

# 1215765 03

# **Test Results**

# S9110 Windscreen Retention Test 6 Hour Soak

Customer: Contact: Thomas KÜGEL

HORIBA MIRA Ltd Verbindungstechnik **PETEC** Safety Development Dept

GmbH,

Wüstenbuch 26. 96132

SCHLÜSSELFELD.

**GERMANY** 

Nuneaton Warwickshire CV10 0TU. UK

Watling Street

Paul Moore

+44(0)24 7635 5000

Witnesses: Rudolf Gerlach - TUV Rheinland Authority: S84925

Test Date(s) 30 November 2017

Test Objective / Method / Specification No

To assess PETEC windscreen bonding product performance according to FMVSS212. Vehicle was soaked at 23°C and 50% relative humidity. The test was conducted 6 hours after the windscreen was fitted. MIRA Test Number S9110.

Specimen Description / Part No(s)

PETEC Scheibenkleber (83600), PETEC Multiaktiv Primer (82410), PETEC Aktivator (82230).

### Test vehicle:

Make Ford

Model Mondeo Drive hand RH drive

VIN WF05XXGBB57C13161

Test Results Summary

Results only relate to items tested. The subject was tested in Not Met See comments Met accordance with the test specification with without deviation. The acceptance criteria of the test specification were:

Prepared By:

Approved By:

William Martin

Colin Smith Head of Crash Senior Engineer - Crash

Date: 29/09/21

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## **Product Details**

Part Description	Part Number	Date Received
Primer	PETEC 82410	27 & 28/11/17
Activator	PETEC 82230	27 & 28/11/17
Sealant	PETEC 83600	27 & 28/11/17

## Test Results Detail

The test vehicle was soaked at a 6 hour average temperature of 23°C and relative humidity 50% after windscreen installation, which was carried out by 24 Screen Savers Ltd. It was then subjected to a 100% frontal impact by being propelled into a rigid crash block at 30mph (48km/h), as described in FMVSS212 Section 5. The ATDs were restrained by the vehicle's standard seat belts and the airbags triggered by the vehicle standard system.

Test Conditions				
Tyre Pressure (bar)	Front	2.1	Rear	2.1
Vehicle modifications	None			
Steering Column	Mid position			
Windows	Down			
Seatbelt Height Adjust	Mid position			
Doors	Unlocked			
Parking Brake	Off			
Ignition	On			
Seat Adjustment - Driver	Mid Fore/Aft – Lowest Height			
Seat adjustment – Passenger	Mid Fore/Aft – Lowest Height			
Restraint system specification	Driver and passenger airbag			

Vehicle mass details	Front (kg)	Rear (kg)	Total (kg)
Unloaded vehicle mass	792	555.5	1347.5
Test Weight (in test condition, including 93% fuel, nominal fluids, instrumentation, ballast and 2 occupants)	865	829.5	1694.5

Test Results : Page 2 of 33 PETEC

Assessment against Legislative Criteria		
Impact Velocity (Target 48.3 +1 / -0 km/h)	48.6 km/h	Complied
Impact Alignment (target <5°. Approx. ± 235mm for 2700mm wheelbase)	45 mm left	Complied
Performance assessment:	LH perimeter 0%	Complied
(Max 25% detachment on each side of windscreen perimeter)	RH perimeter 0%	Complied

# Test Equipment

Rigid Barrier with plywood facing

2x Hybrid III 50%ile ATDs (Anthropomorphic Test Devices) – un-instrumented for ballast only Measurement equipment as listed in Appendix 6

6 high speed digital cameras

## Attachments

Appendix 1 - Test Photographs

Appendix 2 - Quality Assurance of Measurements

# Appendix 1 Test Photographs



Photo 1 LH General view – Pre-Test



Photo 2 LH General view – Post-Test



Photo 3 Front view – Pre-Test

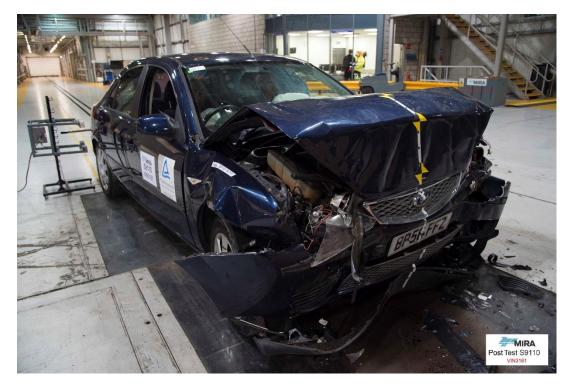


Photo 4 Front view – Post-Test



Photo 5 RH General view – Pre-Test



Photo 6 RH General view – Post-Test



Photo 7
Close front view of LH A-pillar / windscreen LH edge – Post-Test



Photo 8
Close front view of RH A-pillar / windscreen RH edge – Post-Test



Photo 9
Close front view of header rail / windscreen top edge – Post-Test



Photo 10
Close front view of scuttle / windscreen lower edge – Post-Test



Photo 11
Post-test LHF ATD side view – Post-Test



Photo 12
Post-test RHF ATD side view – Post-Test

# Appendix 2 Quality Assurance of Measurements

All instrumentation, high speed images and associated analysis contained in this report conforms to the requirements within SAE J211 July 2007.

The test equipment is checked on a regular schedule to traceable standards in an International Assurance of Measurements (QAM) procedure. Each item of equipment is issued with a QAM number.

