 3.6 µV
- 200 mV to 2 V: 32 ppm + 4.6 µV
- 2 V to 20 V: 26 ppm + 46 µV
- 20 V to 200 V: 32 ppm + 460 µV
- 200 V to 1000 V: 32 ppm + 4.6 mV

**Measurement**
- 0 mV to 200 mV: 4.7 µV
- 200 mV to 2 V: 16 ppm + 1.2 µV
- 2 V to 20 V: 12 ppm + 2.6 µV
- 20 V to 200 V: 18 ppm + 46 µV
- 200 V to 1000 V: 18 ppm + 460 µV

**DC RESISTANCE**

**Generation**
- 10 Ω: 6.9 mΩ
- 100 Ω: 12 mΩ
- 1 kΩ: 93 mΩ
- 10 kΩ: 930 mΩ
- 100 kΩ: 9.4 Ω
- 1 MΩ: 160 Ω
- 10 MΩ: 4.6 kΩ
- 100 MΩ: 590 kΩ
- 1 GΩ: 14 MΩ
- 1 mΩ: 15 ppm
- 10 mΩ: 8.0 ppm
- 100 mΩ: 7.6 ppm
- 1 Ω: 6.9 ppm
- 10 Ω: 6.6 ppm
- 100 Ω: 13 ppm
- 1 kΩ: 7.7 ppm
- 10 kΩ: 10 ppm
- 100 kΩ: 6.5 ppm
- 1 MΩ: 7.9 ppm

- Nominal values obtained from a multi-function calibrator for calibration of multimeters, resistance meters etc.
- Standard resistors available for calibration of resistance bridges, long-scale multimeters etc.
## Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC RESISTANCE (continued)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 mΩ</td>
<td>47 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 mΩ</td>
<td>24 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 mΩ</td>
<td>10 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ω</td>
<td>8.9 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Ω</td>
<td>9.2 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Ω</td>
<td>12 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 kΩ</td>
<td>9.2 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 kΩ</td>
<td>11 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 kΩ</td>
<td>9.1 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 MΩ</td>
<td>8.9 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Ω to 2 mΩ</td>
<td>35 μΩ</td>
<td>14 ppm + 33 μΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 mΩ to 20 Ω</td>
<td>9.2 ppm</td>
<td>0.21 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 Ω to 200 Ω</td>
<td>7.0 ppm</td>
<td>2.4 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 Ω to 2 kΩ</td>
<td>7.0 ppm</td>
<td>21 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 kΩ to 20 kΩ</td>
<td>7.4 ppm</td>
<td>0.27 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 kΩ to 200 kΩ</td>
<td>12 ppm</td>
<td>4.4 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 kΩ to 2 MΩ</td>
<td>23 ppm</td>
<td>97 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 MΩ to 20 MΩ</td>
<td>0.023 %</td>
<td>+ 11 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 MΩ to 200 MΩ</td>
<td>0.23 %</td>
<td>+ 1.1 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 MΩ to 2 GΩ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High resistance/high voltage Measurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0 kΩ to 100 kΩ</td>
<td>0.038 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 MΩ to 1 MΩ</td>
<td>0.060 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 MΩ to 10 MΩ</td>
<td>0.059 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 MΩ to 100 MΩ</td>
<td>0.061 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 MΩ to 1 GΩ</td>
<td>0.053 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GΩ to 10 GΩ</td>
<td>0.054 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 GΩ to 100 GΩ</td>
<td>0.072 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 GΩ to 1 TΩ</td>
<td>0.25 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 MΩ to 10 MΩ</td>
<td>0.32 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 MΩ to 100 MΩ</td>
<td>0.31 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 MΩ to 1 GΩ</td>
<td>0.31 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GΩ to 10 GΩ</td>
<td>0.31 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 GΩ to 100 GΩ</td>
<td>0.37 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 GΩ to 1 TΩ</td>
<td>0.44 %</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The applied voltages will be in the range 10 V to 1000 V DC

