



Easidew PRO I.S. Process Dew-Point Transmitter User Manual



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Easidew PRO I.S.

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Contents

Safety	vi
Electrical Safety	vi
Pressure Safety	vi
Toxic Materials	vi
Repair and Maintenance	vi
Calibration	vi
Safety Conformity	vi
Abbreviations	vii
Warnings	viii
 1 INTRODUCTION	 1
1.1 Features	1
 2 INSTALLATION	 2
2.1 Unpacking the Instrument	2
2.2 Transmitter Mounting	2
2.2.1 Wall Mount Bracket	3
2.2.2 Transmitter Mounting – Sample Block (Optional)	4
2.2.3 Transmitter Mounting – Direct Pipeline Connection	5
2.2.4 Transmitter Mounting – With Additional Process Connection Adapter	6
2.3 Preparation of the Sensor Cable	7
2.4 Electrical Schematic	8
 3 OPERATION	 9
3.1 Measurement and Configuration	9
3.2 Sampling Hints	9
 4 GOOD MEASUREMENT PRACTICE	 11
 5 MAINTENANCE	 14

Figures

<i>Figure 1</i>	<i>Wall-Mount Bracket</i>	<i>3</i>
<i>Figure 2</i>	<i>Transmitter Mounting – Sensor Block</i>	<i>4</i>
<i>Figure 3</i>	<i>Transmitter Mounting – Pipe or Duct</i>	<i>5</i>
<i>Figure 4</i>	<i>Transmitter Mounting with Adapter</i>	<i>6</i>
<i>Figure 5</i>	<i>Wire and Crimp Details</i>	<i>7</i>
<i>Figure 6</i>	<i>Terminal Block Connection</i>	<i>7</i>
<i>Figure 7</i>	<i>Hazardous Area Connection</i>	<i>8</i>
<i>Figure 8</i>	<i>Indication of Dead Space</i>	<i>10</i>
<i>Figure 9</i>	<i>Material Permeability Comparison</i>	<i>11</i>
<i>Figure 10</i>	<i>Replacement of Sensor Guard</i>	<i>14</i>
<i>Figure 11</i>	<i>Dimensions</i>	<i>18</i>

Appendices

Appendix A	Technical Specifications.....	16
	A.1 Dimensions	17
Appendix B	System Drawings.....	20
	B.1 Baseefa Approved System Drawing	20
	B.2 QPS Approved System Drawing.....	21
Appendix C	Hazardous Area Certification	23
	C.1 Product Standards	23
	C.2 Product Certification	23
	C.3 Global Certificates/Approvals	23
	C.4 Terminal Parameters	24
	C.5 Special Conditions.....	24
	C.6 Maintenance and Installation	24
Appendix D	Quality, Recycling & Warranty Information.....	26
Appendix E	Return Document & Decontamination Declaration	28

Safety

The manufacturer has designed this equipment to be safe when operated using the procedures detailed in this manual. The user must not use this equipment for any other purpose than that stated. Do not apply values greater than the maximum value stated.

This manual contains operating and safety instructions, which must be followed to ensure the safe operation and to maintain the equipment in a safe condition. The safety instructions are either warnings or cautions issued to protect the user and the equipment from injury or damage. Use competent personnel using good engineering practice for all procedures in this manual.

Electrical Safety

The instrument is designed to be completely safe when used with options and accessories supplied by the manufacturer for use with the instrument.

Pressure Safety

DO NOT permit pressures greater than the safe working pressure to be applied to the instrument. The specified safe working pressure is 45 MPa (450 barg / 6500 psig). Refer to Appendix A, Technical Specifications.

Toxic Materials

The use of hazardous materials in the construction of this instrument has been minimized. During normal operation, it is not possible for the user to come into contact with any hazardous substance, which might be employed in the construction of the instrument. Care should, however, be exercised during maintenance and the disposal of certain parts.

Repair and Maintenance

The instrument must be maintained either by the manufacturer or an accredited service agent. Refer to www.michell.com for details of Michell Instruments' worldwide offices contact information.

Calibration

The recommended calibration interval for the Easidew PRO I.S. is 12 months. The instrument should be returned to Michell Instruments or one of their accredited service agents for re-calibration.

Safety Conformity

This product meets the essential protection requirements of the relevant UK and EU directives. Further details of applied standards may be found in the Technical Specifications, Appendix A.

Abbreviations

The following abbreviations are used in this manual:

bara	bar absolute
barg	pressure unit (=100 kP or 0.987 atm) gauge
°C	degrees Celsius
°F	degrees Fahrenheit
DC	direct current
µm	micro-meter
lbf-ft	pound foot
NI/min	normal liters per minute
mA	milliampere
Mpa	megapascal
m/sec	meters per second
mW	milli Watts
nF	nano-Farad
Nm	Newton meter
ppm _v	parts per million by volume
RH	relative humidity
scfh	standard cubic feet per hour
scfs	standard cubic feet per second
V	Volts

Warnings

The following general warning listed below is applicable to this instrument. It is repeated in the text in the appropriate locations.



Where this hazard warning symbol appears in the following sections it is used to indicate areas where potentially hazardous operations need to be carried out.

1 INTRODUCTION

The Easidew PRO I.S. has been manufactured, tested and calibrated to the highest available standards and should arrive in perfect working order, ready for installation into a gas or liquid measurement application.

For questions about the instrument or how to install and operate it, contact your local representative. Refer to www.michell.com for details of Michell Instruments' worldwide offices' contact information.

1.1 Features

The Easidew PRO I.S. is a continuous, on-line, 4...20 mA transmitter for the measurement of moisture content in air, other non-corrosive gases and non-polar liquids. It is designed specifically for use within Zone 0, 1 & 2 hazardous areas.

Its key features are:

- Measurement range -110...+20°Cdp (-166...+68°Fdp)
- Moisture in gases (ppm_v) or liquids (ppm_w)
- Hazardous area certifications (ATEX, IECEx, UKCA, QPS, GOST)
- Calibration certificate (UKAS and NIST)
- Accuracy ±1°Cdp
- 2-wire and linear 4...20 mA output
- Non-standard outputs configurability

2 INSTALLATION

2.1 Unpacking the Instrument

On delivery, please check that all the following standard components are present in the packing box:

- Easidew PRO I.S. Transmitter
- Bonded seal
- Certificate of calibration
- 3 off cable crimps
- Mounting bracket (optional)

The Easidew PRO I.S. is protected within the main packaging by a blue cap covering the transmitter connector and a small desiccant capsule installed inside the plastic protective transit cover. Neither of these items is required for the operation of the Easidew PRO I.S.

Prior to installation of the Easidew PRO I.S., unscrew and remove the plastic protective transit cover and retain for future use. Take care to prevent any contamination of the transmitter before installation. **NOTE: Do not handle the sintered guard.**

2.2 Transmitter Mounting

The Easidew PRO I.S. Transmitter can be mounted either in a flow-through sampling block (optional extra) or directly inserted into a pipe or duct and can be operated at pressures up to 45 MPa (450 barg/6500 psig) when fitted with the bonded seal provided.