The numbers for the equipment used in these tests were:-

Item	QAM number	Cal due date
ATD Identification – LHF HIII 50% No 75	N/A	N/A
ATD Identification – RHF HIII 50% No 138	N/A	N/A
Weigh Scales	38720-23 38724-27	29/06/2018 20/08/2018
5m Steel Tape Measure	34848	07/11/2022
Digital Level	33520	18/01/2018
Stop Watch	34851 38460	15/12/2018 17/05/2018
Tyre Pressure gauge	39679	09/03/2018
Impact Speed Measure (fixed)	8167	26/02/2018
Impact speed measure (mobile)	17921	29/07/2018
Climatic Control Temperature Probe	39704-07, 39785-88	03/01/2018
Climatic Control Humidity Probe	31995-96 31997-98	18/08/2018 19/01/2018
32ch Thermocouple Amplifier	30279	03/01/2018
Climactic Chamber Controller	34000	05/01/2018

Camera ID	View	QAM number	Cal due date
1	F01 LH View – Whole Vehicle	37921	01/08/2018
2	F02 LH View – Front Half of Vehicle	37924	13/07/2018
3	F06 RH View – Whole Vehicle	37938	17/08/2018
4	F07 RH View – Front Half of Vehicle	37922	22/11/2018
5	F14 Overhead View – Whole Vehicle	37919	18/07/2018
6	F11 Front View – Front Half of Vehicle	37917	18/07/2018
7			
8			

Channel Sample Rate: N/A

## Weigh Scales

## CALIBRATION CERTIFICATE

## Issued by HORIBA MIRA Ltd

Issue date: 29 Jun 2017 Cert No: 33720170617



Page 1 of 5 Pages

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Mark Pickering – Department Manager Philip Macleod – Supervisor – Instrument Calibration

Intercomp 170127-WPC

mac

Dominic Mhandu - Metrologist

Client: Test Operations FG Section:

nstruments

Watting Street Nuneaton Warwickshire

17 Jun 2017

Client ID: Q38720 to Q38723

MIRA ID: Date received: Dallas ID:

Address:

Manufacturer: Safety, Crash Off-Board Model:

> Description: Weigh Pads Serial No: 0216MC15008 Calibration Date: 29 Jun 2017 QA4299/C/07 Calibration Procedure: Equipment used: Page 2-5 Measurement Results: Page 2-5

Page 2-5 Measurement Uncertainty:

Condition of Instrument: Used, in good condition

Wilhin specification on receipt, at the points measured subject to the measurement uncertainty Yes Adjusted during calibration No Repaired prior to or during calibration No Within specification on completion, at the points measured subject to the measurement uncertainty Yes

The reported values are the result of measurements taken at the time of calibration within the environment stated and do not carry any implication regarding the lang term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate relate only to the instrument detailed above on the dates specified.

The instrument was allowed to acclimatise in an environment of 20°C ± 2°C and 50%RH ± 25%RH, for a minimum of 12 hours before commencing the calibration. The electrical supply within the laboratory is 240 Yolis  $\pm$  15 Yolis and 50 Hz  $\pm$ 3.5Hz with a total harmonic distortion of less than 3%.

This Instrument was calibrated by comparison with force measurement reference standards using a MIRA procedure. where the instrument has an electrical output and this has been calibrated, the output has been measured using electrical reference standards.

The reported uncertainty is based on a standard uncertainty multiplied by a coverage fector of k=2, providing a level of confidence of

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## CALIBRATION CERTIFICATE

## Issued by HORIBA MIRA Ltd

Issue date: 20 Aug 2017 Cert No: 38724170817



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- Mark Pickering Department Manager
- ☐ Philip Macleod Supervisor -② Dominic Mhandu Metrologist - Instrument Calibration

Client: Test Operations FG Safety, Crash Off-Board Section: Instruments

Watling Street Nuneaton

Warwickshire

Client ID:

Address:

MIRA ID: Q38724 to Q38727 Date received: 17 Aug 2017 Dallas ID:

Manufacturer: Intercomp 170127-WPC Model:

Description: Weigh Pads Serial No: 0216MC15003 Calibration Date: 20 Aug 2017 Calibration Procedure: QA4299/C/C7 Equipment used: Pages 2 to 5 Measurement Results: Pages 2 to 5 Measurement Uncertainty: Pages 2 to 5

Condition of Instrument: Used, in good condition

Within specification on receipt, at the points measured subject to the measurement uncertainty Yes Adjusted during calibration No Repaired prior to or during calibration No Within specification on completion, at the points measured subject to the measurement uncartainty Yes

The reported values are the result of measurements taken at the time of calibration within the environment stated and do not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate relate only to the instrument detailed above on the dates

The instrument was allowed to acclimatise in an environment of  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and  $50\%\text{RH} \pm 25\%\text{RH}$ , for a minimum of 12 hours before commencing the calibration. The electrical supply within the laboratory is 240 Volts  $\pm$  15 Volts and 50 Hz  $\pm$  0.5Hz with a total harmonic distortion of less than 3%.

This Instrument was calibrated by comparison with force measurement reference standards using a MIRA procedure. Where the instrument has an electrical output and this has been calibrated, the output has been measured using electrical reference standards.

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%

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## 5m Steel Tape Measure

# CALIBRATION CERTIFICATE

## Issued by HORIBA MIRA Ltd

Issue date: 08 Nov 2017 Cert No: 34848181017



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mag

Mark Pickering – Department Manager Philip Madeod – Supervisor – Instrument Calibration Dominic Mhandu - Metrologist

Client: Test Operations FG Safety, Crash Off-Board Section:

Instruments Watting Street

Nuneaton

Warwickshire

MIRA ID: Q34848 Date received: 18 Oct 2017 Dallas ID:

Address:

Client ID:

Assist Manufacturer: 32G-5019 Model:

5m Steel Tape Description: Measure

Serial No: **Calibration Date:** 08 Nov 2017 QA3105/C/03 Calibration Procedure:

Equipment used: Page 2 Measurement Results: Page 2 Measurement Uncertainty: Page 2

Condition of Instrument: Used, in good condition

Within specification on receipt, at the points measured subject to the measurement uncertainty Yes Adjusted during calibration No Repaired prior to or during calibration No Within specification on completion, at the points measured subject to the measurement uncertainty

The reported values are the result of measurements taken at the time of collibration within the environment stated and do not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate relate only to the instrument detailed above on the dates specified.

The instrument was allowed to accumatise in an environment of 20°C ± 2°C and 50%RH ± 25%RH, for a minimum of 12 from suctions the commencing the collibration. The electrical supply within the laboratory is 240 Volts  $\pm$  15 Volts and 50 Hz  $\pm$  0.6Hz with a total harmonic distortion of less than 3%.

This Instrument was calibrated by comparison with length measurement reference standards using a MIRA procedure which incorporates limits based on the tolerances contained in document NIST handbook 44 section 5.52.



certainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of The reported uncert approximately 85%.