The applied voltages will be in the range 1 kV to 5 kV DC
<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTAGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Peterlee</td>
</tr>
<tr>
<td>Measurement</td>
<td>20 mV to 200 mV</td>
<td></td>
<td>0.012% + 43 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 55 Hz</td>
<td></td>
<td>0.012% + 60 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>55 kHz to 2 kHz</td>
<td></td>
<td>0.16% + 48 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 kHz to 10 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mV to 2 V</td>
<td></td>
<td>93 ppm + 350 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 100 Hz</td>
<td></td>
<td>73 ppm + 350 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Hz to 2 kHz</td>
<td></td>
<td>93 ppm + 490 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 kHz to 10 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 V to 20 V</td>
<td></td>
<td>93 ppm + 3.2 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 100 Hz</td>
<td></td>
<td>70 ppm + 6.3 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Hz to 2 kHz</td>
<td></td>
<td>93 ppm + 4.7 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 kHz to 10 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 V to 200 V</td>
<td></td>
<td>93 ppm + 33 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 100 Hz</td>
<td></td>
<td>69 ppm + 33 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Hz to 2 kHz</td>
<td></td>
<td>0.15% + 64 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 kHz to 10 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 V to 1000 V</td>
<td></td>
<td>93 ppm + 270 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 100 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Hz to 2 kHz</td>
<td></td>
<td>93 ppm + 780 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation</td>
<td>20 mV to 200 mV</td>
<td></td>
<td>0.062% + 34 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 1 kHz</td>
<td></td>
<td>0.11% + 50 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kHz to 10 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mV to 2 V</td>
<td></td>
<td>0.049% + 270 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 1 kHz</td>
<td></td>
<td>0.11% + 300 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kHz to 10 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 V to 20 V</td>
<td></td>
<td>0.048% + 2.5 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 1 kHz</td>
<td></td>
<td>0.085% + 2.8 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kHz to 10 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 V to 200 V</td>
<td></td>
<td>0.070% + 22 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 1 kHz</td>
<td></td>
<td>0.13% + 53 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kHz to 10 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 V to 1000 V</td>
<td></td>
<td>0.077% + 89 µV</td>
<td>Minimum frequency 46 Hz above 700 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 1 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kHz to 10 kHz</td>
<td></td>
<td>0.20% + 0.46 V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Schedule of Accreditation
issued by
United Kingdom Accreditation Service
21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

Seaward Electronic Ltd
Issue No: 015  Issue date: 18 December 2015

Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument or Gauge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC CURRENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation</td>
<td>0 μA to 200 μA</td>
<td>93 ppm + 35 nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 μA to 2 mA</td>
<td>81 ppm + 55 nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 mA to 20 mA</td>
<td>47 ppm + 400 nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 mA to 200 mA</td>
<td>0.012 % + 4.0 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mA to 1 A</td>
<td>0.014 % + 41 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 A to 2 A</td>
<td>0.020 % + 42 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 A to 10 A</td>
<td>0.039 % + 410 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 A to 30 A</td>
<td>0.039 % + 640 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 A to 1500 A</td>
<td>0.53 % + 490 m A</td>
<td>Hall effect clamps</td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td>0 μA to 200 μA</td>
<td>29 ppm + 25 nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 μA to 2 mA</td>
<td>29 ppm + 110 nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 mA to 20 mA</td>
<td>29 ppm + 1.0 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 mA to 200 mA</td>
<td>58 ppm + 14 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mA to 1 A</td>
<td>170 ppm + 330 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 A to 20 A</td>
<td>0.082 % + 140 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC CURRENT</td>
<td>45 Hz to 500 Hz</td>
<td>0.12 % + 290 nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation</td>
<td>20 μA to 200 μA</td>
<td>0.11 % + 580 nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 μA to 2 mA</td>
<td>0.11 % + 5.8 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 mA to 20 mA</td>
<td>0.11 % + 53 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 mA to 200 mA</td>
<td>0.12 % + 500 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 100 Hz</td>
<td>0.079 % + 2.8 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of clamp-on ammeters using multi-turn coil</td>
<td>50 to 60 Hz</td>
<td>0.34 % + 0.15 A</td>
<td>Hall effect clamps</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 A to 1500 A</td>
<td>0.55 % + 0.51 A</td>
<td>Wound clamps</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 A to 1500 A</td>