For mounting instructions see Sections 2.2.2 or 2.2.3.

When installed, fully tighten using a wrench until the seal is fully compressed and to the following torque settings:

- 5/8" - 18 UNF 30.5 Nm (22.5 ft-lbs)

The recommended fluid flow rate, when mounted in the optional sampling block, is 1...5 NI/min (2.1...10.6 scfh). However, for direct insertion applications, fluid flow can be from static to 10 m/sec (32.8 fps).

After installation into the flow stream, the Easidew PRO I.S. housing (provided it is not mounted onto a wall bracket) may be positioned at any angle, through approximately 330° of rotation, to allow for the cable gland positioning. To position the housing, loosen the large clamping nut sufficiently to allow free rotation of the sensor assembly within the transmitter body.



The Easidew PRO I.S. is fitted with a mechanical stop to prevent over-rotation of the sensor assembly within the transmitter body – this could damage the sensor wires.

Rotate the sensor housing until the cable gland is in the desired position. While firmly holding the housing in position, re-tighten the large clamp nut up against the housing seal using a spanner/wrench of the correct size. **NOTE: Do not apply excessive force.**

2.2.1 Wall Mount Bracket

The Easidew PRO I.S. can be supplied with an optional wall-mounting bracket. This allows the customer to physically support the transmitter, ensuring that the stress on the mounting flange is kept to a minimum.

The bracket needs to be attached to the Easidew PRO I.S. (see *Figure 1*) using the hex screws provided. It can be fitted either horizontally or vertically and can then be attached to a wall or plate to provide support for the transmitter.

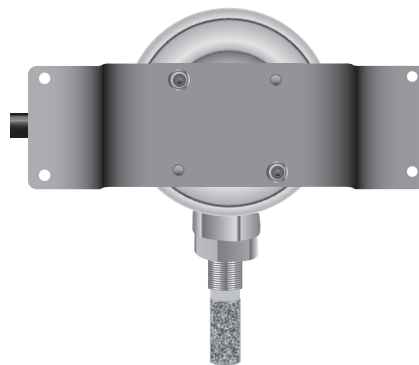


Figure 1 *Wall-Mount Bracket*

2.2.2 Transmitter Mounting – Sample Block (Optional)



The following procedure must be carried out by a qualified installation engineer.

To mount the transmitter into the sensor block (preferred method), proceed as follows, refer to *Figure 2*.

1. Remove the protective cover (2) (and its desiccant capsule) from the tip of the transmitter (1).
2. Fit the seal (4) over the threaded part of the transmitter body.



WARNING: Under no circumstances should the sensor guard be handled with the fingers.

3. Screw the transmitter (1) into the sample block (3) and tighten to the recommended torque setting (see Section 2.2). **NOTE: Use the flats of the hexagonal nut and not the sensor body.**
4. Connect a cable (5) to the connector terminal block (see Section 2.3).

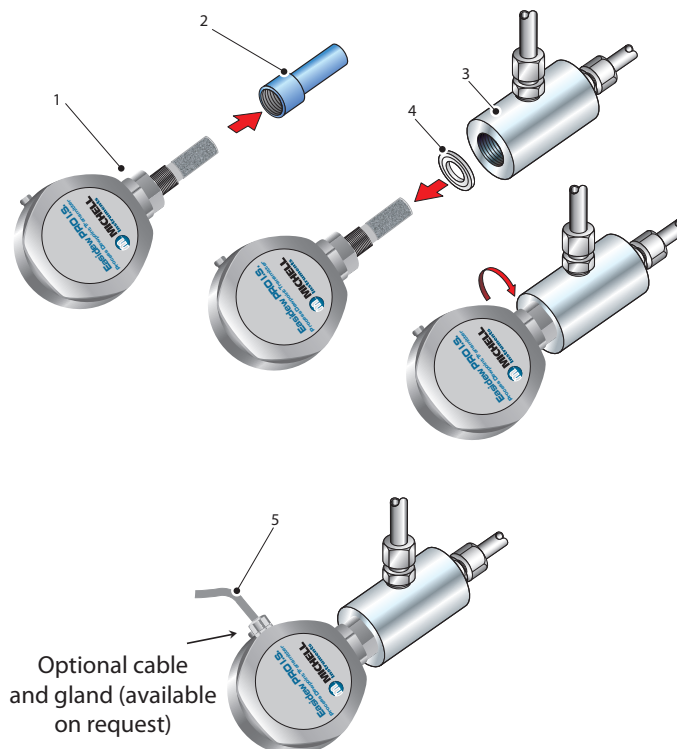


Figure 2 *Transmitter Mounting – Sensor Block*

2.2.3 Transmitter Mounting – Direct Pipeline Connection

The transmitter may be directly mounted into a pipe or duct as shown in *Figure 3*.



CAUTION: Do not mount the transmitter too close to the bottom of a bend where any condensate in the pipeline might collect and saturate the probe.

The pipe or duct will require a thread to match the transmitter body thread. Fixing dimensions are shown in *Figure 3*. For circular pipework, to ensure the integrity of a gas tight seal, a mounting flange will be required on the pipework in order to provide a flat surface to seal against.



The following procedure must be carried out by competent personnel.

1. Ensure that the protective cover (and its desiccant capsule) has been removed from the tip of the transmitter.



WARNING: Under no circumstances should the sensor guard be handled with the fingers.

2. Fit a bonded seal (2) over the threaded part of the transmitter body.
3. Screw the transmitter into the pipe (1). Tighten enough to obtain a gas tight seal. (Torque will depend upon the pipeline material.) **NOTE: Do not overtighten or the thread on the pipework may be stripped.**

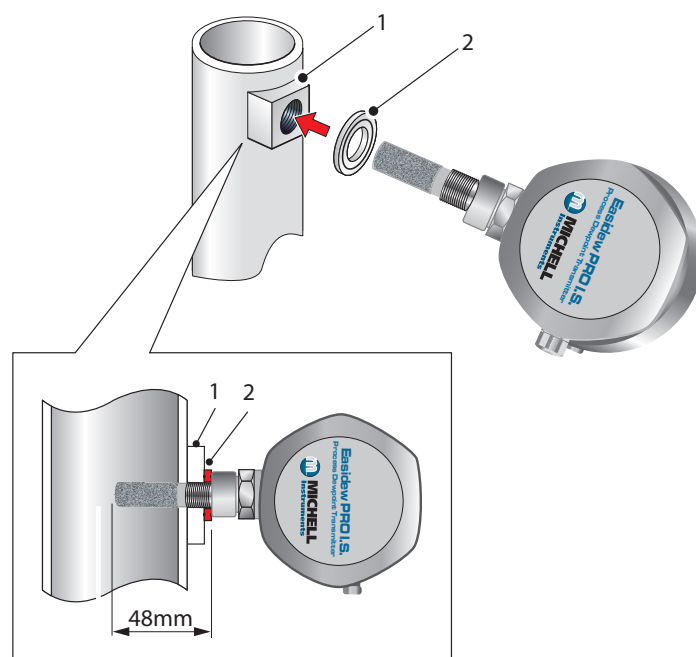


Figure 3 Transmitter Mounting – Pipe or Duct

2.2.4 Transmitter Mounting – With Additional Process Connection Adapter



The following procedure must be carried out by a qualified installation engineer.

