



MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-02/03
TECHPLACE II SINGAPORE 569874
65 67484384



Certificate of Calibration

Date: April 28, 2020

Cert No. 551220083587388

Customer:

WATERS PACIFIC PTE LTD

1 SCIENCE PARK ROAD, #02-08 THE CAPRICORN
SINGAPORE SCIENCE PARK II
SINGAPORE 117528

Work Order #: SG-11014134

MPC Control #: 17E3258
Asset ID: 93188
Gage Type: MULTIFUNCTION I/O
Manufacturer: NATIONAL INSTRUMENTS
Model Number: PXI-6229
Size: N/A
Temp/RH: 22°C / 50 %
Location: Calibration performed at MPC facility

Serial Number: 17E3258
Department: N/A
Performed By: DIVIEERNRAJ CHANDRAN
Received Condition: IN TOLERANCE
Returned Condition: IN TOLERANCE
Cal. Date: April 28, 2020
Cal. Interval: 12 MONTHS
Cal. Due Date: April 28, 2021

Calibration Notes:

Performance test passed. See attached data (2 Pages).

Calibration performed for PT Surya Teknologi.

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
DH3876	MULTI-FUNCTION CALIBRATOR	5700A/NAF	6020913	FLUKE	Apr 9, 2021	551220083583661
DC8376	DIGITAL MULTIMETER	PXI-4071	EC2663	NATIONAL INSTRUMENTS	Mar 21, 2021	551220082875809
CA8201	225MHZ UNIVERSAL COUNTER	53132A	MY40004745	AGILENT	May 4, 2020	551220082996309

Procedures Used in this Event

Procedure Name	Description
NI B/E/M/S/X SERIES DAQ	DAQ Multifcton and Simultaneous Multifuction I/O, National Instruments B/E/M/S Series, Oct-18-2019

Calibrating Technician:

DIVIEERNRAJ CHANDRAN

QC Approval:

JUN CALIMAG

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCSL Z540.3-2006 and in case without guard banded the probability of false-accept depending on test uncertainty ratio.

THE CALIBRATION REPORT STATUS:

PASS- Term used when compliance statement is given, and the measurement result is PASS.

PASS^o - Term used when compliance statement is given, and the measurement result is conditional passed or PASS^o.

FAIL- Term used when compliance statement is given, and the measurement result is FAIL.

FAIL^o - Term used when compliance statement is given, and the measurement result is conditional failed or FAIL^o.

REPORT OF VALUE - Term used when reported measurement is not requiring compliance statement in report.

ADJUSTED - When adjustments are made to an instrument which changes the value of measurement from what was measured as found to new value as left.

LIMITED - When an instrument fails calibration but is still functional in a limited manner.

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated. This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCSL Z540.3. Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.

CALIBRATION PERFORMANCE TEST DATA

DUT Information	
Type	PXI-6229
Tracking number	93188
Serial Number	17E3258
Notes	Verification and adjustment were performed.

Operator Information	
Operator	Divieernraj Chandran
Calibration Date	28 April 2020 16:30:40
Notes	As Found test limits are derived from 1 year specifications. As Left test limits are derived from 24 hour specifications.

Environmental Conditions	
Temperature	22.0 C
Humidity	50.0 %

Customer Information	
Name	Waters Pacific Pte Ltd
Work Order	SG-11014134
Address	1 Science Park Road, #02-08 The Caparicorn Singapore Science Park II. Singapore 117528
Notes	In-Lab Calibration

Version Information

Calibration Executive Version	3.6.1
Procedure Version	3.6.1.0
NI-DAQmx	15.0.0

Standard Information

Type	Tracking Number	Calibration Due Date	Notes
Fluke 5700A Multifunction Calibrator	DH3876	4/9/2021	
National Instruments PXI-4071 Digital Multimeter	DC8376	3/21/2021	
Agilent 53132A 225MHz Universal Counter	CA8201	5/4/2020	