<td>0.55 % + 0.51 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td>50 Hz to 200 Hz:</td>
<td>0.023 % + 320 nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 μA to 200 μA</td>
<td>0.023 % + 1.6 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 μA to 2 mA</td>
<td>0.023 % + 16 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 mA to 20 mA</td>
<td>0.023 % + 160 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 mA to 200 mA</td>
<td>0.058 % + 1.6 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mA to 2 A</td>
<td>0.058 % + 1.6 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 100 Hz</td>
<td>0.12 % + 3.5 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 A to 20 A</td>
<td>0.12 % + 3.5 mA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assessment Manager: GP
<table>
<thead>
<tr>
<th>Measured Quantity Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( (k = 2) )</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FREQUENCY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of Portable Appliance Testers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Bond</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At 50 Hz:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Hz to 1 GHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3 ppm to 1.3 mHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insulation Resistance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At DC:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.25 MΩ</td>
<td></td>
<td>0.25 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5 MΩ</td>
<td></td>
<td>0.13 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0 MΩ</td>
<td></td>
<td>0.077 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0 MΩ</td>
<td></td>
<td>0.060 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0 MΩ</td>
<td></td>
<td>0.062 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 MΩ</td>
<td></td>
<td>0.066 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 MΩ</td>
<td></td>
<td>0.052 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 MΩ</td>
<td></td>
<td>0.051 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 MΩ</td>
<td></td>
<td>0.068 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 MΩ</td>
<td></td>
<td>0.064 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 MΩ</td>
<td></td>
<td>0.083 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 MΩ</td>
<td></td>
<td>0.12 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calibration of Portable Appliance Testers (continued)</strong></td>
<td></td>
<td></td>
<td>Petrelee</td>
<td></td>
</tr>
<tr>
<td>Insulation Resistance Test Voltage</td>
<td>100 V</td>
<td>0.094 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>250 V</td>
<td>0.073 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>500 V</td>
<td>0.13 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000 V</td>
<td>0.11 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leakage Current</td>
<td>DC:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 μA to 320 μA</td>
<td>0.12 % + 0.051 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>320 μA to 3.2 mA</td>
<td>0.069 % + 0.23 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 mA to 32 mA</td>
<td>0.11 % + 2.3 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 Hz to 60 Hz:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 mA to 1.6 mA</td>
<td>0.29 % + 0.40 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.6 mA to 16 mA</td>
<td>0.35 % + 3.8 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16 mA to 20 mA</td>
<td>0.35 % + 39 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash Test</td>
<td>DC, 50 Hz and 60 Hz:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current (0 mA to 32 mA)</td>
<td>See Leakage Current above</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Voltage (AC, 50 Hz and 60 Hz)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kV</td>
<td>12 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.5 kV</td>
<td>13 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 kV</td>
<td>17 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 kV</td>
<td>21 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 kV</td>
<td>28 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 kV</td>
<td>35 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Voltage (DC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kV</td>
<td>10 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 kV</td>
<td>12 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 kV</td>
<td>13 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 kV</td>
<td>14 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 kV</td>
<td>20 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 kV</td>
<td>32 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Test</td>
<td>At 50 Hz:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kVA and 3 kVA nominal</td>
<td>1.5 % + 0.015 kVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calibration of RCD Testers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trip Current</td>
<td>At 50 Hz:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 mA to 100 mA</td>
<td>1.4 % + 0.083 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 mA to 2 A</td>
<td>1.4 % + 0.83 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trip Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 ms to 100 ms</td>
<td>0.96 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 ms to 400 ms</td>
<td>1.5 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>400 ms to 700 ms</td>
<td>4.8 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>700 ms to 900 ms</td>
<td>8.5 ms</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Calibration of Loop Testers

