

# Schedule

Issue date: 19 July 2017  
Valid until: 19 July 2020



MS ISO/IEC 17025

NO: SAMM 839

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LABORATORY LOCATION:  
(PERMANENT LABORATORY)



LABORATORY OF NIHON DENKEI (M) SDN. BHD.  
UNIT NO. A-11-1, NORTH POINT OFFICE  
MID VALLEY CITY  
NO. 1, MEDAN SYED PUTRA UTARA  
59200 KUALA LUMPUR

FIELD OF CALIBRATION:

ELECTRICAL

This laboratory has demonstrated its technical competence to operate in accordance with MS ISO/IEC 17025:2005 (ISO/IEC 17025:2005).

This laboratory's fulfillment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001 (see Joint ISO-ILAC-IAF Communiqué dated April 2017).

\* The expanded uncertainties are based on an estimated confidence probability of approximately 95% and have a coverage factor of  $k=2$  unless stated otherwise.

## SCOPE OF CALIBRATION: ELECTRICAL

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
<b>SOURCES</b>			
a) DC Voltage	-0.1 mV to -100 mV -100.1 mV to -1 V -1.1 V to -10 V -10.1 V to -100 V -100.1 V to -1000 V  0.1 mV to 100 mV 100.1 mV to 1 V 1.1 V to 10 V 10.1 V to 100 V 100.1 V to 1000 V	0.0076 mV 0.000025 V 0.00018 V 0.0045 V 0.045 V  0.0076 mV 0.000025 V 0.00018 V 0.0045 V 0.045 V	Measurement Using Multimeter Keysight 34470A
(b) DC Current	0.1 $\mu$ A to 1 $\mu$ A 1.1 $\mu$ A to 10 $\mu$ A 10.1 $\mu$ A to 100 $\mu$ A 100.1 $\mu$ A to 1 mA 1.1 mA to 10 mA 10.1 mA to 100 mA 100.1 mA to 1 A 1.1 A to 10 A	0.00055 $\mu$ A 0.0052 $\mu$ A 0.051 $\mu$ A 0.00055 mA 0.0070 mA 0.055 mA 0.00090 A 0.014 A	Measurement Using Multimeter Keysight 34470A

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## SCOPE OF CALIBRATION: ELECTRICAL

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
(c) AC Voltage	<b><u>40Hz to 50kHz</u></b>  10.1 mV to 100 mV 100.1 mV to 1 V 1.1 V to 10 V 10.1 V to 100 V 100.1 V to 750 V	  0.11 mV 0.0020 V 0.011 V 0.10 V 0.92 V	Measurement Using Multimeter Keysight 34470A
(d) AC Current	<b><u>20Hz to 5kHz</u></b>  10 $\mu$ A to 100 $\mu$ A 100.1 $\mu$ A to 1 mA 1.1 mA to 10 mA 10.1 mA to 100 mA 100.1 mA to 1 A 1.1 A to 10 A	  0.15 $\mu$ A 0.0015 mA 0.0014 mA 0.14 mA 0.0015 A 0.021 A	Measurement Using Multimeter Keysight 34470A
(e) Resistance 2 wire	0.1 $\Omega$ to 100 $\Omega$ 100.1 $\Omega$ to 1 k $\Omega$ 1.1k $\Omega$ to 10 k $\Omega$ 10.1k $\Omega$ to 100 k $\Omega$ 100.1k $\Omega$ to 1 M $\Omega$ 1.1M $\Omega$ to 10 M $\Omega$ 10.1M $\Omega$ to 100 M $\Omega$	0.10 $\Omega$ 0.00010 k $\Omega$ 0.00046 k $\Omega$ 0.0045 k $\Omega$ 0.000076 M $\Omega$ 0.0026 M $\Omega$ 0.30 M $\Omega$	Measurement Using Multimeter Keysight 34470A
f) Resistance 4 wire	0.1 $\Omega$ to 100 $\Omega$ 100.1 $\Omega$ to 1 k $\Omega$ 1.1k $\Omega$ to 10 k $\Omega$ 10.1k $\Omega$ to 100 k $\Omega$ 100.1k $\Omega$ to 1 M $\Omega$ 1.1M $\Omega$ to 10 M $\Omega$	0.10 $\Omega$ 0.00010 k $\Omega$ 0.00046 k $\Omega$ 0.0045 k $\Omega$ 0.000076 M $\Omega$ 0.0026 M $\Omega$	Measurement Using Multimeter Keysight 34470A

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## SCOPE OF CALIBRATION: ELECTRICAL