To mount the adapter into the transmitter, proceed as follows (see *Figure 4*):

1. Ensure that the protective cover (2), and its desiccant capsule (2a), have been removed from the tip of the transmitter.
2. Fit the bonded seal (3) over the threaded part of the transmitter body.
3. Screw the adapter (4) onto the threaded part of the transmitter and tighten to 30.5 Nm (22.5 ft-lbs). **NOTE: Use the flats of the hexagonal nut and not the sensor body.**



WARNING: Under no circumstances should the sensor guard be handled with the fingers.

4. Screw the transmitter (1) with its seal (3) and adapter (4) into the sample block (see Section 2.2.2) or pipeline (see Section 2.2.3) and fully tighten using a wrench until the seal is fully compressed and to the following torque settings:

G 1/2" BSP 56 Nm (41.3 ft-lbs)

3/4" - 16 UNF ` 40 Nm (29.5 ft-lbs)

1/2" NPT Use a suitable sealant e.g. PTFE tape using correct taping procedures

NOTE: Use the flats of the hexagonal nut and not the sensor body.

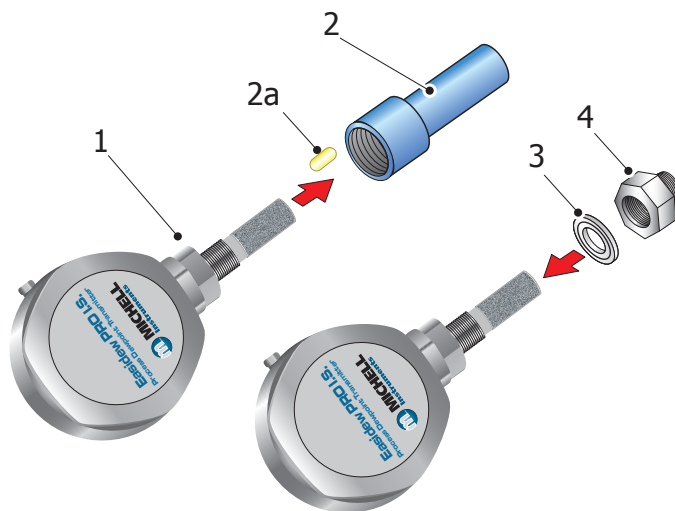


Figure 4 *Transmitter Mounting with Adapter*

2.3 Preparation of the Sensor Cable

The sensor cable is NOT supplied as standard.



The crimps supplied must be fitted onto any cable installed into the connector in order to comply with Hazardous Area Certification of the product.

When making a cable assembly it is important that the cable is correctly terminated (see below).

NOTE: Figure 5 shown below, should be followed in detail. The crimps should be applied such that there is no possibility of a conductor strand of a core becoming free.

When the crimp is made it should have a minimum of 2 positions of crimping. After the crimp is made it should be trimmed to a length of 5 mm.

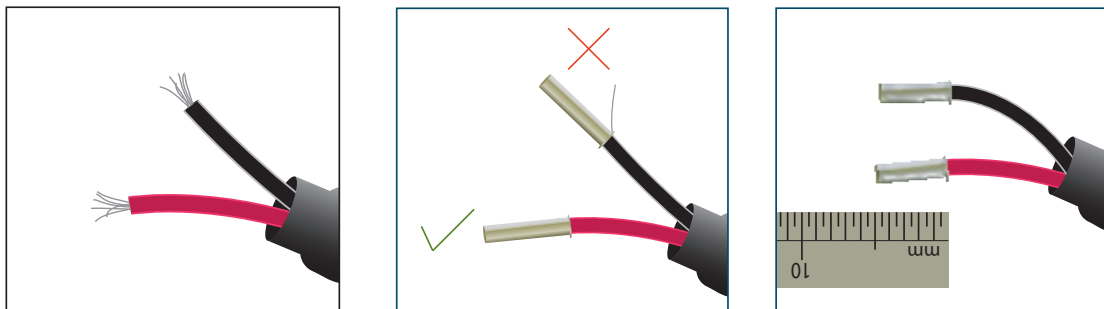


Figure 5 *Wire and Crimp Details*

Cable connection to the Easidew PRO I.S. is made via the connector terminal block.

When the crimps are installed into the connector terminal block ensure they are fully inserted, before tightening the terminal clamping screws.

NOTE: Ensure the assembled green wire in terminal 3 remains connected.



Figure 6 *Terminal Block Connection*

When all wire connections are made, ensure that there is a minimum clearance distance and a minimum creepage distance in air of 2 mm (0.8") between each terminal.

2.4 Electrical Schematic

NOTE: The screen/shield should be connected for maximum performance and to avoid interference.



Always connect the 4...20 mA return signal to a suitable load (see *Figure 7*) before the power is applied. Without this connection, the transmitter may be damaged if allowed to operate for prolonged periods.

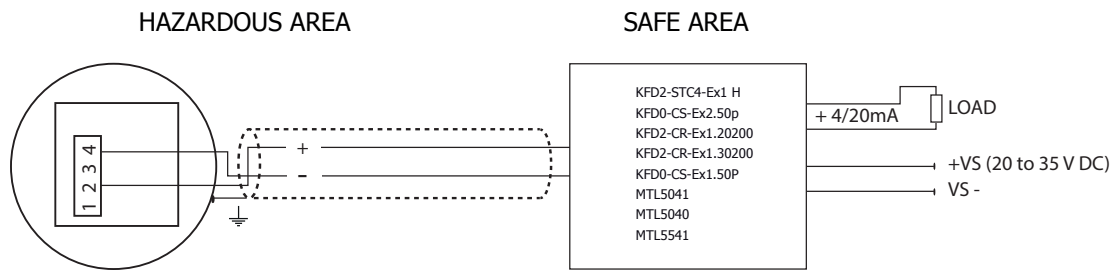


Figure 7 *Hazardous Area Connection*

1. Connect cable screen to cable gland.
2. Refer to system drawing in Appendix B.

3 OPERATION

3.1 Measurement and Configuration

The Easidew PRO I.S. can be configured to provide an output of 4...20 mA (2-wire connection) for the following:

Dew point	-110...+20°C (-166...+68°F)
Moisture content in gas	0...3000 ppm _v
Moisture content in liquids	0...3000 ppm _w

The Easidew PRO I.S. can be purchased factory configured as required. Alternatively, the Easidew PRO I.S. can be configured by the customer, using the Easidew Communications Kit (EPR-CK) and Easidew Application Software. The Easidew Communications Kit can be purchased from Michell Instruments or a local representative. For a free copy of the Application Software contact Michell Instruments' UK office (see www.michell.com for details of Michell's contact information).