**Loop impedance**

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration of Loop Testers</td>
<td><strong>At 50 Hz:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5 Ω to 1 Ω</td>
<td>12 mΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 Ω</td>
<td>36 mΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 Ω</td>
<td>65 mΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Ω</td>
<td>0.65 Ω</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kΩ</td>
<td>6.1 Ω</td>
<td></td>
</tr>
</tbody>
</table>

## Calibration of Seaward PV100/PV150 solar installation meters

The accreditation for calibration of these instruments includes the expression of opinions relating to the effects of storage periods of up to six months on the calibration validity.

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation Resistance</td>
<td><strong>0.5 MΩ</strong></td>
<td>10 kΩ</td>
<td>At 500 V DC</td>
</tr>
<tr>
<td></td>
<td>1 MΩ</td>
<td>10 kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 MΩ</td>
<td>100 kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>90 MΩ</td>
<td>100 kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>190 MΩ</td>
<td>1.0 MΩ</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation Voltage</td>
<td><strong>250 V</strong></td>
<td>1.0 V</td>
<td>Into 1 mA load</td>
</tr>
<tr>
<td></td>
<td>500 V</td>
<td>1.0 V</td>
<td>Into 1 mA load</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Resistance</td>
<td><strong>0.67 Ω</strong></td>
<td>10 mΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2 Ω</td>
<td>10 mΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.5 Ω</td>
<td>100 mΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Ω</td>
<td>1.0 Ω</td>
<td></td>
</tr>
<tr>
<td></td>
<td>190 Ω</td>
<td>1.0 Ω</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current clamp input</td>
<td><strong>100 mV (10 A simulation)</strong></td>
<td>100 mA</td>
<td>Simulation of current clamp at 100 A/V</td>
</tr>
<tr>
<td></td>
<td>199 mV (20 A simulation)</td>
<td>100 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500 mV (50 A simulation)</td>
<td>100 mA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPE Voltage</td>
<td><strong>110 V</strong></td>
<td>1.0 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>240 V</td>
<td>1.0 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>420 V</td>
<td>1.0 V</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open circuit panel voltage</td>
<td><strong>10.9 V</strong></td>
<td>100 mV</td>
<td>DC Voltage</td>
</tr>
<tr>
<td></td>
<td>49.9 V</td>
<td>100 mV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>202 V</td>
<td>1.0 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>440 V</td>
<td>1.0 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>640 V</td>
<td>1.0 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>900 V</td>
<td>1.0 V</td>
<td></td>
</tr>
</tbody>
</table>
Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration of Seaward PV100/PV150 solar installation meters (ctd)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short circuit current</td>
<td>0.97 A</td>
<td>10 mA</td>
<td>DC Current</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.7 A</td>
<td>20 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 A</td>
<td>50 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of defibrillator testers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>20 J to 70 J</td>
<td>1.5 % to 1.3 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>70 J to 100 J</td>
<td>1.3 % to 1.2 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 J to 360 J</td>
<td>1.2 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of temperature indicators By electrical simulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting ambient temperature measurement</td>
<td>17 °C to 23 °C</td>
<td>0.22 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT100 indicators</td>
<td>-125 °C to 0 °C</td>
<td>0.0025 °C to 0.0047 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 °C to 130 °C</td>
<td>0.0047 °C to 0.0070 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>130 °C to 266 °C</td>
<td>0.0070 °C to 0.0096 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>266 °C to 408 °C</td>
<td>0.0096 °C to 0.012 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>408 °C to 558 °C</td>
<td>0.012 °C to 0.015 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>558 °C to 715 °C</td>
<td>0.015 °C to 0.018 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>715 °C to 883 °C</td>
<td>0.018 °C to 0.021 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT25 indicators</td>
<td>5 °C to 408 °C</td>
<td>0.0056 °C to 0.013 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>408 °C to 883 °C</td>
<td>0.013 °C to 0.024 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type K thermocouple indicator simulation</td>
<td>-270 °C to -220 °C</td>
<td>2.4 °C</td>
<td>Including reference junction compensation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-200 °C to -70 °C</td>
<td>0.83 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-70 °C to 1370 °C</td>
<td>0.75 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of Medical Safety Analysers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Bond Resistance</td>
<td>At 50 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.1 Ω</td>
<td>0.024 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.33 Ω</td>
<td>0.047 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5 Ω</td>
<td>0.058 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Ω</td>
<td>0.025 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.8 Ω</td>
<td>0.047 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18 Ω</td>
<td>0.085 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Bond Current</td>
<td>2 mA to 20 mA</td>
<td>0.12 % + 0.58 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 mA to 200 mA</td>
<td>0.12 % + 5.8 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mA to 2 A</td>
<td>0.19 % + 6.1 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 A to 20 A</td>
<td>0.23 % + 24 mA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration of Medical Safety Analysers (continued)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>At DC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.01 MΩ to 5 MΩ</td>
<td>0.35 % + 5.8 kΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 MΩ to 20 MΩ</td>
<td>3.5 % + 5.8 kΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 MΩ to 200 MΩ</td>
<td>3.5 % + 15 kΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 MΩ to 2000 MΩ</td>
<td>3.5 % + 0.37 MΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation Resistance Test Voltage</td>
<td>100 V to 1000 V</td>
<td>0.35 % + 67 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leakage Current</td>
<td>DC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 μA to 200 μA</td>
<td>0.021 % + 0.58 μA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 μA to 2 mA</td>
<td>0.018 % + 0.60 μA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 mA to 20 mA</td>
<td>0.018 % + 1.6 μA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC 50 to 60 Hz</td>
<td>0.12 % + 1.0 μA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 μA to 200 μA</td>
<td>0.14 % + 2.3 μA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 μA to 2 mA</td>
<td>0.13 % + 36 μA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 mA to 20 mA</td>
<td>0.12 % + 36 μA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage Measurement</td>
<td>AC 50 to 60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 mV to 200 mV</td>
<td>0.093 % + 0.73 mV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 mV to 2 V</td>
<td>0.081 % + 7.2 mV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 V to 20 V</td>
<td>0.081 % + 7.2 mV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 V to 200 V</td>
<td>0.093 % + 48 mV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load</td>
<td>0.13 kVA</td>
<td>0.010 kVA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Calibration of Seaward Apollo 600 Portable Appliance Testers

