



Easidew I.S. Dew-Point Transmitter User Manual



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Easidew I.S.

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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 52.5 MPa (525 barg/7614 psig). Refer to the Technical Specifications in Appendix A.

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 this instrument is 12 months unless it is to be used in a mission-critical application or in a dirty or contaminated environment in which case the calibration interval should be reduced accordingly. The instrument should be returned to the manufacturer, Michell Instruments Ltd., or one of their accredited service agents for re-calibration.

Safety Conformity

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

Abbreviations

The following abbreviations are used in this manual:

barg	pressure unit (=100 kP or 0.987 atm) (bar gauge)
°C	degrees Celsius
°F	degrees Fahrenheit
DC	direct current
dp	dew point
fps	feet per second
ft-lbs	feet per pounds
g	grams
lbs/in	pounds per inch
µm	micrometer
m/sec	meters per second
mA	milliampere
max	maximum
mm	millimetres
MPa	megapascal
NI/min	normal liters per minute
Nm	Newton meter
oz	ounces
ppm _v	parts per million by volume
psig	pounds per square inch
RH	relative humidity
scfh	standard cubic feet per hour
V	Volts
Ω	Ohms
∅	diameter
"	inch(es)

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 I.S. dew-point transmitter has been manufactured, tested and calibrated to the highest available standards and should be in perfect working order, ready for installation into a gas measurement application. If, after reading this manual, there are any questions about the instrument or how to install and operate it, please contact a Michell representative. Refer to www.michell.com for details of Michell Instruments' worldwide offices contact information.

This manual covers the following Easidew I.S. (Intrinsically Safe) dew-point products:

Easidew I.S. with G 1/2" BSP thread

Easidew I.S. with 3/4" UNF thread

Easidew I.S. with 5/8" UNF thread

1.1 Features

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

The key features are:

- IECEx, QPS, ATEX, UKCA certified transmitter for use in hazardous areas
- G1/2" BSP, 3/4" or 5/8" UNF process connection
- Dew-point or ppmV moisture content
- 2-wire loop powered connection
- Rugged 316 stainless steel IP66 construction
- Measurement ranges -100...+20°Cdp (-148...+68°Fdp)
-110...+20°Cdp (-166...+68°Fdp)
- Accuracy $\pm 2^\circ\text{Cdp}$
- Calibration Certificate (NPL, NIST)

2 INSTALLATION



Any leak/pressure test must be conducted using cylinder nitrogen ($\geq 99.995\%$ purity) regulated to the required pressure (not exceeding the maximum operating pressure of the sensor/system). Hydrostatic testing using water or any liquid is not permitted.

2.1 Unpacking the Transmitter

On removing the transmitter from the box, please check that all the following standard components are included:

- Easidew Transmitter
- Certificate of Calibration
- Electrical Connector (DIN 43650 models only)

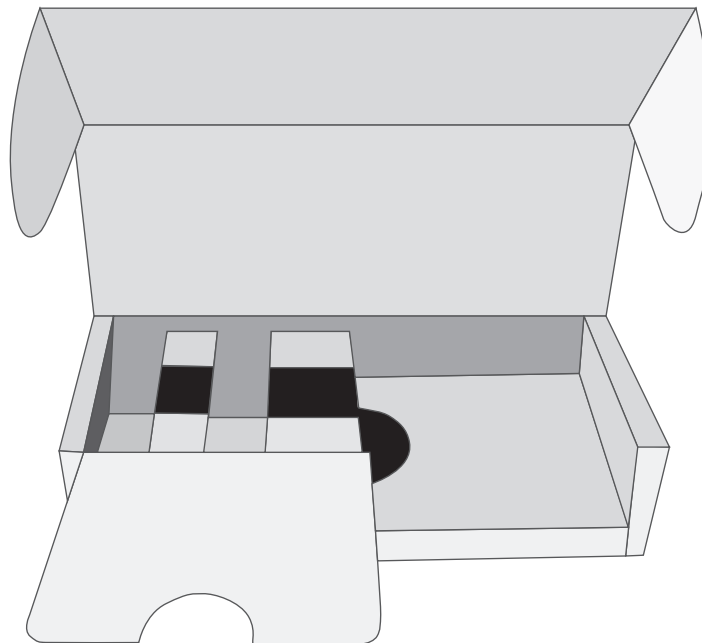


Figure 1 *DIN43650 Transmitter Unpacking Method*

The Transmitter will also be supplied with a process seal, which will be fitted to the unit. Depending on the version, this will either be a bonded seal (5/8" or G1/2" thread versions) or an o-ring seal (3/4" thread versions).