For moisture content in gas, the calculation from the measured dew point is assumed to be at atmospheric pressure. Alternatively, a fixed gas pressure needs to be programmed into the Easidew PRO I.S.

For moisture content measurement in liquid, the Easidew PRO I.S. requires the saturation constant of the liquid to be programmed into the transmitters, either at the factory or by the customer using the Application Software.

The transmitter requires a 6-point look-up table for saturation constants up to 3000 ppm_w over the temperature range 0...+50°C (+32...+122°F). Saturation constants for 8 common liquids can be programmed into the Easidew PRO I.S. via the Application Software. Alternatively, the user can program saturation constants manually. The Application Software Help file provides detailed instructions on how to perform this task.

3.2 Sampling Hints

Operation is very simple, assuming the following installation techniques are adhered to:

Be Sure the Sample is Representative of the Gas Under Test:

The sample point should be as close to the critical measurement point as possible. Also, never sample from the bottom of a pipe as entrained liquids may be drawn into the sensing element.

Minimize Dead Space in Sample Lines:

Dead space causes moisture entrapment points, increased system response times and measurement errors, as a result of the trapped moisture being released into the passing sample gas and causing an increase in partial vapor pressure.

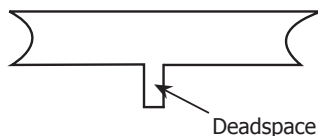


Figure 8 *Indication of Dead Space*

Remove Any Particulate Matter or Oil from the Gas Sample:

Particulate matter at high velocity can damage the sensing element and similarly, at low velocity, they may 'blind' the sensing element and reduce its response speed. If particulate, such as degraded desiccant, pipe scale or rust is present in the sample gas, use an in-line filter, as a minimum level of protection. For more demanding applications Michell Instruments offers a range of sampling systems (for more information contact www.michell.com).

Use High Quality Sample Tube and Fittings:

Michell Instruments recommends that, wherever possible, stainless steel tubing and fittings should be used. This is particularly important at low dew points since other materials have hygroscopic characteristics and adsorb moisture on the tube walls, slowing down response and, in extreme circumstances, giving false readings. For temporary applications, or where stainless steel tubing is not practical, use high quality thick walled PTFE tubing.

Position Transmitter away from Heat Source:

It is recommended, as good instrumentation practice, that the transmitter is placed away from any heat source to avoid adsorption/desorption.

4 GOOD MEASUREMENT PRACTICE

Ensuring reliable and accurate moisture measurements requires the correct sampling techniques, and a basic understanding of how water vapor behaves. This section aims to explain the common mistakes and how to avoid them.

Sampling Materials – Permeation and Diffusion

All materials are permeable to water vapor since water molecules are extremely small compared to the structure of solids, even including the crystalline structure of metals. The graph above demonstrates this effect by showing the increase in dew point temperature seen when passing very dry gas through tubing of different materials, where the exterior of the tubing is in the ambient environment.

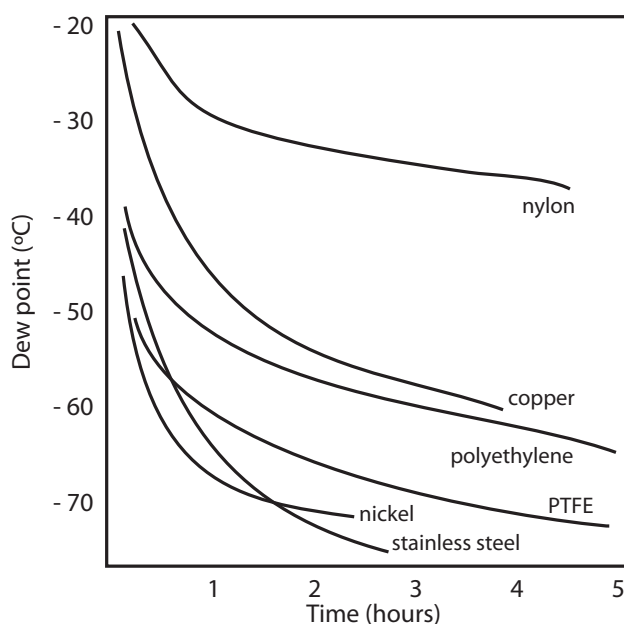


Figure 9 *Material Permeability Comparison*

What this demonstrates is the dramatic effect that different tubing materials have on the humidity levels of a gas passed through them. Many materials contain moisture as part of their structure and when these are used as tubing for a dry gas the gas will absorb some of the moisture. Always avoid using organic materials (e.g. rubber), materials containing salts and anything which has small pores which can easily trap moisture (e.g. nylon).

As well as trapping moisture, porous sampling materials will also allow moisture vapor to ingress into the sample line from outside. This effect is called diffusion and occurs when the partial water vapor pressure exerted on the outside of a sample tube is higher than on the inside. Remember that water molecules are very small so in this case the term 'porous' applies to materials that would be considered impermeable in an everyday sense – such as polyethylene or PTFE. Stainless steel and other metals can be considered as practically impermeable and it is surface finish of pipework that becomes the dominant factor. Electropolished stainless steel gives the best results over the shortest time period.

Take into consideration the gas you are measuring, and then choose materials appropriate to the results you need. The effects of diffusion or moisture trapped in materials are more significant when measuring very dry gases than when measuring a sample with a high level of humidity.

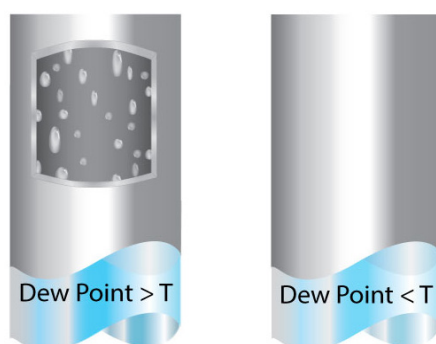
Temperature and Pressure effects

As the temperature or pressure of the environment fluctuates, water molecules are adsorbed and desorbed from the internal surfaces of the sample tubing, causing small fluctuations in the measured dew point.

Adsorption is the adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to the surface of a material, creating a film. The rate of adsorption is increased at higher pressures and lower temperatures.

Desorption is the release of a substance from or through the surface of a material. In constant environmental conditions, an adsorbed substance will remain on a surface almost indefinitely. However, as the temperature rises, so does the likelihood of desorption occurring.

Ensuring the temperature of the sampling components is kept at consistent levels is important to prevent temperature fluctuation (i.e. through diurnal changes) continually varying the rates of adsorption and desorption. This effect will manifest through a measured value which increases during the day (as desorption peaks), then decreasing at night as more moisture is adsorbed into the sampling equipment.



If temperatures drop below the sample dew point, water may condense in sample tubing and affect the accuracy of measurements.

Maintaining the temperature of the sample system tubing above the dew point of the sample is vital to prevent condensation. Any condensation invalidates the sampling process as it reduces the water vapor content of the gas being measured. Condensed liquid can also alter the humidity elsewhere by dripping or running to other locations where it may re-evaporate.