<table>
<thead>
<tr>
<th>Measured Quantity Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth Bond Resistance</td>
<td>0.05 Ω to 19.99 Ω</td>
<td>0.015 % + 6.0 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Bond Test Current</td>
<td>0 mA to 250 mA DC</td>
<td>0.037 % + 0.58 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Bond Test Voltage</td>
<td>0 V to 10 VDC</td>
<td>42 ppm + 0.58 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>0.1 MΩ to 1 MΩ</td>
<td>0.019 % + 5.8 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 MΩ to 10 MΩ</td>
<td>0.065 % + 5.8 kΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 MΩ to 20 MΩ</td>
<td>0.91 % + 7.5 kΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation Voltage</td>
<td>0 V to 750 V DC</td>
<td>0.012 % + 0.058 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation Current</td>
<td>0 mA to 2 mA DC</td>
<td>0.014 % + 5.8 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Leakage Current</td>
<td>0.20 mA to 10mA DC</td>
<td>0.14 % + 5.6 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10mA to 20 mA DC</td>
<td>0.13 % + 64 μA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Touch Leakage Current</td>
<td>0.10 mA to 3.50 mA DC</td>
<td>0.14 % + 5.6 μA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The accreditation for calibration of these instruments includes the expression of opinions relating to the effects of storage periods of up to six months on the calibration validity.
Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calibration of Seaward Apollo 600 Portable Appliance Testers</strong> (continued)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substitute Leakage Current</td>
<td>0.20 mA to 20 mA, 50 Hz</td>
<td>0.14 % + 24 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substitute Leakage Test Voltage</td>
<td>0 V to 50 V, 50 Hz</td>
<td>0.069 % + 25 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Test Voltage</td>
<td>0 V to 250 V, 50 Hz</td>
<td>0.069 % + 0.63 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Test Current</td>
<td>0 A to 16 A, 50 Hz</td>
<td>1.2 % + 0.24 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCD Test Time</td>
<td>10 ms, 20 ms, 500 ms</td>
<td>0.13 ms, 0.26 ms, 4.5 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCD Test Current</td>
<td>0 mA to 165 mA, 50 Hz</td>
<td>0.25 % + 47 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calibration of HV Neon Indicators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leakage Current</td>
<td>0 μA to 600 μA, 600 μA to 6000 μA</td>
<td>1.4 % + 1.6 μA, 1.4 % + 14 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calibration of DC Power Supplies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Voltage</td>
<td>0 V to 1 V, 1 V to 10 V, 10 V to 100 V, 100 V to 1000 V</td>
<td>52 ppm + 0.58 mV, 48 ppm + 0.58 mV, 61 ppm + 1.0 mV, 61 ppm + 59 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Current</td>
<td>0 mA to 10 mA, 10 mA to 100 mA, 100 mA to 1 A, 1 A to 10 A, 10 A to 20 A</td>
<td>0.060 % + 0.58 mA, 0.059 % + 0.58 mA, 0.12 % + 0.59 mA, 0.068 % + 4.9 mA, 0.068 % + 7.9 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PRESSURE CALIBRATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas Pressure, Gauge &amp; Absolute</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of pressure indicating instruments and gauges</td>
<td>-85 kPa to 0.0 Pa, 0.0 Pa to 50 kPa, 50 kPa to 200 kPa, 200 kPa to 2 MPa</td>
<td>1.0 kPa, 24 Pa, 0.58 kPa, 1.1 kPa</td>
<td>These gauge pressure ranges can be calibrated in absolute mode subject to an additional uncertainty of +/- 24 Pa.</td>
<td></td>
</tr>
</tbody>
</table>
## Schedule of Accreditation

**Issued by**

**United Kingdom Accreditation Service**

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

Seaward Electronic Ltd

Issue No: 015  Issue date: 18 December 2015

Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ((k = 2))</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELECTRICAL CALIBRATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DC VOLTAGE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation</td>
<td>0 mV to 200 mV</td>
<td>84 ppm + 7.0 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mV to 2 V</td>
<td>73 ppm + 55 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 V to 20 V</td>
<td>73 ppm + 0.47 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 V to 200 V</td>
<td>74 ppm + 4.7 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 V to 1000 V</td>
<td>74 ppm + 31 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td>Up to 100 mV</td>
<td>68 ppm + 5.7 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 mV to 1 V</td>
<td>58 ppm + 10 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 V to 10 V</td>
<td>51 ppm + 82 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 V to 100 V</td>
<td>63 ppm + 0.91 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 V to 1000 V</td>
<td>63 ppm + 13 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DC RESISTANCE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation</td>
<td>10 Ω</td>
<td>59 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Ω</td>
<td>67 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kΩ</td>
<td>0.17 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 kΩ</td>
<td>1.2 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 kΩ</td>
<td>12 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 MΩ</td>
<td>0.24 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 MΩ</td>
<td>12 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 MΩ</td>
<td>0.24 MΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td>Up to 100 Ω</td>
<td>0.12 % + 13 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Ω to 1 kΩ</td>
<td>0.12 % + 95 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kΩ to 10 kΩ</td>
<td>0.12 % + 0.95 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 kΩ to 100 kΩ</td>
<td>0.12 % + 9.5 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 kΩ to 1 MΩ</td>
<td>0.12 % + 0.16 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 MΩ to 10 MΩ</td>
<td>0.47 % + 4.6 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 MΩ to 100 MΩ</td>
<td>1.1 % + 0.60 MΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AC VOLTAGE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation</td>
<td>20 mV to 200 mV</td>
<td>0.056 % + 49 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 1 kHz</td>
<td>0.092 % + 67 µV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kHz to 2 kHz</td>
<td>0.15 % + 0.30 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 kHz to 10 kHz</td>
<td>0.15 % + 30 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mV to 2 V</td>
<td>0.070 % + 0.53 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 1 kHz</td>
<td>0.095 % + 0.55 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kHz to 2 kHz</td>
<td>0.13 % + 0.94 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 kHz to 10 kHz</td>
<td>0.13 % + 9.4 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 V to 20 V</td>
<td>0.069 % + 5.3 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 1 kHz</td>
<td>0.087 % + 5.5 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kHz to 2 kHz</td>
<td>0.15 % + 9.4 mV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assessment Manager: GP