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
<b>2. INDICATING INSTRUMENTS</b>  (a) DC Voltage	-0.1 mV to -100 mV -100.1 mV to -1 V -1.1 V to -10 V -10.1 V to -100 V -100.1 V to -1000 V	0.0013 mV 0.000010 V 0.000040 V 0.00056 V 0.0071 V	Generating using Calibrator model Fluke 5700A
	0.1 mV to 100 mV 100.1 mV to 1 V 1.1 V to 10 V 10.1 V to 100 V 100.1 V to 1000 V	0.0013 mV 0.000010 V 0.000040 V 0.00056 V 0.0071 V	
(b) DC Current	-10 $\mu$ A to -200 $\mu$ A -200.1 $\mu$ A to -2mA - 2.1 mA to -20 mA -20.1 mA to -200 mA -200.1 mA to -2 A -2.1 A to -10 A  10 $\mu$ A to 200 $\mu$ A 200.1 $\mu$ A to 2 mA 2.1 mA to 20 mA 20.1 mA to 200 mA 200.1 mA to 2 A 2.1 A to 10 A	0.0015 $\mu$ A 0.0015 mA 0.00076 mA 0.0099 mA 0.00018 A 0.0041 A  0.0015 $\mu$ A 0.0015 mA 0.00076 mA 0.0099 mA 0.00018 A 0.0041 A	Generating using Calibrator model Fluke 5700A & Fluke 5725A Amplifier
(c) AC Voltage	<b>40Hz to 20kHz</b> 1.1mV to 20 mV 20.1mV to 200 mV 200.1mV to 2 V 2.1 V to 20V 20.1 V to 200 V  <b>40Hz to 1kHz</b> 200.1 V to 1000 V	0.0060 mV 0.024 mV 0.00012 V 0.0012 V 0.013 V  0.085 V	Generating using Calibrator model Fluke 5700A

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Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
(d) AC Current	<b>40Hz to 10kHz</b> 10 $\mu$ A to 200 $\mu$ A 200.1 $\mu$ A to 2 mA 2.1 mA to 20 mA 20.1 mA to 200 mA 200.1 mA to 2 A 2.1 A to 10 A	0.30 $\mu$ A 0.0029 mA 0.028 mA 0.24 mA 0.015 A 0.037 A	Generating using Calibrator model Fluke 5700A & Fluke 5725A Amplifier
e) Resistance	FIXED VALUE  1 $\Omega$ 10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$ 1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$	0.000098 $\Omega$ 0.000091 $\Omega$ 0.00026 $\Omega$ 0.000088 k $\Omega$ 0.000020 k $\Omega$ 0.00023 k $\Omega$ 0.000021 M $\Omega$ 0.00014 M $\Omega$ 0.0045 M $\Omega$	Generating using Calibrator model Fluke 5700A

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## SCOPE OF CALIBRATION: ELECTRICAL

## SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
<b>1. SOURCES</b>			
(a) DC Voltage	-0.1 mV to -100 mV -100.1 mV to -1 V -1.1 V to -10 V -10.1 V to -100 V -100.1 V to -1000 V  0.1 mV to 100 mV 100.1 mV to 1 V 1.1 V to 10 V 10.1 V to 100 V 100.1 V to 1000 V	0.0076 mV 0.000025 V 0.00018 V 0.0045 V 0.045 V  0.0076 mV 0.000025 V 0.00018 V 0.0045 V 0.045 V	Measurement Using Multimeter Keysight 34470A
(b) DC Current	100.1 nA to 1 $\mu$ A 1.1 $\mu$ A to 10 $\mu$ A 10.1 $\mu$ A to 100 $\mu$ A 100.1 $\mu$ A to 1 mA 1.1 mA to 10 mA 10.1 mA to 100 mA 100.1 mA to 1 A 1.1 A to 10 A	0.00055 $\mu$ A 0.0052 $\mu$ A 0.051 $\mu$ A 0.00055 mA 0.0070 mA 0.055 mA 0.00090 A 0.014 A	Measurement Using Multimeter Keysight 34470A
(c) AC Voltage	<b>40Hz to 50kHz</b>  10.1 mV to 100 mV 100.1 mV to 1 V 1.1 V to 10 V 10.1 V to 100 V 100.1 V to 750 V	0.11 mV 0.0020 V 0.011 V 0.10 V 0.92 V	Measurement Using Multimeter Keysight 34470A
(d) AC Current	<b>20Hz to 5kHz</b>  10 $\mu$ A to 100 $\mu$ A 100.1 $\mu$ A to 1 mA 1.1 mA to 10 mA 10.1 mA to 100 mA 100.1 mA to 1 A 1.1 A to 10 A	0.15 $\mu$ A 0.0015 mA 0.0014 mA 0.14 mA 0.0015 A 0.021 A	Measurement Using Multimeter Keysight 34470A