The transmitter sensing element is protected while in transit by a blue plastic cover containing a small desiccant capsule. The cover should be removed before operation but should be retained in case required for return shipping.

Depending on the model, the transmitter may come with the electrical connector fitted to protect the transmitter pins during transit. Keep the connector in a safe place until ready to wire up the sensor.

2.2 Preparation of the Sensor Cable

The sensor cable is NOT supplied as standard. A cable can be obtained by contacting your local distributor or Michell Instruments (see www.michell.com for details).



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

If making a cable assembly it is important that the cable is correctly terminated. See *Figures 3 to 6*.

Cable connection to the Easidew I.S. transmitter is made via the removable connector. Removing the central screw enables the connector terminal block to be removed from the outer housing by using a small screwdriver to prise it clear.

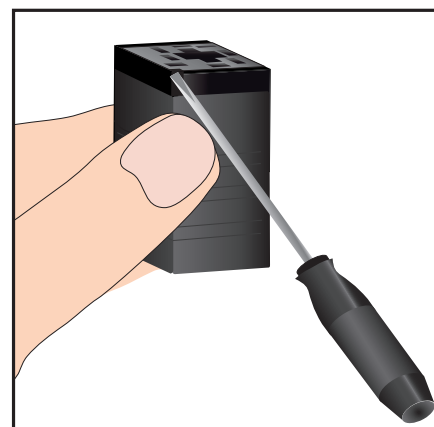
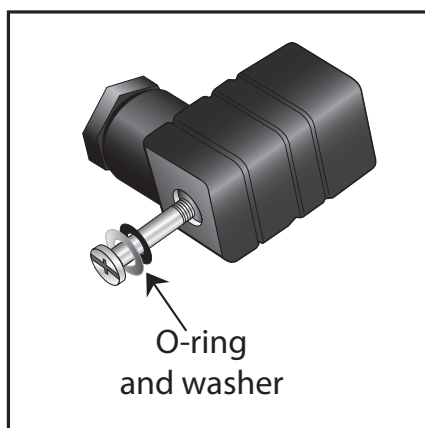


Figure 2 *Connector Terminal Block Removal*



Caution: When removing the central screw ensure that the small sealing O-ring and the washer are retained on the screw and are present during re-installation.

NOTE: *Figure 3 to Figure 6* 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 (see *Figure 4*).

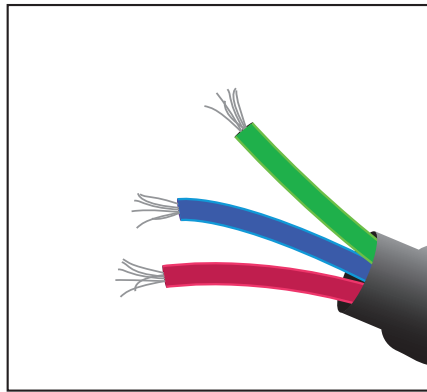


Figure 3 *Bare Wires*

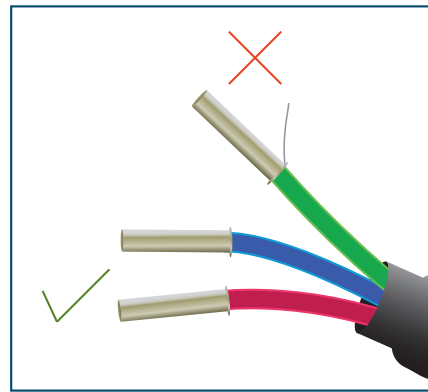


Figure 4 *Crimped Wires*

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 5mm (see *Figure 5*). When the crimps are installed into the connector terminal block ensure they are fully inserted, as shown in *Figure 6*, before tightening the terminal clamping screw.