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TO00326 Issue 20

## **Digital Level**

# CALIBRATION CERTIFICATE

## Issued by HORIBA MIRA Ltd

Issue date: 18 Jan 2017

Cert No: 33520130117



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Mark Pickering – Head of Instrument Calibration & Repair Philip Macleoc – Supervisor – Instrument Calibration Dominio Mhandu - Metrologist

Client: Section: Test Operations FG

Manufacturer: Model:

Smarttool

Dallas ID:

Safety, Crash Off-Board Instruments

Address: Watling Street

Description: Serial No:

Digital Level

Nuneaton Warwickshire

Calibration Date:

18 Jan 2017 QA3129/C/03

Client ID:

Calibration Procedure: Equipment used:

Page 2 Page 2 Page 2

MIRA ID: Q33520 Date received:

Measurement Results: 13 Jan 2017 Measurement Uncertainty:

Used, in good condition

Condition of Instrument:

Yes

Within specification on receipt, at the points measured subject to the measurement uncertainty Adjusted during calibration

No

Repaired prior to or during calibration

No

Within specification on completion, at the points in easured subject to the measurement uncertainty The reported values are the result of measurements taken at the time of calibration within the environment stated and do

not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate relate only to the instrument detailed above on the dates specified.

The instrument was allowed to acclimatise in an environment of 20°C ± 2°C and 50%RH ± 25%RH, for a minimum of 12 hours before can menoing the calibration. The electrical supply within the laboratory is 240 Volts  $\pm$  15 Volts and 50 Hz  $\pm$  0.5Hz with a total harmonic distortion of less than 3%.

Instrument calibrated by comparison with angular reference standards using MIRA Procedure QA3129/C.



The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 85%.

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1 CU002b Issue 20

## **Stop Watch**

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Mark Pickering – Head of Instrument Calibration & Repair
 Philip Madeod – Supervisor – Instrument Calibration
 ■ Philip Madeod – Phil

Client: MIRA, Test Operations FG
Section: Vehicle Env & Aero,
Climatic Chamber
Address: Watling Street

Nuneaton Warwickshire

Client ID: -MIRA ID: Q38460

Date received: 23 Mar 2015

Manufacturer: Model:

del: 811-1818 scription: Stop Watch

 Description:
 Stop Watch

 Serial No:

 Calibration Date:
 18 May 2015

Calibration Procedure: QA2113/C/02
Equipment used: Page 2
Measurement Results: Page 2
Measurement Uncertainty: Page 2

Condition of Instrument: New

Within specification on receipt, at the points measured subject to the measurement uncertainty

Adjusted during calibration

Repaired prior to or during calibration

Within specification on completion, at the points measured subject to the measurement uncertainty

Yes

The reported values are the result of measurements taken at the time of calibration within the environment stated and do not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate relate only to the instrument detailed above on the dates specified.

The instrument was allowed to acclimatise in an environment of 20°C  $\pm$  2°C and 50%RH  $\pm$  25%RH, for a minimum of 12 hours before commencing the calibration. The electrical supply within the laboratory is 240 Volts  $\pm$  15 Volts and 50 Hz  $\pm$  0.5Hz with a total harmonic distortion of less than 3%.



The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

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|| Mark Pickering – Head of Instrument Calibration & Repair |► Philip Madeod – Supervisor – Instrument Calibration || Miroslaw Palucki – Netrologist

Client: Mechanical Engineering FG
Section: Braking
Address: Watling Street
Nuneaton

Warwickshire

Client ID: -MIRA ID: Q34851

Date received: 25 Nov 2015

Dallas ID:

Manufacturer: RS
Model: 699-9259
Description: Digital Stopwatch
Serial No: Calibration Date: 16 Dec 2015

Calibration Procedure: CA2113/C/02
Equipment used: Page 2
Measurement Results: Page 2
Measurement Uncertainty: Page 2

Condition of Instrument: Used, in good condition

Within specification on receipt, at the points measured subject to the measurement uncertainty

Yas
Adjusted during calibration

Repaired prior to or during calibration

Within specification on completion, at the points measured subject to the measurement uncertainty

Yas

The reported values are the result of measurements taken at the time of calibration within the environment stated and do not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate relate only to the instrument detailed above on the dates specified.

The instrument was allowed to accumatise in an environment of  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and  $50\%\text{RH} \pm 25\%\text{RH}$ , for a minimum of 12 hours before commencing the calibration. The electrical supply within the laboratory is 240 Volts  $\pm$  15 Volts and 50 Hz  $\pm$  0.5Hz with a total harmonic distortion of less than 3%.



The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

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## **Tyre Pressure Gauge**

# CALIBRATION CERTIFICATE

## Issued by HORIBA MIRA Ltd

Issue date: 09 Mar 2017 Cert No: 39679100117



Page 1 of 3 Pages

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Mark Pickering – Head of Instrument Calibration & Repair Philip Macleod – Supervisor – Instrument Calibration

Deminic Mhandu Metrologist

Client Test Operations FG Section: Safety, Crash Off-Board

Instruments Watling Street

Nuneaton Warw ckshire

10 Jan 2017

Client ID: MIRA ID: Q39679

Date received: Dallas ID:

Address:

PCL Manufacturer: AFG1H03 Model:

Description: 12 bar Tyre Inflator 141121095 Serial No: 09 Mar 2017 Calibration Date: Calibration Procedure: QA4097/C/03 Equipment used: Page 3 Page 2

Measurement Results: Measurement Uncertainty: Page 2

#### Used, in good condition Condition of Instrument:

Within specification on receipt, at the points measured subject to the measurement uncertainty Yes Adjusted during calibration No Repaired prior to or during calibration No Within specification on completion, at the points measured subject to the measurement uncertainty Yes

The reported values are the result of measurements taken at the time of calibration within the environment stated and do not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate relate only to the instrument detailed above on the dates

The instrument was allowed to acclimatise in an environment of 20°C ± 2°C and 50%HH ± 26%HH, for a minimum of 12 rours before commencing the calibration. The electrical supply within the laboratory is 240 Volts  $\pm$  15 Volts and 50 Hz  $\pm$ 0.6Hz with a total harmonic distortion of less than 3%.

