



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 21, 2020

Customer:

WATERS PACIFIC PTE LTD

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

Cert No. 551220083577998

Work Order #:	SG-11014090
MPC Control #:	145DF14
Serial Number:	145DF14
Asset ID:	91745
Department:	N/A
Gage Type:	MULTIFUNCTION I/O
Performed By:	DIVIEERNRAJ CHANDRAN
Manufacturer:	NATIONAL INSTRUMENTS
Received Condition:	IN TOLERANCE
Model Number:	PXI-6229
Returned Condition:	IN TOLERANCE
Size:	N/A
Cal. Date:	April 21, 2020
Temp/RH:	22°C / 50 %
Cal. Interval:	12 MONTHS
Location:	Calibration performed at MPC facility
Cal. Due Date:	April 21, 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 #
DC8376	DIGITAL MULTIMETER	PXI-4071	EC2663	NATIONAL INSTRUMENTS	Mar 21, 2021	551220082875809
CA8201	225MHZ UNIVERSAL COUNTER	53132A	MY40004745	AGILENT	May 4, 2020	551220082996309
FA3467	CALIBRATOR	5720A/ WIDEBAND OPTION	4665018	FLUKE	May 13, 2020	551220083009554

Procedures Used in this Event

Procedure Name	Description
NI B/E/M/S/X SERIES DAQ	DAQ Multifunction and Simultaneous Multifunction 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/NCCL Z540.3-2006.

The status of compliance with the acceptance criteria is reported as:

PASS - Compliant with specification;
FAIL - Not compliant with specification.

FAIL² - The measured value is not within the acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.

PASS² - The measured value is within acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.

The expanded uncertainty of measurement is stated as the standard uncertainty 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/NCCL Z540.3 Method 6-Guard Bands based on Test Uncertainty Ratio. 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		Operator Information		Customer Information	
Type	PXI-6229	Operator	Divieernraj Chandran	Name	Waters Pacific Pte Ltd
Tracking number	91745	Calibration Date	21 April 2020 15:32:19	Work Order	SG-11014090
Serial Number	145DF14	Notes	As Found test limits are derived from 1 year specifications. As Left test limits are derived from 24 hour specifications.	Address	1 Science Park Road, #02-08 The Caparicorn Singapore Science Park II. Singapore 117528
Notes	Verification and adjustment were performed.			Notes	In-Lab Calibration

Environmental Conditions	
Temperature	22.0 C
Humidity	50.0 %

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	FA3467	5/13/2020	
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	-0.1995777 V	-0.1994880 V	Passed	-0.1996940 V	-0.1996086 V	-0.1995060 V	Passed	0.00011 V
-0.2 V	0.2 V	ai0	0.0000000 V	-0.0000700 V	-0.0000145 V	0.0000700 V	Passed	-0.0000700 V	-0.0000055 V	0.0000700 V	Passed	0.0000035 V
-0.2 V	0.2 V	ai0	0.1996000 V	0.1994880 V	0.1995784 V	0.1997120 V	Passed	0.1995060 V	0.1996098 V	0.1996940 V	Passed	0.00011 V
-1 V	1 V	ai0	-0.998000 V	-0.998359 V	-0.997917 V	-0.997641 V	Passed	-0.998269 V	-0.997978 V	-0.997731 V	Passed	0.00011 V
-1 V	1 V	ai0	0.000000 V	-0.000189 V	0.000005 V	0.000189 V	Passed	-0.000189 V	-0.000001 V	0.000189 V	Passed	0.0000035 V
-1 V	1 V	ai0	0.998000 V	0.997641 V	0.997960 V	0.998359 V	Passed	0.997731 V	0.998011 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	-4.98996 V	-4.98883 V	Passed	0.00011 V
-5 V	5 V	ai0	0.000000 V	-0.000817 V	0.000008 V	0.000817 V	Passed	-0.000817 V	0.000006 V	0.000817 V	Passed	0.0000035 V
-5 V	5 V	ai0	4.99000 V	4.98839 V	4.98975 V	4.99162 V	Passed	4.98883 V	4.99003 V	4.99117 V	Passed	0.00011 V
-10 V	10 V	ai0	-9.98000 V	-9.98310 V	-9.97944 V	-9.97690 V	Passed	-9.98220 V	-9.97992 V	-9.97780 V	Passed	0.00011 V
-10 V	10 V	ai0	0.00000 V	-0.00160 V	0.00000 V	0.00160 V	Passed	-0.00160 V	-0.00001 V	0.00160 V	Passed	0.0000035 V
-10 V	10 V	ai0	9.98000 V	9.97690 V	9.97956 V	9.98310 V	Passed	9.97780 V	9.98010 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	9.98039 V	9.98323 V	Passed	9.97767 V	9.97977 V	9.98233 V	Passed	0.00011 V
-10 V	10 V	ao0	0.00000 V	-0.00173 V	0.000016 V	0.00173 V	Passed	-0.00173 V	0.000016 V	0.00173 V	Passed	0.0000035 V
-10 V	10 V	ao0	-9.98000 V	-9.98323 V	-9.98038 V	-9.97677 V	Passed	-9.98233 V	-9.97976 V	-9.97767 V	Passed	0.00011 V
-10 V	10 V	ao1	9.98000 V	9.97677 V	9.98055 V	9.98323 V	Passed	9.97767 V	9.97991 V	9.98233 V	Passed	0.00011 V
-10 V	10 V	ao1	0.00000 V	-0.00173 V	-0.00024 V	0.00173 V	Passed	-0.00173 V	-0.00024 V	0.00173 V	Passed	0.0000035 V
-10 V	10 V	ao1	-9.98000 V	-9.98323 V	-9.98044 V	-9.97677 V	Passed	-9.98233 V	-9.97983 V	-9.97767 V	Passed	0.00011 V
-10 V	10 V	ao2	9.98000 V	9.97677 V	9.98038 V	9.98323 V	Passed	9.97767 V	9.97979 V	9.98233 V	Passed	0.00011 V
-10 V	10 V	ao2	0.00000 V	-0.00173 V	-0.00012 V	0.00173 V	Passed	-0.00173 V	-0.00010 V	0.00173 V	Passed	0.0000035 V
-10 V	10 V	ao2	-9.98000 V	-9.98323 V	-9.98057 V	-9.97677 V	Passed	-9.98233 V	-9.97995 V	-9.97767 V	Passed	0.00011 V
-10 V	10 V	ao3	9.98000 V	9.97677 V	9.98046 V	9.98323 V	Passed	9.97767 V	9.98016 V	9.98233 V	Passed	0.00011 V
-10 V	10 V	ao3	0.00000 V	-0.00173 V	0.000017 V	0.00173 V	Passed	-0.00173 V	0.000018 V	0.00173 V	Passed	0.0000035 V
-10 V	10 V	ao3	-9.98000 V	-9.98323 V	-9.98051 V	-9.97677 V	Passed	-9.98233 V	-9.97989 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	
ct0	5.000000 MHz	4.999750 MHz	4.999965 MHz	5.000250 MHz	Passed	4.999750 MHz	4.999965 MHz	5.000250 MHz	Passed	3 x 10 ⁻¹¹