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## SCOPE OF CALIBRATION: ELECTRICAL

## SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
(e) Resistance 2 wire	0.1 $\Omega$ to 100 $\Omega$ 100.1 $\Omega$ to 1 k $\Omega$ 1.1k $\Omega$ to 10 k $\Omega$ 10.1k $\Omega$ to 100 k $\Omega$ 100.1k $\Omega$ to 1 M $\Omega$ 1.1M $\Omega$ to 10 M $\Omega$ 10.1M $\Omega$ to 100 M $\Omega$	0.10 $\Omega$ 0.00010 k $\Omega$ 0.00046 k $\Omega$ 0.0045 k $\Omega$ 0.000076 M $\Omega$ 0.0026 M $\Omega$ 0.30 M $\Omega$	Measurement Using Multimeter Keysight 34470A
(f) Resistance 4 wire	0.1 $\Omega$ to 100 $\Omega$ 100.1 $\Omega$ to 1 k $\Omega$ 1.1k $\Omega$ to 10 k $\Omega$ 10.1k $\Omega$ to 100 k $\Omega$ 100.1k $\Omega$ to 1 M $\Omega$ 1.1M $\Omega$ to 10 M $\Omega$	0.10 $\Omega$ 0.00010 k $\Omega$ 0.00046 k $\Omega$ 0.0045 k $\Omega$ 0.000076 M $\Omega$ 0.0026 M $\Omega$	Measurement Using Multimeter Keysight 34470A
<b>2. INDICATING INSTRUMENTS</b>			
(a) DC Voltage	-0.1 mV to -100 mV -100.1 mV to -1 V -1.1 V to -10 V -10.1 V to -100 V -100.1 V to -1000 V  0.1 mV to 100 mV 100.1 mV to 1 V 1.1 V to 10 V 10.1 V to 100 V 100.1 V to 1000 V	0.0013 mV 0.000010 V 0.000040 V 0.00056 V 0.0071 V  0.0013 mV 0.000010 V 0.000040 V 0.00056 V 0.0071 V	Generating using Calibrator model Fluke 5700A
(b) DC Current	-10 $\mu$ A to -200 $\mu$ A -200.1 $\mu$ A to -2mA - 2.1 mA to -20 mA -20.1 mA to -200 mA -200.1 mA to -2 A -2.1 A to -10 A  10 $\mu$ A to 200 $\mu$ A 200.1 $\mu$ A to 2 mA 2.1 mA to 20 mA 20.1 mA to 200 mA 200.1 mA to 2 A 2.1 A to 10 A	0.0015 $\mu$ A 0.0015 mA 0.00076 mA 0.0099 mA 0.00018 A 0.0041 A  0.0015 $\mu$ A 0.0015 mA 0.00076 mA 0.0099 mA 0.00018 A 0.0041 A	Generating using Calibrator model Fluke 5700A & Fluke 5725A Amplifier

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## SCOPE OF CALIBRATION: ELECTRICAL

## SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
(c) AC Voltage	<u>40Hz to 20kHz</u> 1.1mV to 20 mV 20.1mV to 200 mV 200.1mV to 2 V 2.1 V to 20V 20.1 V to 200 V  <u>40Hz to 1kHz</u> 200.1 V to 1000 V	0.0060 mV 0.024 mV 0.00012 V 0.0012 V 0.013 V  0.085 V	Generating using Calibrator model Fluke 5700A
( d ) AC Current	<u>40Hz to 10kHz</u> 10 $\mu$ A to 200 $\mu$ A 200.1 $\mu$ A to 2 mA 2.1 mA to 20 mA 20.1 mA to 200 mA 200.1 mA to 2 A 2.1 A to 10 A	0.30 $\mu$ A 0.0029 mA 0.028 mA 0.24 mA 0.015 A 0.037 A	Generating using Calibrator model Fluke 5700A & Fluke 5725A Amplifier
e) Resistance	FIXED VALUE  1 $\Omega$ 10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10k $\Omega$ 100 k $\Omega$ 1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$	0.000098 $\Omega$ 0.000091 $\Omega$ 0.00026 $\Omega$ 0.0000088 k $\Omega$ 0.000020 k $\Omega$ 0.00023 k $\Omega$ 0.000021 M $\Omega$ 0.00014 M $\Omega$ 0.0045 M $\Omega$	Generating using Calibrator model Fluke 5700A

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## Signatories:

1. Ng Kah Wai
2. Shazrul Azmir