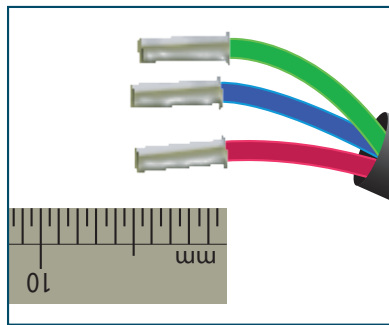


Figure 5 *Cut to 5mm*

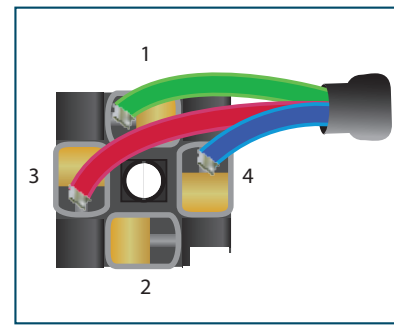


Figure 6 *Connection to Connector Terminal Block*

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

For the transmitter to work properly, and to achieve maximum performance, the sensor cable must be connected to the sensor connector as shown in the drawing below.

Note: The drawing below shows the identity of the connector terminals and wiring connections of the cable manufactured by Michell Instruments.

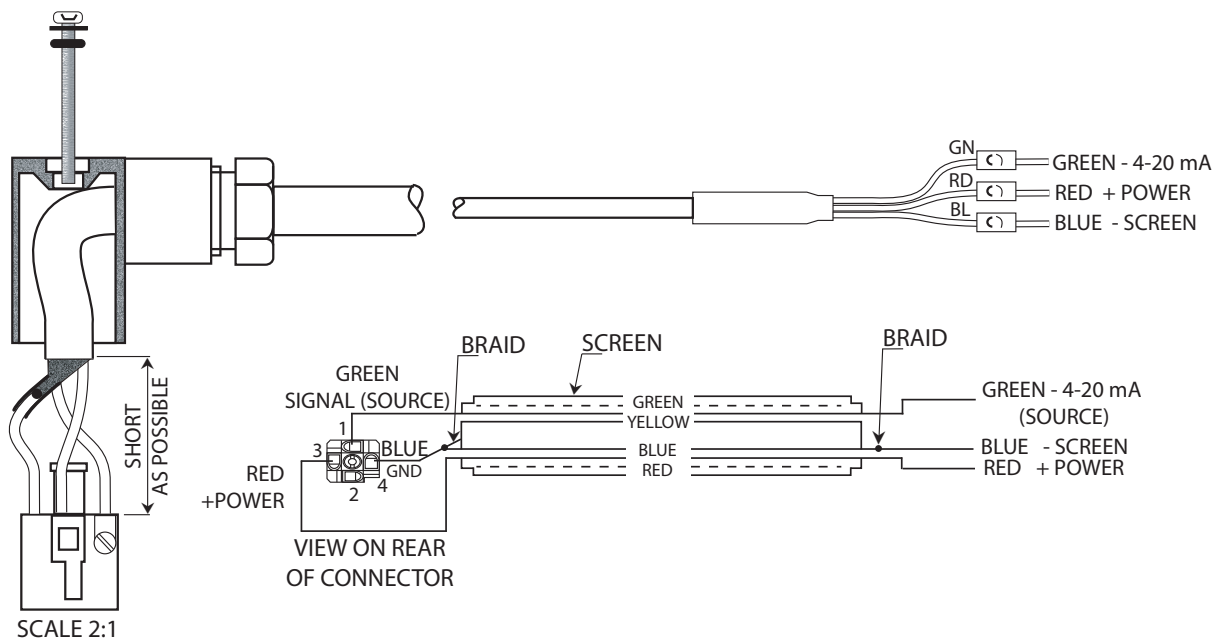


Figure 7 *Wiring Connections*



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.

2.3 Cable Connection

When installing the connector, and to ensure that full ingress protection is achieved, the securing screw (with the O-ring and washer) must be tightened to a minimum torque setting of 3.4 Nm (2.5 ft-lbs). The sensor cable used must be a minimum diameter of 4.6mm (0.2”).