Although ambient pressure does not change drastically in a single location, the gas sample pressure does need to be kept constant to avoid inconsistencies introduced by adsorption or desorption. The integrity of all connections is also an important consideration, especially when sampling low dew points at an elevated pressure. If a small leak occurs in a high-pressure line, gas will leak out; however, vortices at the leak point and a negative vapor pressure differential will also allow water vapor to contaminate the flow.

Theoretically flow rate has no direct effect on the measured moisture content, but in practice it can have unanticipated effects on response speed and accuracy. An inadequate flow rate may:

- Accentuate adsorption and desorption effects on the gas passing through the sampling system.
- Allow pockets of wet gas to remain undisturbed in a complex sampling system, which will then gradually be released into the sample flow.
- Increase the chance of contamination from back diffusion. Ambient air that is wetter than the sample can flow from the exhaust back into the system. A longer exhaust tube can help alleviate this problem.
- Slow the response of the sensor to changes in moisture content.

An excessively high flow rate can:

- Introduce back pressure, causing slower response times and unpredictable changes in dew point
- Result in a reduction in depression capabilities in chilled mirror instruments by having a cooling effect on the mirror. This is most apparent with gases that have a high thermal conductivity such as hydrogen and helium.

System design for fastest response times

The more complicated the sample system, the more areas there are for trapped moisture to hide. The key pitfalls to look out for here are the length of the sample tubing and dead volumes.

The sample point should always be as close as possible to the critical measurement point to obtain a truly representative measurement. The length of the sample line to the sensor or instrument should be as short as possible. Interconnection points and valves trap moisture, so using the simplest sampling arrangement possible will reduce the time it takes for the sample system to dry out when purged with dry gas.

Over a long tubing run, water will inevitably migrate into any line, and the effects of adsorption and desorption will become more apparent.

Dead volumes (areas which are not in a direct flow path) in sample lines, hold onto water molecules which are slowly released into the passing gas. This results in increased purge and response times, and wetter than expected readings. Hygroscopic materials in filters, valves (e.g. rubber from pressure regulators) or any other parts of the system can also trap moisture.

Plan your sampling system to ensure that the sample tap point and the measurement point are as close as possible to avoid long runs of tubing and dead volumes.

Filtration

All trace moisture measurement instruments and sensors are by their nature sensitive devices. Many processes contain dust, dirt or liquid droplets. Particulate filters are used for removing dirt, rust, scale and any other solids that may be in a sample stream. For protection against liquids, a coalescing or membrane filter should be used. The membrane provides protection from liquid droplets and can even stop flow to the analyser completely when a large slug of liquid is encountered, saving the sensor from potentially irreparable damage.

5 MAINTENANCE

Calibration

Routine maintenance of the Easidew I.S. is confined to regular re-calibration by exposure of the transmitter to sample gases of known moisture content to ensure that the stated accuracy is maintained. Calibration services traceable to the UK *National Physical Laboratory* (NPL) and the US *National Institute of Standards and Technology* (NIST) are provided by Michell Instruments.

Michell Instruments offers a re-calibration service to suit specific needs. A Michell representative can provide detailed, custom advice (for Michell Instruments' contact information go to www.michell.com).

Sensor Guard Replacement

The sensor is supplied with a stainless steel sintered guard.

The stainless steel guard provides $<80\mu\text{m}$ protection to the dew-point sensor. It is designed to show any contamination and the guard should be changed if the surface becomes discolored.

When replacing the guard, care should be taken to handle the guard by the bottom part only. A replacement guard (SSG) can be obtained by contacting Michell Instruments (www.michell.com) or your local distributor.

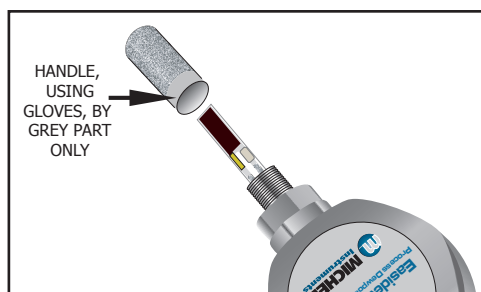


Figure 10 Replacement of Sensor Guard

Bonded Seal

If the installed bonded seal gets damaged or lost, a pack of 5 replacement bonded seals can be obtained by contacting Michell Instruments, or your local distributor, and quoting part number 5/8-BS.

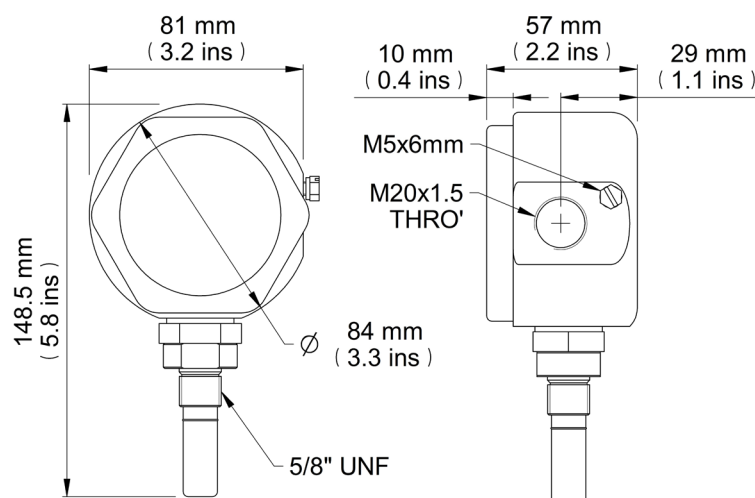
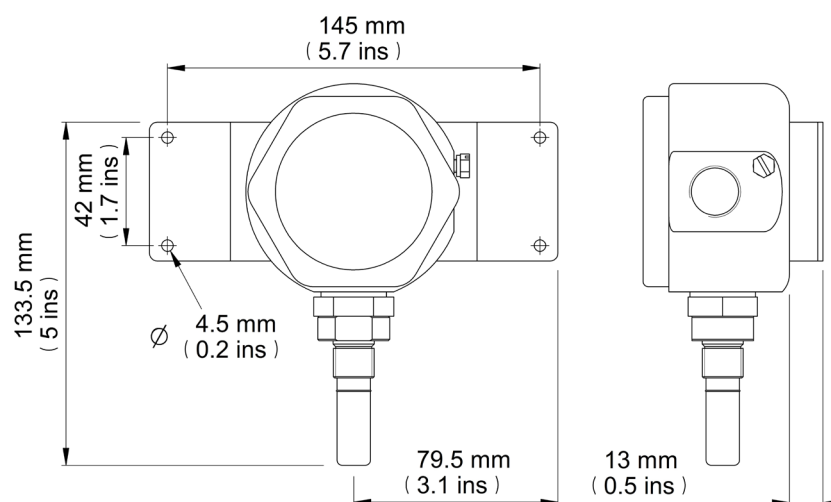
Appendix A