Calibration Results

Analog Input Test

Calibration				As Found				As Left				Uncertainty
LowerRange	UpperRange	Channel	Test Value	Low Limit	Reading	High Limit	PassFail	Low Limit	Reading	High Limit	PassFail	
-0.2 V	0.2 V	ai0	-0.1996000 V	-0.1997120 V	-0.1995912 V	-0.1994880 V	Passed	-0.1996940 V	-0.1995956 V	-0.1995060 V	Passed	0.00011 V
-0.2 V	0.2 V	ai0	0.0000000 V	-0.0000700 V	0.0000103 V	0.0000700 V	Passed	-0.0000700 V	-0.0000131 V	0.0000700 V	Passed	0.000035 V
-0.2 V	0.2 V	ai0	0.1996000 V	0.1994880 V	0.1995908 V	0.1997120 V	Passed	0.1995060 V	0.1995915 V	0.1996940 V	Passed	0.00011 V
-1 V	1 V	ai0	-0.998000 V	-0.998359 V	-0.997964 V	-0.997641 V	Passed	-0.998269 V	-0.998003 V	-0.997731 V	Passed	0.00011 V
-1 V	1 V	ai0	0.000000 V	-0.000189 V	0.000010 V	0.000189 V	Passed	-0.000189 V	0.000010 V	0.000189 V	Passed	0.000035 V
-1 V	1 V	ai0	0.998000 V	0.997641 V	0.997965 V	0.998359 V	Passed	0.997731 V	0.998018 V	0.998269 V	Passed	0.00011 V
-5 V	5 V	ai0	-4.99000 V	-4.99162 V	-4.98974 V	-4.98839 V	Passed	-4.99117 V	-4.98999 V	-4.98883 V	Passed	0.00011 V
-5 V	5 V	ai0	0.000000 V	-0.000817 V	-0.000020 V	0.000817 V	Passed	-0.000817 V	0.000010 V	0.000817 V	Passed	0.000035 V
-5 V	5 V	ai0	4.99000 V	4.98839 V	4.98980 V	4.99162 V	Passed	4.98883 V	4.99008 V	4.99117 V	Passed	0.00011 V
-10 V	10 V	ai0	-9.98000 V	-9.98310 V	-9.97938 V	-9.97690 V	Passed	-9.98220 V	-9.97985 V	-9.97780 V	Passed	0.00011 V
-10 V	10 V	ai0	0.000000 V	-0.00160 V	-0.00002 V	0.00160 V	Passed	-0.00160 V	0.00001 V	0.00160 V	Passed	0.000035 V
-10 V	10 V	ai0	9.98000 V	9.97690 V	9.97955 V	9.98310 V	Passed	9.97780 V	9.98017 V	9.98220 V	Passed	0.00011 V

Analog Output Test

Calibration				As Found				As Left				Uncertainty
LowerRange	UpperRange	Channel	Test Value	Low Limit	Reading	High Limit	PassFail	Low Limit	Reading	High Limit	PassFail	
-10 V	10 V	ao0	9.98000 V	9.97677 V	9.98028 V	9.98323 V	Passed	9.97767 V	9.97972 V	9.98233 V	Passed	0.00011 V
-10 V	10 V	ao0	0.00000 V	-0.00173 V	-0.00018 V	0.00173 V	Passed	-0.00173 V	-0.00020 V	0.00173 V	Passed	0.000035 V
-10 V	10 V	ao0	-9.98000 V	-9.98323 V	-9.98040 V	-9.97677 V	Passed	-9.98233 V	-9.97983 V	-9.97767 V	Passed	0.00011 V
-10 V	10 V	ao1	9.98000 V	9.97677 V	9.98015 V	9.98323 V	Passed	9.97767 V	9.97987 V	9.98233 V	Passed	0.00011 V
-10 V	10 V	ao1	0.00000 V	-0.00173 V	0.00005 V	0.00173 V	Passed	-0.00173 V	0.00002 V	0.00173 V	Passed	0.000035 V
-10 V	10 V	ao1	-9.98000 V	-9.98323 V	-9.98047 V	-9.97677 V	Passed	-9.98233 V	-9.97989 V	-9.97767 V	Passed	0.00011 V
-10 V	10 V	ao2	9.98000 V	9.97677 V	9.98011 V	9.98323 V	Passed	9.97767 V	9.97980 V	9.98233 V	Passed	0.00011 V
-10 V	10 V	ao2	0.00000 V	-0.00173 V	0.00008 V	0.00173 V	Passed	-0.00173 V	0.00007 V	0.00173 V	Passed	0.000035 V
-10 V	10 V	ao2	-9.98000 V	-9.98323 V	-9.98025 V	-9.97677 V	Passed	-9.98233 V	-9.97968 V	-9.97767 V	Passed	0.00011 V
-10 V	10 V	ao3	9.98000 V	9.97677 V	9.98044 V	9.98323 V	Passed	9.97767 V	9.97984 V	9.98233 V	Passed	0.00011 V
-10 V	10 V	ao3	0.00000 V	-0.00173 V	0.00000 V	0.00173 V	Passed	-0.00173 V	0.00000 V	0.00173 V	Passed	0.000035 V
-10 V	10 V	ao3	-9.98000 V	-9.98323 V	-9.98059 V	-9.97677 V	Passed	-9.98233 V	-9.98001 V	-9.97767 V	Passed	0.00011 V

Counter Test

Calibration		As Found				As Left				Uncertainty
Channel	Test Value	Low Limit	Reading	High Limit	PassFail	Low Limit	Reading	High Limit	PassFail	
ctr0	5.000000 MHz	4.999750 MHz	5.000001 MHz	5.000250 MHz	Passed	4.999750 MHz	5.000001 MHz	5.000250 MHz	Passed	3 x 10-11