This Instrument was calibrated by comparison with pressure measurement reference standards using a MIRA procedure which incorporates limits based on the applicable standard, BS EN 12645:1989.



The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 36%.

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## 9 Beam Speed Measurement Laser

# CALIBRATION CERTIFICATE

## Issued by HORIBA MIRA Ltd

Issue date: 19 Apr 2017 Cert No: 08167190417



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- Mark Pickering Head of Instrument Calibration & Repair Philip Macleod Supervisor Instrument Calibration Commic Mhandu Metrologist

Client: Section:

Address:

Test Operations FC Safety, Crash Off-Board

Instruments Watting Street

Nuneaton

Warwickshire

Client ID: MIRA ID: Date received:

Q08167 19 Apr 2017

Dallas ID:

Manufacturer: Model:

Description:

Serial No: Calibration Date: Calibration Procedure:

Equipment used: Measurement Results: Messurement Uncertainty: MIRA

9 Beam Speed Measurement Sys

20 Apr 2017 QA2364/C/09 Page 5 Pages 2 to 4 Page 6

Condition of Instrument:

Used, in good condition

Within specification on receipt, at the points measured subject to the measurement uncertainty No Adjusted during calibration No Repaired prior to or during calibration. Yes Within specification on completion, at the points measured subject to the measurement uncertainty No

The reported values are the result of measurements taken at the time of calibration within the environment stated and do not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate relate only to the instrument detailed above on the cates specified.

The instrument was allowed to acclimatise in an environment of 20°C ± 2°C and 50%RH ± 25%RH, for a minimum of 12 hours before commencing the calibration. The electrical supply within the laboratory is 240 Volts  $\pm$  15 Volts and 50 Hz  $\pm$ 0.5Hz with a total harmonic distortion of less than 3%.

This speed measurement system was calibrated by comparison with distance and time measurement reference standards using a MIRA procedure which incorporates limits based on client requirements detailed in request for service document CR225072012A

This calibration certificate includes the laser speed measurements taken after repair.

Laser speed set C1 still does not conform to specification.

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

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## Mobile Speed Measurement Laser

# CALIBRATION CERTIFICATE

Issued by HORIBA MIRA Ltd

Issue date: 21 Jun 2017 Cert No: 178992503171



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http://www.horiba-mira.com

Mark Pickering – Department Manager Phillip Macteod – Supervisor – Instrument Calibration Dominic Mhandu - Metrologist

Client: Section:

Test Operations FG

Safety Crash Off-Board

Instruments Watting Street Manufacturer: Model:

MIRA TD590

Address:

Description:

Voie Speed

34 Apr 2017

Measurement Unit.

Cable & Frame

Nuneaton

Warwickshire

Q17899 to Q17901

MIRA ID: Date received: 25 Mar 2017

Dallas ID:

Client ID:

Serial No:

Calibration Date: Calibration Procedure:

Equipment used: Measurement Results: QA2517/C/03 Page 2 Page 2

Measurement Uncertainty:

Page 2

Condition of Instrument:

Used, in good condition

Within specification on receipt, at the points measured subject to the measurement uncertainty Adjusted during calibration

Repaired prior to or during calibration

Within specification on completion, at the points measured subject to the measurement uncertainty

No No Yes

Yes

The reported values are the result of measurements taken at the time of calibration within the environment stated and do not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements cetailed within this Calibration Certificate relate only to the instrument detailed above on the dates specified.

The instrument was allowed to acclimatise in an environment of 20°C ± 2°C and 50%RH ± 25%RH for a minimum of 12 hours before commencing the calibration. The electrical supply within the laboratory is 240 Volts ± 15 Volts and 50 Hz ± 0.5Hz with a total harmonic distort on of less than 3%.

This instrument was calibrated by comparison with time and displacement measurement reference standards using a MIRA procedure which incorporates limits based on client requirements. These requirements are specified in document CR225072012B.

This certificate includes all component parts list. This certificate is a replacement for Certificate number 17899250317.

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 86%.

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## **Climatic Temperature Probes**

# CERTIFICATE OF CALIBRATION

ISSUED BY: Universal Instrument Services Ltd.

Date of Calibration: 3rd January 2017 Date of issue:

6th January 2017

Certificate Number: 00048454



## Universal



UNIVERSAL INSTRUMENT SERVICES Ltd.

Unit 69 The Whittle Estate, Cambridge Road. Whetstone, Leicester LES 6PA Tel: 0116 275 0123 Fax: 0116 275 0262 Website: www.uiscal.com

Email; sales@uiscal,co.uk

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The J.Brube

Sustamer: HORIBA MIRA LIMITED

WATLING STREET NUNEATON WARWICKSHIRE

Operator: .KB Our Ref:

361434

Manufacturer: Description:

Not Known "T" Thermocouple T-TYPE

Model: Serial No:

G39704 Q39704

Asset No: Order No: Date Received:

263528 19th December 2016

CONDITION OF UNIT UNDER TEST

The Thermocouple was visually inspected prior to calibration

YES/NO

#### ADDITIONAL COMMENTS

## STABILITY

The readings given are the results at the time of calibration and do not carry any implication regarding the long term stability of the unit under lost.

## ACCREDITATIONS

UIS is accredited by UKAS to BS FN 17025:2005 to undortake the calibration presented in this certificate.

#### ENVIRONMENT

The instrument was calibrated in our laboratory with the ambient conditions stated on the results page.

## PROCEDURE

UIS procedure CP7.5.3

#### UNCERTAINTIES

The reported expanded uncertainty is based on a standard uncertainty multiplied by a covering factor k=2, providing a level of confidence of approximately 95%. The procetainty evaluation has been carried out in accordance with UKAS requirements.

#### TEST EQUIPMENT USED

Asset No.	Description	4	
ID3156	Hart 1590 Super-Thermometer II	Certificate No.	Expiry date
ID3051	Tinsley Sld Resister 25 onms	296385	21/MAR/2017
ID3032	PRT (25 onns)	JKAS 0361304	09/111/2018
ID3269	PRT (25 dams)	UKAS 47039	14/JUL/2017
ID3245	PRT (25 plums)	UKAS 47042	14/JUL/2017
D3245	PRT (25 ohms)	UKAS 47018	12/JUL/2017
D3276	Fluke 1586-2588 Multiplexer	UKAS 47020	12/JUL/2017
1-1-1-1	r use 1000-2000 Muniplexer	UKAS 47348	25/FEE/2017

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ISSUED BY: Universal Instrument Services Ltd.