Technical Specifications

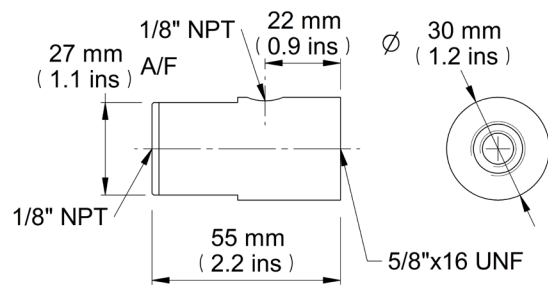
Appendix A Technical Specifications

Product	Easidew PRO I.S. for Gases		Easidew PRO LQ I.S. for Liquids	
Performance Specifications				
Measurement range	-110...+20°C (-166...+68°F) dew point -100...+20°C (-148...+68°F) dew point		0...1000 ppm _w capability – factory configured to customer-required range and application	
Accuracy	±1°C (±1.8°F) dew point (+20...-60°C / +68...-76°F) ±2°C (±3.6°F) dew point (-60...-110°C / -76...-166°F)			
Response time	5 mins to T95 (dry to wet)			
Repeatability	0.5°C (0.9°F) dew point			
Calibration	Traceable 13-point calibration and certificate			
Electrical Specifications				
Output signal	4...20 mA (2-wire connection, current source); User configurable over range			
Output	Dew point or moisture content		Moisture content	
Analog output scaled range	Dew point: -110...+20°C (-166...+68°F) or -100...+20°C (-148...+68°F) Moisture content in gas: 0...3000 ppm _v Non-standard: mg/m ³ , lbs/MMSCF natural gas		Moisture content in liquid: 0...1000 ppm _w capability – factory configured to customer-required range and application	
Supply voltage	12...28 V DC			
Load resistance	Max 250 Ω @ 12 V (500 Ω @ 24 V)			
Current consumption	23 mA max, depending on output signal			
Saturation constants (for moisture in liquids measurements only)			6-point look-up table for saturation constants up to 1000 ppm _w over the temperature range 0...+50°C (32...+122°F); saturation constants for 10 common liquids can be programmed into the Easidew PRO LQ I.S. via the application software; alternatively the user can program saturation constants manually	
CE & UKCA conformity	Approved			
Operating Specifications				
Operating temperature	-40...+60°C (-40...+140°F)			
Compensated Temperature Range	-20...+50°C (-4...+122°F) NOTE: The transmitter accuracy statement is only valid for the temperature range: -20/+50°C (-4/+122°F)			
Storage Temperature	-40...+60°C (-40...+140°F)			
Operating pressure	45 MPa (450 barg) maximum			
Flow rate	1...5 Nl/min mounted in standard sampling block 0...10 m/sec direct insertion		0.1...0.3L/min through Easidew sample block 0.1...1m/s direct insertion	
Mechanical Specifications				
Ingress protection	IP66 in accordance with standard BS EN 60529:1992; NEMA 4 protection in accordance with standard NEMA 250-2003			
Intrinsically safe area certificates *	See Appendix C			
Canadian pressure vessel cert	C.R.N. — 11 Canadian provinces			
Oxygen service	Optional: cleaned for enriched oxygen			
Housing material	316 stainless steel			
Filter (sensor protection)	Standard: Stainless steel sintered guard (for protection against fine particulate >80µm) Optional: HDPE guard (for protection against fine particulate >10µm)			
Process connection and material	316 stainless steel 5/8" — 18 UNF with bonded seal, G1/2" and 3/4" UNF adaptors available (material certificate to BS EN 10204 3.1 — see 'accessories and spare parts' on product order codes)			
Weight	1.27 kg (2.8 lb)			
Electrical connections	Screw terminal via female M20 x 1.5 mm gland			
Diagnostic conditions (factory programmed)	Condition Sensor fault Under-range dew point Over-range dew point		Output 23 mA 4 mA 20 mA	
Approved galvanic isolators	KFD2-CR-EX1.20200	KFD0-CS-EX2.50P	MTL5040	KFD0-CS-EX1.50P
	KFD2-CR-EX1.30200	KFD2-STC4-EX1.H	MTL5541	MTL5041

* The end user has a responsibility to ensure that when installed in the Hazardous Area, the system is compliant with relevant local and international installation Standards for the use of equipment in explosive atmospheres.

A.1 Dimensions**Transmitter for Cable Gland Installation****Transmitter with Wall Mount Bracket**

Optional Sample Block



Bonded Seal

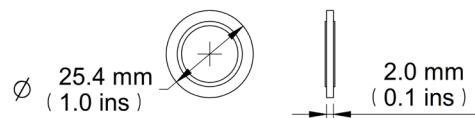


Figure 11 *Dimensions*

Appendix B

System Drawings

B.1 Baseefa Approved System Drawing

THE CAPACITANCE AND EITHER THE INDUCTANCE OR THE INDUCTANCE TO RESISTANCE RATIO (L/R) OF THE CABLE MUST NOT EXCEED THE FOLLOWING VALUES:

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	OR	L/R RATIO (μ H/ohm)
IIC	SEE NOTE 1 * 40 nF	4.2mH		54 μ H/ Ω
IIB	613 nF	12.6mH		217 μ H/ Ω
IIA	2.11 μ F	33mH		435 μ H/ Ω

THE ISOLATION OF THE SIGNAL WIRES WITH THE EASIDWY DISCONNECTED, MUST BE ABLE TO WITHSTAND A 500V AC INSULATION TEST.

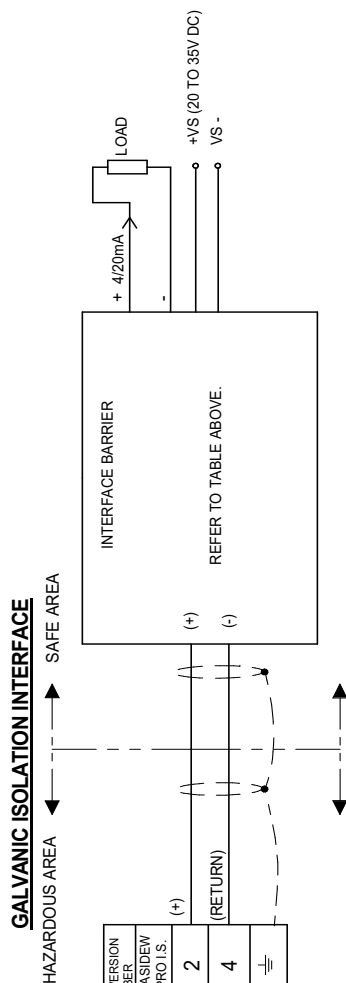
AT INSTALLATION OF SYSTEM PERFORM A RISK ASSESSMENT IN ACCORDANCE WITH EN60079-25:2004 cl.10 AND INSTALL LIGHTENING PROTECTION AS NECESSARY.