Page 12 of 17
## Schedule of Accreditation

**Issued by United Kingdom Accreditation Service**
21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

### Seaward Electronic Ltd

**Issue No:** 015  **Issue date:** 18 December 2015

Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
</table>
| **AC VOLTAGE** (continued) | Generation (continued) | 20 V to 200 V  
45 Hz to 1 kHz  
1 kHz to 2 kHz  
2 kHz to 10 kHz  
200 V to 1000 V  
45 Hz to 1 kHz | 0.087 % + 53 mV  
0.12 % + 70 mV  
0.19 % + 0.10 mV | | |
| | Measurement | 10 mV to 100 mV  
45 Hz to 1 kHz  
1 kHz to 10 kHz  
100 mV to 1 V  
45 Hz to 1 kHz  
1 kHz to 10 kHz | 0.082 % + 57 μV  
0.11 % + 72 μV | | |
| | | 1 V to 10 V  
45 Hz to 1 kHz  
1 kHz to 10 kHz | 0.080 % + 3.8 mV  
0.096 % + 4.0 mV | | |
| | | 10 V to 100 V  
45 Hz to 1 kHz  
1 kHz to 10 kHz | 0.080 % + 37 mV  
0.11 % + 59 mV | | |
| | | 100 V to 750 V  
45 Hz to 1 kHz | 0.080 % + 0.29 mV | | |
| **DC CURRENT** | Generation | 0 A to 200 μA  
200 μA to 2 mA  
2 mA to 20 mA  
20 mA to 200 mA  
200 mA to 2 A  
2 A to 20 A | 0.019 % + 40 nA  
0.017 % + 0.17 μA  
0.017 % + 1.6 μA  
0.018 % + 19 μA  
0.069 % + 0.36 mA  
0.055 % + 1.4 mA | | |
| | Calibration of clamp-on ammeters using multi-turn coil | 20A to 200 A  
200 A to 1000A | 0.53 % + 0.49 A  
0.53 % + 0.49 A | Hall Effect Clamps | |
| | Measurement | 0 A to 10 mA  
10 mA to 100 mA  
100 mA to 1 A  
1 A to 3 A | 0.058 % + 7.3 μA  
0.059 % + 19 μA  
0.12 % + 0.13 mA  
0.14 % + 0.87 mA | | |
<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of Clamp-on ammeters using multi-turn coil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC CURRENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation</td>
<td>45 Hz to 200 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 μA to 200 μA</td>
<td>0.13 % + 0.57 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 μA to 2 mA</td>
<td>0.079 % + 1.9 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 mA to 20 mA</td>
<td>0.078 % + 35 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 mA to 200 mA</td>
<td>0.085 % + 0.19 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mA to 2 A</td>
<td>0.12 % + 1.8 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 Hz to 200 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 A to 20 A</td>
<td>0.19% + 9.3 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of clamp-on ammeters using multi-turn coil</td>
<td>50 to 60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 A to 200 A</td>
<td>0.33 % + 46 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 A to 1000 A</td>
<td>0.32 % + 46 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 A to 200 A</td>
<td>0.56 % + 0.49 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 A to 1000 A</td>
<td>0.55 % + 0.60 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td>45 Hz to 500 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 mA to 1 A</td>
<td>0.16 % + 0.68 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 A to 2 A</td>
<td>0.20 % + 2.2 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>1 Hz to 10 Hz</td>
<td>17 ppm + 1.3 mHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 Hz to 100 Hz</td>
<td>17 ppm + 1.3 mHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Hz to 1 kHz</td>
<td>17 ppm + 1.2 mHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kHz to 10 kHz</td>
<td>17 ppm + 1.2 mHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 kHz to 100 kHz</td>
<td>17 ppm + 1.4 mHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 kHz to 1 MHz</td>
<td>17 ppm + 8.3 mHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 MHz to 10 MHz</td>
<td>17 ppm + 82 mHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 MHz to 100 MHz</td>
<td>17 ppm + 0.82 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of Oscilloscopes</td>
<td>100 MHz to 1 GHz</td>
<td>17 ppm + 8.2 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Deflection</td>
<td>2 mV / division</td>
<td>34 μV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 mV / division</td>
<td>40 μV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 mV / division</td>
<td>51 μV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 mV / division</td>
<td>80 μV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 mV / division</td>
<td>0.18 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 mV / division</td>
<td>0.35 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 mV / division</td>
<td>0.70 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>500 mV / division</td>
<td>1.7 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 V / division</td>
<td>3.5 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 V / division</td>
<td>7.0 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 V / division</td>
<td>17 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 V / division</td>
<td>35 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 V / division</td>
<td>82 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 V / division</td>
<td>0.20 V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assessment Manager: GP
## Schedule of Accreditation