Date of Calibration: 3rd January 2017

Date of issue: 5th January 2017 Cortificate Number: 00048455



## Universal



UNIVERSAL INSTRUMENT SERVICES Ltd. Unit 69 The Whitle Estate, Cambridge Read,

Whetstone, Leicester LE8 5PA Tel: 0116 275 0123 Fax: 0116 275 0262 Websile: www.uiscal.com Email: sales@uiscal.co.uk Page 1 of 2 Pages Approved Signatory

J.Bruce

Customer: HORIBA MIRA LIMITED

WATLING STREET NUNEATON WARWICKSHIRE

Operator: JKB Our Ref: 331435 Manufacturer: Not Known
Description: "T" Thermocouple

Model: T-TYPF Serial No: Q39705 Asset No: Q39705 Order No: 263528

Date Received: 19th December 2016

#### CONDITION OF UNIT UNDER TEST

The Thermocouple was visually inspected prior to calibration

## YES/NO

Y

#### ADDITIONAL COMMENTS

#### STABILITY

The readings given are the results at the time of calibration and do not early any implication regarding the long term stability of the unit under test.

## **ACCREDITATIONS**

UIS is accredited by UKAS to BS EN 17025:2005 to undertake the calibration presented in this certificate

#### ENVIRONMENT

The natrument was calibrated in our laboratory with the ambient conditions stated on the results page.

## PROCEDURE

UIS procedure CP7 5.3

#### UNCERTAINTIES

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

#### TEST EQUIPMENT USED

Asset No.	Description	Certificate No.	Expiry date
IE3156	Hart 1690 Super-Thermometer II	296335	21/MAR/2017
IIC3051	Tinsley Std Resistor 25 chms	UKAS 0391304	09/JUL/2018
IE3032	PRT (25 onms)	UKAS 47039	14/JUL/2017
ID3269	PRT (25 chms)	UKAS 47042	14/JUL/2017
ID3240	PRT (25 chms)	UKAS 47018	12/JUL/2017
ID3245	PRT (25 chms)	UKAS 47020	12/JUL/2017
ID3276	Fluke 1568-2588 Multiplexer	UKAS 47348	25/FEB/2017

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ISSUED BY: Universal Instrument Services Ltd.

Date of Calibration: 3rd January 2017

Date of issue: 5th January 2017 Certficate Number: 00048456



## Universal



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Website: www.ulscal.com Email: sales@uiscal.co.uk Page 1 of 2 Pages Approved Signatory

J.Bruce

Gustomen: HORIBA MIRA LIMITED

WATLING STREET NUNEATON WARWICKSHIRE

Operator: JKR

Our Ref: 331436

Manufacturer: Description:

Not Known \* Thermopouple T-TYPE

Model: Serial No: Q39706 Asset No: Q39706 Order No: 263528

Date Received: 19th December 2018

#### CONDITION OF UNIT UNDER TEST

The Thermocouple was visually inspected prior to calibration

#### YES/NO

## ADDITIONAL COMMENTS

The readings given are the results at the time of calibration and do no; carry any implication regarding the long term stability of the unit under test.

#### ACCREDITATIONS

UIS is accredited by UKAS to ES EN 17025;2005 to metrotake the calibration presented in this cartificate.

The instrument was calibrated in our laboratory with the ambient conditions stated on the results page.

#### PROCEDURE

UIS procedure CP7.5.3

## UNCERTAINTIES

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncortainty evaluation has been carried out in accordance with UKAS requirements.

## TEST EQUIPMENT USED

Asset No.	Description	Certificate No.	Expiry date
ID3156	Hart 1590 Super-Thermometer II	296385	21/MAR/2017
(D305)	Tinsley Std Resistor 25 ohms	UKAS 0391304	09/JUL/2018
ID3032	PRT (25 chms)	UKAS 47039	14/JUL/2017
ID3260	PRT (25 ahms)	UKAS 47042	14/JUL/2017
ID3240	PRT (25 ahrns)	UKAS 47018	12/JUL/2017
103245	PRT (25 ohms)	UKAS 47020	12/JUL/2017
103278	Fluke 1586-2588 Multiplexer	UKAS 47348	25/FEB/2017

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ISSUED BY: Universal Instrument Services Ltd.

Date of Calibration: 3rd January 2017

Date of Issue 5th January 2017

Cerificate Number: 00048457



## Universal



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Whetstons, Leloester LE8 6FW
Tel: 0116 275 0123 Fax: 0116 275 0262
Woosile: www.uscal.com

Email: sales@uiscal.co.uk

Page 1 of 2 Pages Approved Signatory

J.51.00

Customer: HORIBA MIRA LIMITED

WATLING STREET

NUNEATON WARWICKSHIRE

Operator: JKB

Operator: JKB Our Ref: 381437 Manufacturer: Not Known
Description: "T" Thermoccupie
Model: I-TYPE

Model: T-TYPE Serial No: 039707 Asset No: 039707

Order No: 263528

Date Received: 19th December 2016

CONDITION OF UNIT UNDER TEST

The Thermocouple was visually inspected prior to calibration

YES/NO

ES/NU

#### ADDITIONAL COMMENTS

#### STABILITY

The readings given ere the results at the time of calibration and do not carry any implication regarding the long torm stability of the unit under test.

### **ACCREDITATIONS**

UIS is accredited by UKAS to BS EN 17025:2005 to undertake the calibration procented in this cortificate.

#### ENVIRONMENT

The instrument was calibrated in our laboratory with the ambient conditions stated on the results page

## PROCEDURE

UIS procedure CP7.5.3

### UNCERTAINTIES

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

#### TEST EQUIPMENT USED

Asset No.	Description	Certificate No.	Foot- day
ID3156	Hart 1590 Super-Thermometer II	296385	Expiry date
ID3051	Tinsley Std Resistor 25 ohms	UKAS 0391304	21/MAR/2017
ID3032	PRT (25 chirs)	UKAS 47039	09/JUL/2018
ID3289	PRT (25 phms)		14/JUL/2017
D3240	PRT (25 ohms)	UKAS 47042	14/JUL/2017
ID3245	PRT (25 ohms)	UKAS 47018	12/JUL/2017
ID3276	Fluke 1586-2588 Multiplexer	UKAS 47020	12/JUL/2017
	o so 1560-2aca termiplexet	UKAS 47348	25/FEB/2017

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ISSUED BY: Universal Instrument Services Ltd.

