

***PYLON ELECTRONICS INC.***

***Mississauga Calibration Lab***

***STATEMENT OF MEASUREMENT  
CAPABILITIES***

# ***ELECTRICAL***

## ELECTRICAL

| Measured Quantity              | Units                   | Range                                                                                | Best Measurement<br>Uncertainty<br>±                           | Capability                                                     |
|--------------------------------|-------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|
| DC Voltage                     | Volts (V)               | 1 $\mu$ V to 1 kV<br>100 mV<br>1.0 V to 10 V<br>10 V to 1 kV<br>1 kV to 10 kV        | -<br>0.0015%<br>0.0010%<br>0.0012%<br>2.0 %                    | Generate<br>Measure<br>Measure<br>Measure<br>Measure           |
| DC Current                     | Amperes (A)             | 0 A to 20 A<br>0 A to 20 A<br>20 A to 100 A                                          | -<br>0.01%<br>0.25%                                            | Generate<br>Measure<br>Measure                                 |
| Resistance<br>Four Terminal    | Resistance ( $\Omega$ ) | 0.1 to 1<br>1 to 1 k<br>1 k to 100 k<br>100 k to 1 M<br>1 M to 100 M<br>100 M to 1 G | 0.0515%<br>0.0065%<br>0.0011%<br>0.0020%<br>0.0550%<br>0.5010% | Measure<br>Measure<br>Measure<br>Measure<br>Measure<br>Measure |
| Capacitance<br>Fixed Standards | Farads (F)              | 10 pF to 1.0 $\mu$ F                                                                 | 0.1%                                                           | Generate                                                       |
| Inductance<br>Fixed Standards  | Henries (H)             | 100 $\mu$ H<br>1 mH to 1 H                                                           | 0.25%<br>0.1%                                                  | Generate<br>Generate                                           |

## ELECTRICAL (Continued)

| Measured Quantity | Units     | Range                                                                        | Best Measurement Uncertainty<br>$\pm$              | Capability |
|-------------------|-----------|------------------------------------------------------------------------------|----------------------------------------------------|------------|
| AC Voltage        | Volts (V) | 10 mV<br>(1 Hz to 20 kHz)<br>(20 kHz to 100 kHz)<br>(100 kHz to 300 kHz)     | $\leq 0.060\%$<br>$\leq 0.511\%$<br>$\leq 4.020\%$ | Measure    |
|                   |           | 100 mV-10 V<br>(1 Hz to 20 kHz)<br>(20 kHz to 100 kHz)<br>(100 kHz to 2 MHz) | $\leq 0.016\%$<br>$\leq 0.082\%$<br>$\leq 1.510\%$ | Measure    |
|                   |           | 100 V<br>(1 Hz to 20 kHz)<br>(20 kHz to 100 kHz)<br>(100 kHz to 1 MHz)       | $\leq 0.024\%$<br>$\leq 0.122\%$<br>$\leq 1.510\%$ | Measure    |
|                   |           | 1000 V (700 V Max)<br>(1 Hz to 20 kHz)<br>(20 kHz to 100 kHz)                | $\leq 0.062\%$<br>$\leq 0.302\%$                   | Measure    |