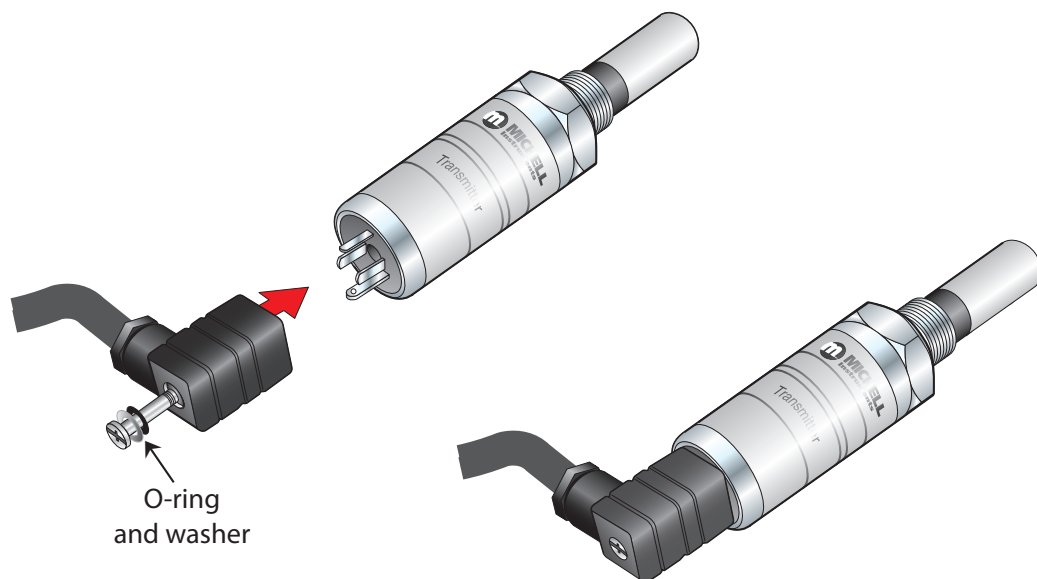


Figure 8 *Connector Installation*

2.4 Electrical Schematic

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

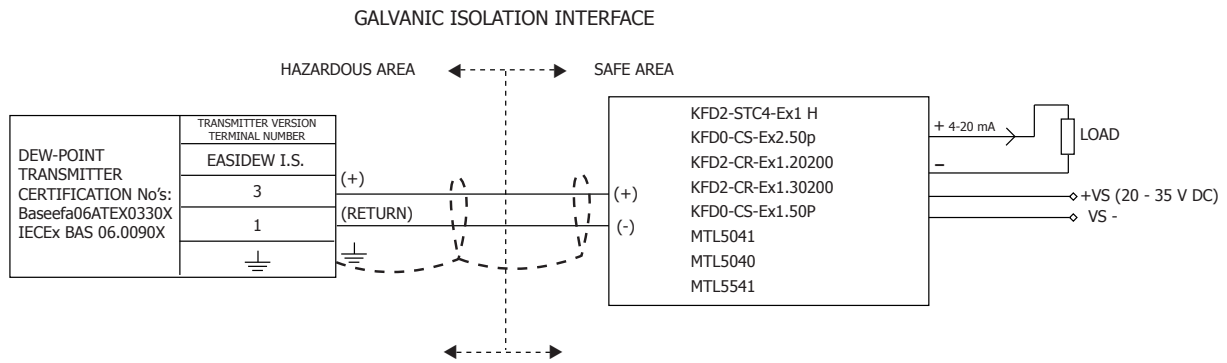


Figure 9 Electrical Connections

2.5 Transmitter Mounting

Prior to installation of the transmitter, unscrew and remove the black, green or blue plastic cover and retain for future use. Take care to prevent any contamination of the sensor before installation (**handle the transmitter by the main body only, avoiding contact with the sensor guard**).

The Easidew I.S. can be mounted either into a flow-through sensor sampling block (optional) or directly into a pipe or duct. It can be operated at pressures of up to 52.5 MPa (525 barg/7614 psig) when fitted with the bonded seal or O-ring provided.

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

NOTE: Pass the seal over the mounting thread and assemble into the sampling location, by hand, using the wrench flats only. DO NOT grip and twist the sensor cover when installing the sensor.

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

2.5.1 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 12*.

1. Ensure that the green, blue or black protective cover (2), and its desiccant capsule (2a), have been removed from the tip of the transmitter.
2. G 1/2" and 5/8" Versions - Ensure that the bonded seal (2) is over the threaded part of the transmitter body.
3/4" Version - Ensure the O-ring is fully seated in the recess.



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 appropriate torque setting (see Section 2.5). **NOTE: Use the flats of the hexagonal nut and not the sensor body.**
4. Fit the transmitter cable/connector assembly to the plug located on the base of the transmitter and tighten the fixing screw (see Section 2.3).