Date of Calibration: 3rd January 2017

Date of Issue: 5th January 2017 Certicate Number: 00048450



## Universal



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≣mail; sales tuiscal.co.uk

Page 1 of 2 Pages. Approved Signatory

Thom J.Bruce

Customer: HORIBA MIRA LIMITED

WATLING STREET

NUNEATON WARWICKSHIRE

Operator: "KF Our Ref: 361430 Manufacturen Not Known Description:

"T" Thermocouple, T-TYPE Model:

Serial No: Q39785 Asset No; Q39785 Order No: 263528

Date Received: 19th December 2016

CONDITION OF UNIT UNDER TEST

The Thermocouple was visually inspected prior to calibration

YES/NO

## ADDITIONAL COMMENTS

#### STABILITY

The readings given are the results at the time of calibration and do not carry any implication regarding the long term stability

#### ACCREDITATIONS

UIS is accredited by UKAS to BS FN 17026:2005 to undertake the pathration presented in this pertificate.

The instrument was calibrated in our laboratory with the ambient conditions stated on the results page.

#### PROCEDURE

UIS procedure CP7.5.3

## UNCERTAINTIES

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor kHZ providing a level of confidence of approximately 95%. The uncertainty evaluation has been corried out in accordance with UKAS requirements.

## TEST EQUIPMENT USED

Asset No.	Description	Coefficient No.	
ID3156	hart 1590 Super-Thermometer I/	Certificate No.	Expiry date
ID3051	Tinsley Std Hesister 25 chms	296385	21/MAR/2017
ID3032	PRT (25 chms)	UKAS 0391304	09/JUL/2018
103289	PRT (25 chms)	UKAS 47039	14/JUL/2017
ID3240	PR1 (25 ohms)	UKAS 47042	14/JUL/2017
D3245		UKAS 47018	*2/JUL/2017
ID3276	PRT (25 ohms)	UKAS 47020	12/JUL/2017
TOVETO	Fluke 1586-2588 Multiplexer	UKAS 47348	26/FEB/2017

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ISSUED BY: Universal Instrument Services Ltd.

Date of Calibration: 3rd January 2017

Date of Issue: 5th January 2017

Certicate Number: 00048453



## Universal



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Website: www.u.scal.com Email: sales@ulscal.co.uk Page 1 of 2 Pages Approved Signatory

.I.Bruca

Customer: HORIBA MIRA LIMITED

WATLING STREET NUNEATON

WARWICKSHIRE

Operator: JKB Our Ref: 361433 Manufacturer: Not Known Description: 'T' Thermocouple

T-TYPE Model: Serial No: Q39786 Asset No: Q39786 Order Na: 263528

Date Received: 15th December 2016

#### CONDITION OF UNIT UNDER TEST

The Thermocouple was visually inspected prior to calibration.

## YES/NO

## ADDITIONAL COMMENTS

#### STABILITY

The readings given are the results at the time of calibration and do not carry any implication regarding the long term stability of the unit under test.

#### **ACCREDITATIONS**

UIS is accredited by UKAS to BS EN 17025:2006 to undertake the calibration presented in this certificate.

The instrument was calibrated in our laboratory with the ambient conditions stated on the results pane.

## PROCEDURE

UIS procedure CP7.5.3

### UNCERTAINTIES

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor x=2, providing a lovel of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements

## TEST EQUIPMENT USED

Asset No.	Description	Certificate No.	Expiry date
D3156	Hart 1590 Super- hermometer II	298385	21/MAR/2017
ID3051	Tinsley Std Resistor 25 phms	UKAS 0391304	09/JUL/2018
ID3032	PRT (25 ohms)	UKAS 47039	14/JLL/2017
ID3269	PRT (26 ohms)	UKAG 47042	14/JUL/2017
ID3240	PRT (25 ohms)	UKAS 47018	12/JUL/2017
103245	PRT (25 phins)	UKAS 47020	12/JUL/2017
103276	Fluke 1586-2588 Multiplexer	UKAS 47348	25/FEB/2017

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ISSUED BY. Universal Instrument Services Ltd.

Date of Calibration: 3rd January 2017

Date of issue: 5th Jenuary 2017

Certificate Number: 00048452



## Universal



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Website: www.uiscal.com Email: sales @ discal.co.uk Fage 1 of 2 Pages Approved Signatory

Hom J Bruce

Customer: HOR/BA MIRA LIMITED

WATLING STREET NUNEATON WARWICKSHIRE

Operator: JKB Our Ref: 351432 Manufacturer: Not Known

"T" Thermocouple T-TYPE Description: Model:

Serial No: O39787 Asset No: 039787Order No: 263528

Date Received: 19th December 2016

CONDITION OF UNIT UNDER TEST

The Thermocouple was visually inspected prior to calibration

YES/NO

#### ADDITIONAL COMMENTS

#### STABILITY

The readings given are the results at the time of collistation and do not carry any implication regarding the long term stability of the unit under test.

#### ACCREDITATIONS

UIS is accredited by UKAS to BS EN 17025;2005 to undertake the calibration presented in this certificate.

### ENVIRONMENT

The instrument was calibrated in our laboratory with the ambient conditions stated on the results bage.

## PROCEDURE

UIS procedure CP7.5.3

The reported expanded uncertainty is based on a standard uncertainty multiplied by a poverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

#### TEST EQUIPMENT USED

Asset No.	Description	Certificate No.	English days
ID3156	Har, 1590 Super-Thermometer II	298385	Expiry date
ID3051	Tinsley Std Resister 25 phms	UKAS 0391304	21/MAR/2017
ID3032	FRT (25 ohms)	UKAS 47039	09/JUL/2018
ID3259	FRT (25 phms)	UKAS 47042	14/JUL/2017 14/JUL/2017
ID3240	PRT (25 ohms)	UKAS 47018	12/JUL/2017
ID3246	PRT (25 chms)	UKAS 47020	12/JUL/2017
ID3276	Fluke 1586-2588 Multiplexer	UKAS 47348	25/FEB/2017

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ISSUED BY: Universal Instrument Services Ltd.