## ELECTRICAL (Continued)

| Measured Quantity | Units          | Range               | Best Measurement Uncertainty<br>± | Capability      |
|-------------------|----------------|---------------------|-----------------------------------|-----------------|
| AC Current        | Amperes<br>(A) | 10 µA to 20 A       |                                   | <i>Generate</i> |
|                   |                | 100 µA              |                                   |                 |
|                   |                | (10 Hz to 20 Hz)    | 0.43%                             | <i>Measure</i>  |
|                   |                | (20 Hz to 45 Hz)    | 0.18%                             | <i>Measure</i>  |
|                   |                | (45 Hz to 5 kHz)    | 0.09%                             | <i>Measure</i>  |
|                   |                | 1 mA to 100 mA      |                                   |                 |
|                   |                | (10 Hz to 20 Hz)    | 0.42%                             | <i>Measure</i>  |
|                   |                | (20 Hz to 45 Hz)    | 0.17%                             | <i>Measure</i>  |
|                   |                | (45 Hz to 100 Hz)   | 0.08%                             | <i>Measure</i>  |
|                   |                | (100 Hz to 5 kHz)   | 0.05%                             | <i>Measure</i>  |
|                   |                | (5 kHz to 20 kHz)   | 0.08%                             | <i>Measure</i>  |
|                   |                | (20 kHz to 50 kHz)  | 0.44%                             | <i>Measure</i>  |
|                   |                | (50 kHz to 100 kHz) | 0.70%                             | <i>Measure</i>  |
|                   |                | 1 A                 |                                   |                 |
|                   |                | (10 Hz to 20 Hz)    | 0.42%                             | <i>Measure</i>  |
|                   |                | (20 Hz to 45 Hz)    | 0.18%                             | <i>Measure</i>  |
|                   |                | (45 Hz to 100 Hz)   | 0.10%                             | <i>Measure</i>  |
|                   |                | (100 Hz to 5 kHz)   | 0.12%                             | <i>Measure</i>  |
|                   |                | (5 kHz to 20 kHz)   | 0.32%                             | <i>Measure</i>  |
|                   |                | (20 kHz to 50 kHz)  | 1.04 %                            | <i>Measure</i>  |
|                   |                | 1 A to 20 A         |                                   |                 |
|                   |                | (50 Hz to 5 kHz)    | 0.05%                             | <i>Measure</i>  |
|                   |                | 20 A to 100 A       |                                   |                 |
|                   |                | (60 Hz)             | 0.05%                             | <i>Measure</i>  |

*ELECTRICAL (Continued)*

| Measured Quantity | Units   | Range                                | Best Measurement Uncertainty<br>$\pm$       | Capability      |
|-------------------|---------|--------------------------------------|---------------------------------------------|-----------------|
| Ratio, DC         | DCV     | 0 to 1.0                             | 5 ppm                                       | <i>Ratio</i>    |
| Low Frequency     | (db)    | 40 Vpk-pk<br>(1 $\mu$ Hz to 100 kHz) | 0.1db                                       | <i>Generate</i> |
| Frequency         | Hz      | 1 mHz to 1.30 GHz                    | $3 \times 10^{-7}$ to<br>$2 \times 10^{-9}$ | <i>Measure</i>  |
| Time              | Seconds | 10 to $10^4$ sec                     | 0.001 sec                                   | <i>Measure</i>  |

*RF/Microwave Frequency*

| Measured Quantity               | Units | Range                                        | Best Measurement Uncertainty<br>± | Capability      |
|---------------------------------|-------|----------------------------------------------|-----------------------------------|-----------------|
| RF/Microwave Power<br>(50 OHM)  | (dbm) | +23 dbm<br>(1 MHz to 20 MHz)                 | N/A                               | <i>Generate</i> |
|                                 |       | - 130 dbm to +10 dbm<br>(10 MHz to 1024 MHz) | N/A                               | <i>Generate</i> |
|                                 |       | - 80 dbm to +15 dbm<br>(10 MHz to 20 GHz)    | 4%                                | <i>Measure</i>  |
|                                 |       | -70 dbm to -20 dbm<br>(10 MHz to 20 GHz)     | 4%                                | <i>Measure</i>  |
|                                 |       | -15 dbm to +35 dbm<br>(10 MHz to 20 GHz)     | 4%                                | <i>Measure</i>  |
| Attenuation<br>50 ohm           | (db)  | 0 to 100 db<br>(DC to 1 kHz)                 | 1.0 db                            | <i>Measure</i>  |
|                                 |       | 0 to 100 db<br>(DC to 2.0 GHz)               | Greater of 0.2 db<br>or 3%        | <i>Generate</i> |
| Return Loss<br>50 ohm<br>Type N | (db)  | (10 MHz – 18 GHz)                            | Directivity<br>> 38db             | <i>Measure</i>  |