Issued by

**United Kingdom Accreditation Service**

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

Seaward Electronic Ltd

**Issue No:** 015  **Issue date:** 18 December 2015

Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( (k = 2) )</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument or Gauge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Calibration of Oscilloscopes**  
(continued) |       |                                                                                                 |         |               |
| Timebase | 5 ns / division | 0.085 % | | |
|          | 10 ns / division | 0.083 % | | |
|          | 20 ns / division | 0.083 % | | |
|          | 50 ns / division | 0.085 % | | |
|          | 100 ns / division | 0.083 % | | |
|          | 200 ns / division | 0.083 % | | |
|          | 500 ns / division | 0.085 % | | |
|          | 1 μs / division | 0.083 % | | |
|          | 2 μs / division | 0.083 % | | |
|          | 5 μs / division | 0.085 % | | |
|          | 10 μs / division | 0.083 % | | |
|          | 20 μs / division | 0.083 % | | |
|          | 50 μs / division | 0.085 % | | |
|          | 100 μs / division | 0.083 % | | |
|          | 200 μs / division | 0.083 % | | |
|          | 500 μs / division | 0.085 % | | |
|          | 1 ms / division | 0.083 % | | |
|          | 2 ms / division | 0.083 % | | |
|          | 5 ms / division | 0.085 % | | |
|          | 10 ms / division | 0.083 % | | |
|          | 20 ms / division | 0.083 % | | |
|          | 50 ms / division | 0.085 % | | |
|          | 100 ms / division | 0.084 % | | |
|          | 200 ms / division | 0.089 % | | |
|          | 500 ms / division | 0.11 % | | |
|          | 1 s / division | 0.17 % | | |
| **Calibration of Portable Appliance Testers** | | | | |
| Earth Bond | At 50 to 60 Hz | | | |
|          | 0.05 Ω | 1.0 mΩ | | |
|          | 0.1 Ω | 1.0 mΩ | | |
|          | 0.5 Ω | 1.4 mΩ | | |
|          | 1 Ω | 2.3 mΩ | | |
|          | 1.8 Ω | 8.9 mΩ | | |
|          | 10 Ω | 23 mΩ | | |
|          | 18 Ω | 36 mΩ | | |
| Insulation Resistance | At DC | | | |
|          | 10 kΩ to 2 MΩ | 0.12 % + 0.58 kΩ | | |
|          | 2 MΩ to 20 MΩ | 1.2 % + 0.66 kΩ | | |
|          | 20 MΩ to 200 MΩ | 1.2 % + 15 kΩ | | |
|          | 200 MΩ to 2 GΩ | 1.2 % + 0.37 MΩ | | |
| Insulation Resistance Test Voltage | 100 V to 1000 V | 0.19 % + 0.58 V | | |

Assessment Manager: GP
Calibration performed by the Organisation at the locations specified