Date of Calibration: 3rd January 2017

Date of issue: 5th January 2017 Certificate Number: 00048451



## Universal



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Unit 69 The Whittle Estate, Cambridge Road, Whetstone, Leicester LES 6PA Tel: 0116 275 0123 Fax: 5116 275 0262

Website: www.uiscal.com Email: sales@uiscal.co.uk Page 1 of 2 Pages Approved Signatory

Non J.Bruce

Customer: HORIBA MIRA LIMITED

WATLING STREET NUNEATON WARWICKSHIRE

Operator: JKB Our Ref:

361431

Manufacturer: Description:

Not Known "1" Thermoopuple T-TYPE

Model: Serial No. Asset No:

Q39788 Q30788 263528

Order No: Date Received:

19th December 2016

CONDITION OF UNIT UNDER TEST

The Thermocouple was visually inspected prior to calibration

YES/NO

#### ADDITIONAL COMMENTS

## STABILITY

The readings given are the results at the time of pathration and do not carry any implication regarding the long term stability of the unit under test.

#### ACCREDITATIONS

UIS is accredited by UKAS to BS EN 17023:2005 to undertake the calibration presented in this certificate

## ENVIRONMENT

The instrument was calibrated in our laboratory with the ambient contilions stated on the results page

## PROCEDURE

UIS procedure CP7.5.3

#### UNCERTAINTIES

The reported expanded uncertainty is based on a standard uncertainty multiplied by a neverage factor s=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

#### TEST FOUIPMENT USED

Asset No.	Description	Certificate No.	Expiry date
103156	Hart 1590 Super-Thermometer II	296385	21/MAR/2017
103051	Tinsley Std Resistor 25 ohms	UKAS 0391304	09/3012/2018
103032	PRT (25 ohms)	UKAS 47039	14/JUL/2017
ID3289	PRT (25 phms)	UKAS 47542	14/JUL/2017
103240	PRT (25 ohms)	UKAS 47018	12/JUL/2017
100245	PRT (25 ohms)	UKAS 47020	12/JUL/2017
103276	Fluke 1586-2588 Multiplexer	UKAS 47348	25/F FB/2017

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## **Climatic Humidity Probe**

# 3199S (no

# CERTIFICATE OF CALIBRATION

Issued by

## ABSOLUTE CALIBRATION LIMITED

DATE OF ISSUE

18 August 2017

CERSIFICATE NUMBER

0426395





## Absolute Calibration Limited

14 Murrills Estate, Portchester Hampshire, England, PO16 9RD Telephone 023-92321712 Facsimile 023-92210034 Service Facsimilo 023-92327100 www.absolute-cal.ca.uk

Description:	TEMPERATURE/HUMIDITY SENSOR AND ACTIVE ADAPTOR
Manufacturer:	ROTRONIC
Type Number:	HYGROCLIP & MOK-20-XX-010V-2

Type Number: HYGROCLIP & MOK-20-XX-010V-2

Serial Number: 60250059

Customer: HORIBA MIRA LIMITED

WATLING STREET NUNEATON WARW CKSHIRE

Instrument Receipt Date: 02 August 2017

Order Number: 271883

Customer Reference: Q31995

Laboratory Temperature (20.0 ± 3.0) °C Laboratory Humidity (55 ± 20) %rh

Calibration Procedure: CP 112
Calibration Engineer \$ Palabendi
Calibration Date 18 August 2017

This Report Contains Recorded results with no adjustments

Pre and post adjustment results

Post repair results

Results recorded at Customer site

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and forms units of measurement realised at the National Physical Laboratory or other recognized retional metodogy institutes. This certificate may not be reproduced of or than in full, except with the prior written approval of the issuing taboratory.

FM 50/0

Have May felt of 400mm 4205506.

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# CERTIFICATE OF CALIBRATION

lasued by

#### ABSOLUTE CALIBRATION LIMITED

DATE OF ISSUE

18 August 2017

CERTIFICATE NUMBER 0426394





## Absolute Calibration Limited

14 Murzills Estate, Portchesfor Hampshire, England, PO16 9RD Telephone 023-92321712 Facsimile 323-92210034 Service Facsimile 023-92327100 www.absolute-cal.co.uk

Page 1 of 2 Pages Approved Signatory M. F.unala M Formell S Whittingham D Kingswell G Mils

A Francis

Description: TEMPERATURE/HUMIDITY SENSOR AND ACTIVE ADAPTOR Manufacturer: ROTRONIC Type Number: HYGROCLIP & MOK-20-XX-010V-2 Serial Number: 60250328 Customer: HORIBA MIRA LIMITED WATLING STREET NUNEATON WARWICKSHIRE Instrument Receipt Date: 02 August 2017 Order Number: 271883 Customer Reference: Q31996  $(20.0 \pm 3.0)$  °C **Laboratory Temperature** (55 ± 20) %rh Laboratory Humidity

Results recorded at Customer site

Recorded results with no adjustments Pre and post adjustment results

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdow Ascenditation Service. It provides traceability of measurement to the St system of units and for to units of measurement realised at the National Physical Laboratory or other recognised national metralogy institutes. This rectificate may not be reproduced other than in full, except with the prior written approval of the issuing lebendary.

CP 112

S Patabendi

18 August 2017

Post regair results

FM 56/6.