THE SYSTEM MUST BE MARKED WITH A DURABLE LABEL. THE LABEL SHOULD APPEAR ON OR ADJACENT TO THE PRINCIPAL ITEM OF ELECTRICAL APPARATUS IN THE SYSTEM OR AT THE INTERFACE BETWEEN THE INTRINSICALLY SAFE AND NON-INTRINSICALLY SAFE CIRCUITS. THIS MARKING SHALL INCLUDE THE FOLLOWING INFORMATION:

NOTE 1. 48nF MAXIMUM CABLE CAPACITANCE IS ACCEPTABLE IN IIC INSTALLATIONS FOR THE INTRINSIC SAFETY ISOLATORS SHOWN IN THE LIST BELOW. FOR ISOLATORS NOT LISTED BELOW, BUT APPEARING IN TABLE A, ONLY 40nF MAXIMUM CABLE CAPACITANCE IS ACCEPTABLE.

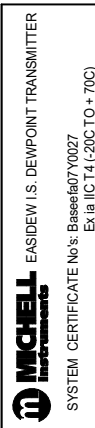
KFD0-CS-Ex1.50P
KFD0-CS-Ex2.50P
KFD0-CR-Ex1.20200
KFD0-CR-Ex1.30200
MTL5041
MTL5040
MTL5541


Type	Certificate Number	Interface	Connection to Easidew i.S.
Isolated Repeater	BAS98ATEX7343	KFD0-CS-Ex1.50P	Pin 1 (+) Pin 2 (-)
Dual Isolated Repeater	BAS98ATEX7343	KFD0-CS-Ex2.50P	Channel 1 - Pin 1 (+) Channel 1 - Pin 2 (-) Channel 2 - Pin 4 (+) Channel 2 - Pin 5 (-)
Transmitter Supply Isolator	BAS00ATEX7164	KFD2-CR-Ex1.20200	Pin 1 (+) Pin 3 (-)
Transmitter Supply Isolator	BAS00ATEX7164	KFD2-CR-Ex1.30200	Pin 1 (+) Pin 3 (-)
Smart Transmitter Power Supply	BAS99ATEX7060	KFD2-STC4-Ex1.H	Pin 1 (+) Pin 3 (-)
Repeater Power Supply	BAS01ATEX7155	MTL5041	Pin 2 (+) Pin 1 (-)
Dual Loop Isolator	BAS98ATEX2227	MTL5040	Pin 2 (+) Pin 1 (-) Pin 5 (+) Pin 4 (-)
Repeater Power Supply	BaseefaATEX0213	MTL5541	Pin 2 (+) Pin 1 (-)



DEWPOINT TRANSMITTER CERTIFICATION No's: Baseelgauga TEX0330X IECEX BAS 06.0090X	TRANSMITTER VERSION TERMINAL NUMBER	
	EASIDEW I.S.	EASIDEW PRO.I.S.
	3	2
	1	4
	≡	≡

SYSTEM LABEL



 3rd ANGLE PROJECTION	TOLERANCES: 0 DEC. PLACE: ±0.5 HOLE Ø: +0.1 1 DEC. PLACE: ±0.2 ANGLES: ±0.5° DIMENSIONS: 2 DEC. PLACE: ±0.1	DRAWING UNITS mm	SCALE N.T.S.	05	13395	16/12/13	IMA
				04	11165	10/08/11	IMA
				03	PRO Version	16/02/09	IMA
				02	08057	27/05/08	IMA
				01	CERT ISS	26/01/07	MSB
TITLE EASIDEW I.S. and EASIDEW PRO I.S. DEWPOINT TRANSMITTER SYSTEM DRAWING				DRAWING NUMBER			
USED ON	MICHEL INSTRUMENTS LTD. CAMBRIDGE ©						SHEET OF 1
							A3

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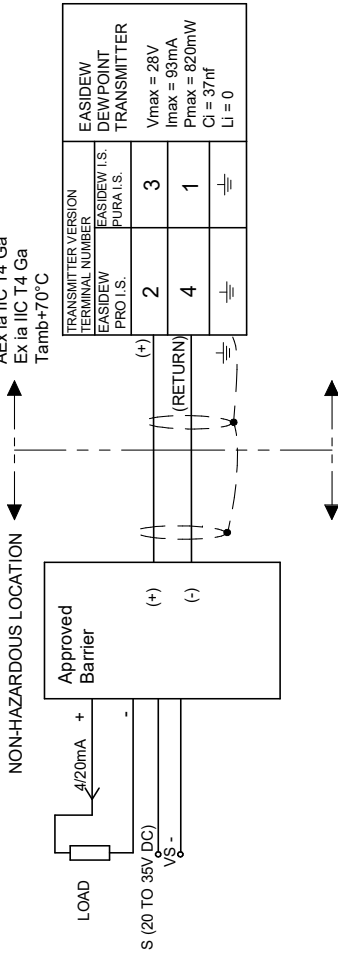
B.2 QPS Approved System Drawing

THE CAPACITANCE AND EITHER THE INDUCTANCE OR THE INDUCTANCE TO RESISTANCE RATIO (L/R) OF THE CABLE MUST NOT EXCEED THE FOLLOWING VALUES:

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH) OR L/R RATIO (µH/Ω)
AB	46 nF	54 µH/Ω
C	613 nF	217 µH/Ω
D	2.11 µF	436 µH/Ω

THE ISOLATION OF THE SIGNAL WIRES WITH THE EASIDEW DISCONNECTED, MUST BE ABLE TO WITHSTAND A 500V AC INSULATION TEST.
THE INSTALLATION MUST COMPLY WITH THE INSTALLATION PRACTICES OF THE COUNTRY OF USE, i.e. ANSI/ISA RP12.6 (INSTALLATION OF INTRINSICALLY SAFE SYSTEMS FOR HAZARDOUS [CLASSIFIED] LOCATIONS) AND THE NATIONAL ELECTRICAL CODE ANSI/NFPA 70.
THE CAPACITANCE AND THE INDUCTANCE OF THE HAZARDOUS AREA CABLES MUST NOT EXCEED THE VALUES GIVEN IN TABLE 1

HAZARDOUS LOCATION
CLASS I, DIVISION 1,
Gps A,B,C, & D
CLASS I, ZONE 0
AEx ia IIC T4 Ga
Ex ia IIC T4 Ga
Tamb+70°C



- Intrinsically safe(ently), Class 1, Div1, Group A,B,C,D
Hazardous Location Installations
- 1) Control room equipment may not use or generate over 250Vrms.
 - 2) Wire all circuits for power supply per CEC Part 1.
 - 3) Use only entity approved safety barrier or other associated equipment that satisfy the following conditions:
 $V_{CO} \leq V_{max}$, $I_{SC} \leq I_{max}$, $C_{\Sigma} \leq C_{CABLE}$, $L_{\Sigma} \geq L_i + L_{CABLE}$
- Transmitter entity parameters are as follows:
- $V_{max} < 28Vdc$
 $I_{max} < 93mA$
 $C_i = 37nF$
 $L_i = 0uH$
- 4) WARNING: SUBSTITUTION OF COMPONENTS MAY IMPARE INTRINSIC SAFETY.
5) Ex ia is defined as Intrinsically Safe.