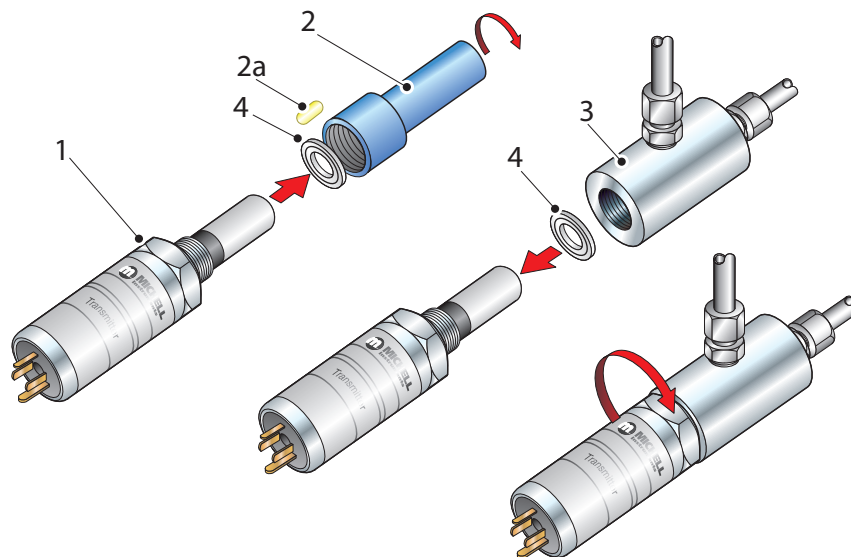


Figure 10 Transmitter Mounting

2.5.2 Transmitter Mounting - Direct Pipeline Connection

The transmitter may be directly mounted into a pipe or duct as shown in *Figure 13*.



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 13*. 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. G 1/2" and 5/8" Versions - Ensure that the bonded seal (2) is over the threaded part of the transmitter body.
3/4" Version - Ensure the O-ring is fully seated in the recess.
3. Screw the transmitter (3) into the pipe (1). Tighten enough to obtain a gas tight seal. **NOTE: Do not overtighten or the thread on the pipework may be stripped.**

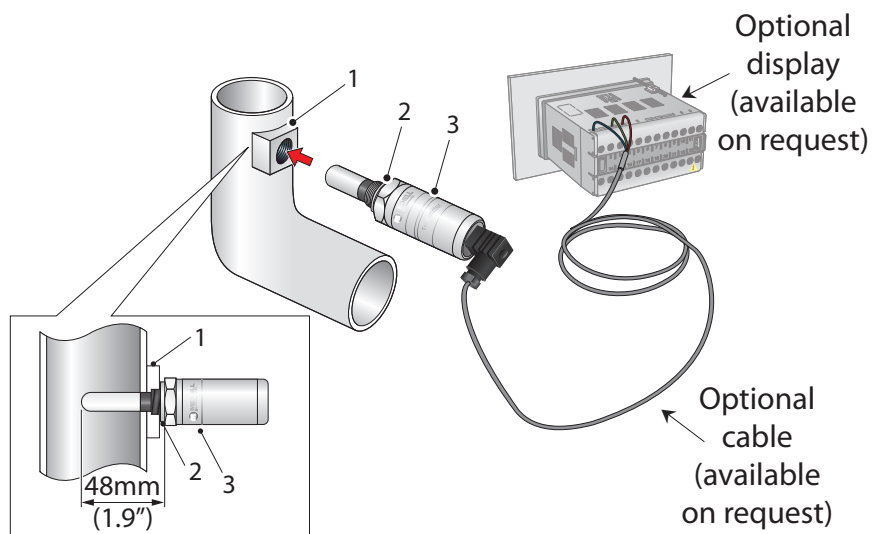


Figure 11 Transmitter Mounting - Pipe or Duct

2.5.3 Transmitter Mounting - With Additional Process Connection Adapter

Applicable to the Easidew I.S. 5/8" Version ONLY



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

To mount the adapter into the transmitter, proceed as follows (see *Figure 14*) :

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 2.5.1) or pipeline (see Section 2.5.2) 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.