Calibration Procedure:

Calibration Engineer

This Report Contains

Calibration Date

issued by

#### ABSOLUTE CALIBRATION LIMITED

DATE OF ISSUE

19 January 2017

CERTIFICATE NUMBER



Page 1 of 2 Faces



## Absolute Calibration Limited

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Approved Sign	.1/
M. Funne I	Z
S Whittinghom	10
D Kingswell	
G Mills	100
A Francis	

Description: THERMOHYGROMETER PROBE AND ACTIVE ADAPTOR

Manufacturer. ROTRINIC

HYGROCLIP & MOK-20-XX-010V-2 Type Number:

55499255 Serial Number:

Customer: HORIBA MIRA LIMITED

WATLING STREET NUNEATON WARWICKSHIRE

Instrument Receipt Date: 17 January 2017

Order Number: 264315 Customer Reference: Q31997

Laboratory Temperature (20.0 ± 3.0)°C Laboratory Humidity (55 ± 20) %rh Calibration Procedure: CP 112

Calibration Engineer S Patabendi Calibration Date 19 January 2017

This Report Contains Recorded results with no adjustments

Pre and post adjustment results

Post repair results

Results recorded at Customer site

This confliction is issued in accordance with the laboratory deponditation requirements at the United Kingdom Accorditation Service. It provides the soft if you have the soft in the Confliction Service and for its units of measurement realised at the Retignal Physical aboratory or other recognised indirect meetings, which is soft in the provided differ then in full, except with the introduction of the issuing leadershop.

EM56/3

U Sweet in folder (410 kg/s/1661).

Issued by

## ABSOLUTE CALIBRATION LIMITED

DATE OF ISSUE

19 January 2017

CERTIFICATE NUMBER 0416612

116610





## **Absolute Calibration Limited**

14 Murills Estate, Portchester Hampshire, England, PC16 93D Telephone 023-92321712 Facsimile 023-92210034 Service Facsimile 023-92327100 www.absolute-cal.co.uk

Page 1 of 2	Pages
Approved Sig	natory
n. Kur	24
M.Funnell	
5 Whittingham	
D Kingswell	

G Mills

A Francis

Description: THERMOHYGROMETER PROBE AND ACTIVE ADAPTOR

Manufacturer: ROTRINIC

Type Number: HYGROCLIP & MOK-20-XX-010V-2

Serial Number: 60250104

Customer: HORIBA MIRA LIMITED

WATLING STREET NUNEATON WARWICKSHIRE

Instrument Receipt Date: 17 January 2017

Order Number: 264315
Customer Reference: Q31998

Laboratory Temperature  $(20.0 \pm 3.0)^{\circ}$ C Laboratory Humidity  $(55 \pm 20)$  %rh Calibration Procedure: CP 112

Calibration Engineer S Patabendi Calibration Date 19 January 2017

This Report Contains Recorded results with no adjustments

Pre and post adjustment results

Post repair results

Results recorded at Customer site

This certificate is issued in accordance with the laboratory appreciation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement in the Still system of units and Art to units of measurement exhaust a thin National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced of the than in full, except with the poor whiten approved of the issuing laboratory.

FM 56/3

Utworking Interior (6 code) 65 (2

## 32ch Thermocouple Amplifier

# CALIBRATION CERTIFICATE

## issued by HORIBA MIRA Ltd

Issue date: 04 Jan 2017 Cert No: 30279191216

A HORIBA COMPANI

Page 1 of 5 Pages

Approved Signatory

Watling Street, Nuneaton Warwickshire, CV10 0TU, UK, Telephone: +44 (0)24 7635 5225 Facsimile: +44 (0)24 7635 6225 http://www.norba-mira.com

Mark Pickering – Head of Instrument Calibration & Repair Philip Macleod – Supervisor – Instrument Calibration

Dominic Mhandu - Metrologist

Client: Test Operations FG Section: Vehicla Env & Aero, Climatic Chamber Address:

Watting Street

Nuneaton Warwickshire

MIRA ID: Date received: Dallas ID:

Client ID:

Q30279 19 Dec 2016

Manufacturer: National Instru Model: SCXI-1102

Description: 32ch Thermocouple Amplifier

122578B Serial No: Calibration Date: 04 Jan 2017 QA2656/C/02 Calibration Procedure: Equipment used: Fage 5 Measurement Results: Fage 2-5 Measurement Uncertainty: Fage 2-5

Condition of Instrument: Used, in good condition

Within specification on receipt, at the points measured subject to the measurement uncertainty Yes Adjusted during calibration No Repaired prior to or during calibration No Within specification on completion, at the points measured subject to the measurement uncertainty

The reported values are the result of measurements taken at the time of calibration within the environment stated and do not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate relate only to the natural detailed above on the dates

The instrument was allowed to additinatise in an environment of 20°C  $\pm$  2°C and 50%RH  $\pm$  25%RH, for a minimum of 12 hours before commencing the calibration. The electrical supply within the laboratory is 240 Vota  $\pm$  15 Votts and 50 Hz  $\pm$ 0.5Hz with a total harmonic distortion of less than 3%.

This Instrument was calibrated by comparison with electrical measurement reference standards using a MIRA procedure which incorporates limits based on client requirements. These requirements are specified in document MC-1504200AA



**PETEC** 

The reported unconstituty is based on a standard uncortainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

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## **Climatic Chamber Controller**

# CALIBRATION CERTIFICATE

## Issued by HORIBA MIRA Ltd

Issue date: 05 Jan 2017 Cert No: 34000050117



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Approved Signatory

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Mark Pickering – Head of Instrument Calibration & Repair Philip Maciaco – Supervisor – Instrument Calibration

Dominic Mhandu Metrologist

Client: Test Operations FG Section: Vehicle Env & Aero, Climatic Chamber Address: Watting Street

Nuneaton Warwickshire

Client ID: MIRA ID: Q34000 05 Jan 2017 Date received:

Dallas ID:

MIRA Manufacturer: MI003878 Model:

Description: Climatic Chamber

Controller Serial No: 101523 05 Jan 2017 Calibration Date: QA5032/C/01 Calibration Procedure: Equipment used: Page 3 Measurement Results: Pages 2 & 3 Measurement Uncertainty: Page 5

Condition of Instrument: Used, in good condition

Within specification on receipt, at the points measured subject to the measurement uncertainty Yes Adjusted during calibration No. Repaired prior to or during calibration No Within specification on completion, at the points measured subject to the measurement uncertainty Yes

The reported values are the result of measurements taken at the time of calibration within the environment stated and do not carry any implication regarding the long term stability or environmental performance of the instrument. All measurements detailed within this Calibration Certificate rolate only to the instrument detailed above on the dates specified.

This calibration was performed at the client site.

This instrument was calibrated by comparison with Temperature measurement reference standards using a MIRA procedure which incorporates limits based on client requirements as specified in document CW003032015A.



The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

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