Type	Certificate Number	Interface	Connection to Easidew I.S.
Isolated Repeater	BAS98ATEX7343 UL Canada E106378CUL	KFD0-CS-Ex1 50P	Pin 1 (+) Pin 2 (-)
Dual Isolated Repeater	BAS98ATEX7343 UL Canada E106378CUL	KFD0-CS-Ex2 50P	Channel 1 - Pin 1 (+) Channel 1 - Pin 2 (-) Channel 2 - Pin 4 (+) Channel 2 - Pin 5 (-)
Transmitter Supply Isolator	BAS00ATEX7164 UL Canada E106378CUL	KFD2-CR-Ex1 20200	Pin 1 (+) Pin 3 (-)
Transmitter Supply Isolator	BAS00ATEX7164 UL Canada E106378CUL	KFD2-CR-Ex1 30200	Pin 1 (+) Pin 3 (-)
Smart Transmitter Power Supply	BAS99ATEX7060 UL Canada E106378CUL	KFD2-STC4-Ex1 H	Pin 1 (+) Pin 3 (-)

3rd ANGLE PROJECTION	TOLERANCES: UNLESS OTHERWISE STATED DEC. PLACE: ±0.5 DIMENSIONS: 1 DEC. PLACE: ±0.1 2 DEC. PLACE: ±0.1	DRAWING UNITS mm	SCALE NTS	QPS 30/06/21	IMA 02/11/17
MATERIAL	FINISH			08 FI increased	IMA 16/12/13
				06 11081	IMA 06/04/11
				05 CERT ISS	IMA 15/05/09
				04 CERT ISS	IMA 25/03/09
				03 CERT ISS	IMA 16/06/08
				ISSUE MOD. No.	DATE
					SIGN
TITLE EASIDEW I.S. & EASIDEW PRO I.S. DEWPOINT TRANSMITTER SYSTEM DRAWIN. QPS				DRAWING NUMBER EX90385QPS	
USED ON MICHELL INSTRUMENTS LTD. CAMBRIDGE ©				SHEET 1 OF 1 A3	

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MICHELL Instruments

DRAWN	CHECKED	APPROVED
MSB		
DATE	10/03/06	DATE



Appendix C

Hazardous Area Certification

Appendix C Hazardous Area Certification

The Easidew PRO I.S is certified compliant to the ATEX Directive (2014/34/EU), the IECEx scheme and SI 2016 No. 1107 UKCA product marking scheme for use within Zone 0, 1 and 2 Hazardous Areas and has been assessed as being so by SGS FIMKO Oy, Finland (Notified Body 0598) and SGS Baseefa UK (Approved Body 1180).

The Easidew PRO I.S is certified compliant to the applicable North American Standards (USA and Canada) for use within Class I, Division 1 and Class I, ZONE 1 Hazardous Locations and has been assessed as being so by QPS.

C.1 Product Standards

This product conforms to the Standards:

BS/EN60079-0:2012/A11:2013	CSA C22.2 No. 60079-0:19
BS/EN60079-11:2012	CSA C22.2 No. 60079-11:14
FM Class 3600:2018	CSA 61010-1-12(R2017)
FM Class 3610:2010	UL61010-1
IEC60079-0:2011	UL60079-0
IEC60079-11:2011	UL60079-11

C.2 Product Certification

This product is attributed with the product certification codes:

ATEX, UKCA & IECEx
II 1G Ex ia IIC T4 Ga (-20°C...+70°C)

North American
IS, Class I, Division 1, Groups A, B, C & D, T4
Class I, Zone 0, AEx ia IIC T4 Gb, Ex ia IIC T4 Gb
Tamb +70°C

C.3 Global Certificates/Approvals

ATEX	SGS Baseefa 06ATEX0330X
IECEx	IECExBAS 06.0090X
UKCA	BAS21UKEX0014X
QPS	LR1507-10

These certificates can be viewed or downloaded from our websites at:
www.processsensing.com & www.michell.com

C.4 Terminal Parameters

U_i	= 28 V
I_i	= 93 mA
P_i	= 820 mW
C_i	= 37 nF
L_i	= 0

C.5 Special Conditions

1. The wiring connections to the free socket must be made via crimped connectors in such a way that all the strands of the wire used are held securely by the crimp.
2. The plastic plug and socket create a potential for electrostatic discharge so must not be rubbed with a dry cloth or cleaned with solvents.
3. The Easidew PRO I.S Dew-Point Transmitter does not withstand the 500 V AC insulation test to frame. This must be taken into account when installing the equipment.

C.6 Maintenance and Installation

The Easidew PRO I.S. must only be installed by suitably qualified personnel and in accordance with the instructions provided and the terms of the applicable product certificates.

Maintenance and servicing of the product must only be carried out by suitably trained personnel or returned to an approved Michell Instruments Service Center.

Appendix D

Quality, Recycling & Warranty Information

Appendix D Quality, Recycling & Warranty Information

Michell Instruments is dedicated to complying to all relevant legislation and directives. Full information can be found on our website at:

www.michell.com/compliance

This page contains information on the following directives:

- Anti-Facilitation of Tax Evasion Policy
- ATEX Directive
- Calibration Facilities
- Conflict Minerals
- FCC Statement
- Manufacturing Quality
- Modern Slavery Statement
- Pressure Equipment Directive
- REACH
- RoHS3
- WEEE2
- Recycling Policy
- Warranty and Returns

This information is also available in PDF format.

Appendix E

Return Document & Decontamination Declaration

Appendix E Return Document & Decontamination Declaration

Decontamination Certificate

IMPORTANT NOTE: Please complete this form prior to this instrument, or any components, leaving your site and being returned to us, or, where applicable, prior to any work being carried out by a Michell engineer at your site.

Instrument			Serial Number	
Warranty Repair?	YES	NO	Original PO #	
Company Name			Contact Name	
Address				
Telephone #			E-mail address	
Reason for Return /Description of Fault:				
Has this equipment been exposed (internally or externally) to any of the following? Please circle (YES/NO) as applicable and provide details below				
Biohazards	YES		NO	
Biological agents	YES		NO	
Hazardous chemicals	YES		NO	
Radioactive substances	YES		NO	
Other hazards	YES		NO	
Please provide details of any hazardous materials used with this equipment as indicated above (use continuation sheet if necessary)				
Your method of cleaning/decontamination				
Has the equipment been cleaned and decontaminated?	YES		NOT NECESSARY	
Michell Instruments will not accept instruments that have been exposed to toxins, radio-activity or bio-hazardous materials. For most applications involving solvents, acidic, basic, flammable or toxic gases a simple purge with dry gas (dew point <-30°C) over 24 hours should be sufficient to decontaminate the unit prior to return. Work will not be carried out on any unit that does not have a completed decontamination declaration.				
Decontamination Declaration				
I declare that the information above is true and complete to the best of my knowledge, and it is safe for Michell personnel to service or repair the returned instrument.				
Name (Print)			Position	
Signature			Date	

NOTES



www.ProcessSensing.com



<http://www.michell.com>