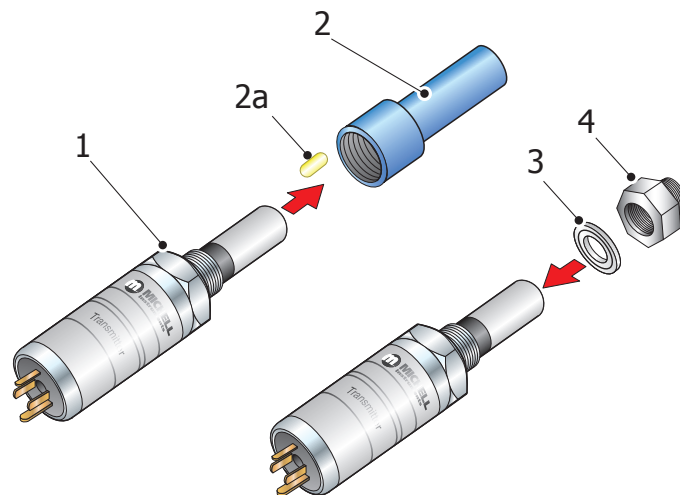


Figure 12 Transmitter Mounting with Adapter

3 OPERATION

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

Sampling Hints

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.

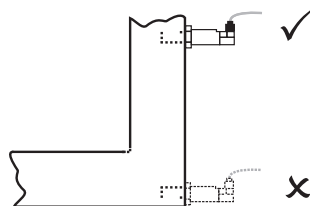


Figure 13 *Installation Location*

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.

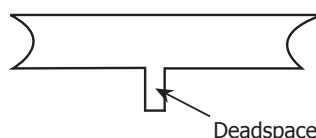


Figure 14 *Indication of Dead Space*

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.

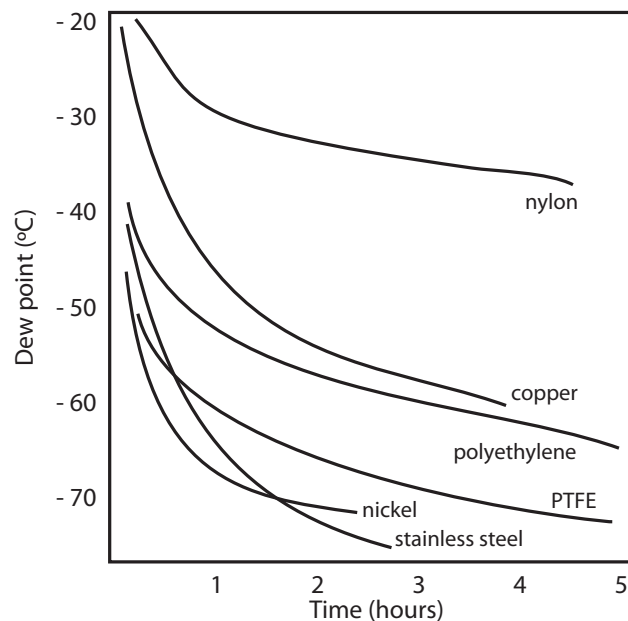


Figure 15 *Material Permeability Comparison*

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.

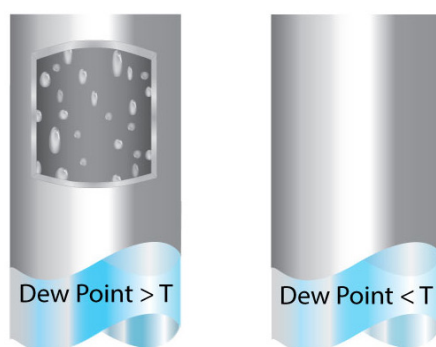
Temperature and Pressure effects

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 variety of re-calibration and service exchange schemes to suit specific needs. A Michell representative can provide detailed, custom advice (refer to www.michell.com for details of Michell Instruments' worldwide offices contact information).



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

Sensor Guard Replacement

The sensor is supplied with either a white HDPE or a stainless steel guard. The method of replacement is the same for both types.

HDPE Guard

The HDPE guard provides $<10\mu\text{m}$ 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. Replacement guards (EA2-HDPE) – a pack of 10 – can be obtained by contacting Michell Instruments (www.michell.com) or your local distributor.

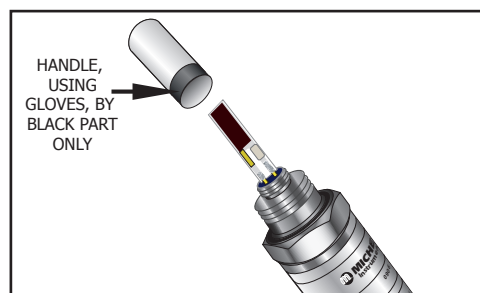


Figure 16 Replacement of HDPE Guard

Stainless Steel Guard

The stainless steel guard provides $<80\mu\text{m}$ protection to the dew-point sensor. Please change the guard if contamination is apparent.