# ***PHYSICAL PROPERTIES***



PHYSICAL/DIMENSIONAL

| Measured Quantity                                                       | Units  | Range                                 | Best Measurement<br>Uncertainty<br>$\pm$              |
|-------------------------------------------------------------------------|--------|---------------------------------------|-------------------------------------------------------|
| Gauge Blocks<br><br>Length                                              | Inches | 0.050" to 1"<br>1" to 4"              | 8 $\mu$ inch<br>8 $\mu$ inch<br>(+ 1 $\mu$ inch/inch) |
| Length Standards                                                        | Inches | 5" to 11"<br>11" to 20"<br>20" to 29" | 25 $\mu$ inch<br>40 $\mu$ inch<br>50 $\mu$ inch       |
| Cylindrical Pin Gauges                                                  | mm     | Up to 38 mm                           | 0.3 $\mu$ m                                           |
| Internal Dimensions<br>Cylindrical Hole Gauges<br>Internal Measurements | Inches | 0.06" to 6.0"<br><br>up to 24"        | 40 $\mu$ inch<br><br>Consult Lab.                     |
| Straightness                                                            | Inches | Consult Lab.                          | 50 $\mu$ inch                                         |
| Surface Plate                                                           | Inches | Consult Lab.                          | Grade "A" for most common<br>sizes.                   |
| Parallels                                                               | Inches | -                                     | 50 $\mu$ inch                                         |
| Indicator Dial                                                          | Inches | up to 1.0"                            | 0.0001 inch                                           |

PHYSICAL/DIMENSIONAL (Continued)

| Measured Quantity       | Units          | Range                                                                                       | Best Measurement Uncertainty $\pm$      |
|-------------------------|----------------|---------------------------------------------------------------------------------------------|-----------------------------------------|
| Calipers Micrometers    | Inches         |                                                                                             |                                         |
| Outside                 |                | Up to 40"                                                                                   | 20 $\mu$ inch<br>up to 4 inches         |
| Inside                  |                | Up to 12"                                                                                   | 40 $\mu$ inch<br>4 inches to 24 inches  |
| Depth                   |                | Up to 12"                                                                                   | 80 $\mu$ inch<br>24 inches to 40 inches |
| Hardness Testers        | Rockwell units | "A" Scale<br>HRA 82,68,47<br><br>"B" Scale<br>HRB 93,70,59<br><br>"C" Scale<br>HRC 63,41,22 | 1 unit                                  |
| Flatness                | Inches         | Area covered by 3" diameter optical flat                                                    | 0.000005 inches                         |
| Level                   | Inch per Foot  | -                                                                                           | 0.001 inch / Foot                       |
| Force Gauges            | (lbs)          | 500 lbs                                                                                     | 0.1% of Indicated Reading               |
| Compression and Tension |                |                                                                                             |                                         |
| Torque                  | -              | 100 ft.lb. to 1000 ft.lb.                                                                   | 0.5% of Indicated Reading               |
| Measure                 |                | 5 in.lb. to 250 ft.lb.                                                                      | 0.25% of Indicated Reading              |
|                         |                | 20 in.oz. to 200 in.oz.                                                                     | 1.0% of Indicated Reading               |
|                         |                | 0.5 in.oz. to 25 in.oz.                                                                     | 0.25% of Indicated Reading              |

*PHYSICAL/DIMENSIONAL (Continued)*

| Measured Quantity               | Units              | Range                                           | Best Measurement Uncertainty $\pm$                           |
|---------------------------------|--------------------|-------------------------------------------------|--------------------------------------------------------------|
| Thermometers                    |                    |                                                 |                                                              |
| Submersible (oil bath)          | $^{\circ}\text{C}$ | -5 $^{\circ}\text{C}$ to 125 $^{\circ}\text{C}$ | $\pm 0.25$ $^{\circ}\text{C}$                                |
| Infrared                        | $^{\circ}\text{C}$ | Ambient to 650 $^{\circ}\text{C}$               | $\pm 0.3$ $^{\circ}\text{C}$                                 |
| Humidity                        | % RH               | Ambient                                         | $\pm 5$ % RH of Indicated Value                              |
| Balance and Scales<br>Physician | (kg)/(lbs)         | 1 g to 1 kg<br>1 lb to 500 lb                   | ASTM class 1 mass comparison<br>ASTM class 5 mass comparison |
| Protractor                      | Degree             | 00°00' to 360° 00'                              | $\pm 00^{\circ} 05''$ (Second)                               |
| Pneumatic Pressure              | PSI                | Up to 10000 PSI                                 | $\pm 0.1\%$ of Indicated Value                               |
| Hydraulic Pressure              | PSI                | Up to 10000 PSI                                 | $\pm 0.1\%$ of Indicated Value                               |
| Hand Crimper (Dia.)             | Inch               | 0.060" to 0.50"                                 | $\pm 0.0002$ "                                               |