<table>
<thead>
<tr>
<th>Measured Quantity Instrument or Gauge</th>
<th>Range</th>
<th>Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)</th>
<th>Remarks</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration of Portable Appliance Testers (continued)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leakage Current</td>
<td>At DC</td>
<td>0 mA to 1 mA 0.16 % + 0.82 μA 1 mA to 10 mA 0.16 % + 6.3 μA 10 mA to 20 mA 0.16 % + 63 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>At 50 Hz to 60 Hz</td>
<td>Up to 1 mA 0.35 % + 0.83 μA 1 mA to 10 mA 0.21 % + 8.3 μA 10 mA to 20 mA 0.21 % + 83 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash Test</td>
<td>DC, 50 Hz to 60 Hz</td>
<td></td>
<td>See Leakage Current above.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current (0 mA to 20 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Voltage (DC)</td>
<td>100 V to 1000 V 0.19 % + 0.58 V 1000 V to 6000 V 0.20 % + 11 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Voltage (AC; 50 Hz to 60 Hz)</td>
<td>100 V to 1000 V 0.37 % + 0.60 V 1000 V to 5000 V 0.64 % + 7.8 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Test</td>
<td>0 kVA to 3 kVA</td>
<td>0.78 % + 0.27 kVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of RCD Testers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trip Current</td>
<td>At 50 Hz</td>
<td>10 mA to 100 mA 1.4 % + 0.083 mA 100 mA to 2 A 1.4 % + 0.83 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trip Time</td>
<td>20 ms to 100 ms</td>
<td>0.96 ms 100 ms to 400 ms 1.5 ms 400 ms to 700 ms 4.8 ms 700 ms to 900 ms 8.5 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of Loop Testers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loop Impedance</td>
<td>At 50 Hz</td>
<td>0.5 Ω to 1 kΩ (0.60 % to 0.80 %) + 4.6 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of Defibrillator Analyzers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>20 J to 70 J 70 J to 100 J 100 J to 360 J</td>
<td>1.5 % to 1.3 % 1.3 % to 1.2 % 1.2 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

END
Introduction

The definitive statement of the accreditation status of a calibration laboratory is the Accreditation Certificate and the associated Schedule of Accreditation. This Schedule of Accreditation is a critical document, as it defines the measurement capabilities, ranges and boundaries of the calibration activities for which the organisation holds accreditation.

Calibration and Measurement Capabilities (CMCs)

The capabilities provided by accredited calibration laboratories are described by the Calibration and Measurement Capability (CMC), which expresses the lowest uncertainty of measurement that can be achieved during a calibration. If a particular device under calibration itself contributes significantly to the uncertainty (for example, if it has limited resolution or exhibits significant non-repeatability) then the uncertainty quoted on a calibration certificate will be increased to account for such factors. The CIPM-ILAC definition of the CMC is as follows:

A CMC is a calibration and measurement capability available to customers under normal conditions:
(a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA; or
(b) as described in the laboratory’s scope of accreditation granted by a signatory to the ILAC Arrangement.

The CMC is normally used to describe the uncertainty that appears in an accredited calibration laboratory’s schedule of accreditation and is the uncertainty for which the laboratory has been accredited using the procedure that was the subject of assessment. The CMC is calculated according to the procedures given in M3003 and is normally stated as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of \( k = 2 \). An accredited laboratory is not permitted to quote an uncertainty that is smaller than the published CMC in certificates issued under its accreditation.

The CMC may be described using various methods in the Schedule of Accreditation:

As a single value that is valid throughout the range.

As a range of values.

As an explicit function of the measurand or of a parameter (see below).

As a matrix or table where the CMCs depend on the values of the measurand and a further quantity.

In graphical form, providing there is sufficient resolution on each axis to obtain at least two significant figures for the CMC.

Expression of CMCs - symbols and units

In general, only units of the SI and those units recognised for use with the SI are used to express the values of quantities and of the associated CMCs. Nevertheless, other commonly used units may be used where considered appropriate for the intended audience. For example, the term “ppm” (part per million) is frequently used by manufacturers of test and measurement equipment to specify the performance of their products. Terms like this may be used in Schedules of Accreditation where they are in common use and understood by the users of such equipment, providing their use does not introduce any ambiguity in the capability that is being described.

When the CMC is expressed as an explicit function of the measurand or of a parameter, this often comprises a relative term (e.g., percentage) and an absolute term, i.e. one expressed in the same units as those of the measurand. This form of expression is used to describe the capability that can be achieved over a range of values. Some examples, and an indication of how they are to be interpreted, are shown below.

DC voltage, 100 mV to 1 V: 0.0025 % + 5.0 \( \mu \)V;

Over the range 100 mV to 1 V, the CMC is 0.0025 \% \( \Delta V \) + 5.0 \( \mu \)V, where \( \Delta V \) is the measured voltage.

Hydraulic pressure, 0.5 MPa to 140 MPa: 0.0036 % + 0.12 ppm/MPa + 4.0 Pa

Over the range 0.5 MPa to 140 MPa, the CMC is 0.0036 \% \( \Delta p \) + (0.12 \times 10^{-5} \times \Delta \mu \) + 4.0 Pa, where \( \Delta p \) is the measured pressure in Pa.

It should be noted that the percentage symbol (\%) simply represents the number 0.01. In cases where the CMC is stated only as a percentage, this is to be interpreted as meaning percentage of the measured value or indication.

Thus, for example, a CMC of 1.5 % means 1.5 \cdot 0.01 \cdot i, where \( i \) is the instrument indication.