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.

Bonded Seal

If the installed bonded seal gets damaged or lost, a pack of 5 replacement bonded seals (1/2-BS (for G 1/2 -BSP) or 5/8-BS (for 5/8" -18 UNF)) can be obtained by contacting Michell Instruments, or your local distributor.

5.1 O-Ring Replacement

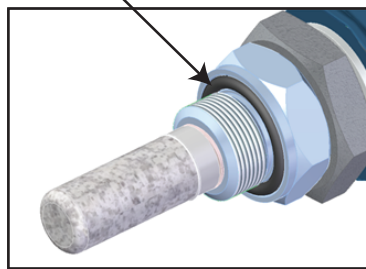
If the installed O-ring gets damaged or lost, a pack of 5 replacement O-rings (3/4-OR (for 3/4" - 16 UNF)) can be obtained by contacting Michell Instruments, or your local distributor.



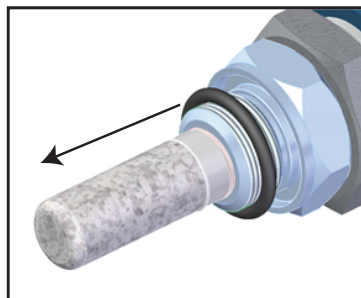
Do not touch the filter with bare hands

1. Identify the O-ring to be removed, as shown below.

BS116 (3/4" x 3/32") viton,
75 shore



2. Carefully slide tweezers, thin bladed screwdriver or a blunt needle under the outer edge of the O-ring. **NOTE: Take care not to scratch any of the surfaces of the surrounding metal component.**
3. Move the tool around the circumference to assist the extraction process. Slide the O-ring clear of the thread and filter.



4. Make sure the groove has no scratches and is free from grease, dirt or debris. Slide the new O-ring over the filter and thread and into the groove. **NOTE: Do not touch the filter with bare hands.**

Appendix A

Technical Specifications

Appendix A Technical Specifications

Performance									
Measurement Range (dew point)	-100...+20°Cdp (-148...+68°Fdp) -110...+20°Cdp (-166...+68°Fdp)								
Accuracy (dew point)	±2°Cdp (±3.6°Fdp)								
Repeatability	0.5°Cdp (0.9°Fdp)								
Response Time	5 mins to T95 (dry to wet)								
Calibration	13-point calibration with traceable 7-point calibration certificate								
Electrical Specifications									
Output Signal	4...20 mA (2-wire connection current source) User-configurable over range								
Output	Dew point or moisture content for ppm _v								
Analog Output Scaled Range	Dew point: -100...+20°C (-148...+68°F) OR Moisture content in gas: 0 - 3000 ppm _v Non-standard available upon request								
Supply Voltage	12...28 V DC								
Load Resistance	Max 250 Ω @ 12 V (500 Ω @ 24 V)								
Current Consumption	20 mA max								
Compliances	CE & UKCA								
Operating Specifications									
Operating Temperature	-40...+60°C (-40...+140°F)								
Operating Pressure	52.5 MPa (525 barg / 7614 psig) max Qualified over-pressure rating: (2 x operating pressure) 90 MPa (900 barg / 13053 psig)								
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)								
Flow Rate	1...5 NI/min (2.1...10.6 scfh) mounted in standard sampling block 0...10 m/sec (0...32.8 fps) direct insertion								
Mechanical Specifications									
Ingress Protection	IP66 in accordance with standard BS EN60529:1992 NEMA 4 in protection accordance with standard NEMA 250-2003								
Housing Material	316 stainless steel								
Dimensions	Transmitter plus connector: L=132mm x ø 45mm (5.19" x ø 1.77")								
Sensor Guard	Standard: HDPE Guard < 10µm Optional: 316 stainless steel sintered guard < 80µm								
Process Connection & Material	G 1/2" BSP; 3/4" - 16 UNF; 5/8" - 18 UNF Material - 316 stainless steel								
Weight	150g (5.29oz)								
Interchangeability	Fully interchangeable transmitter								
Electrical Connection	Hirschmann GDS series (DIN 4350-C)								
Diagnostic Conditions (factory programmed)	<table border="1"> <thead> <tr> <th>Condition</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Sensor fault</td> <td>23 mA</td> </tr> <tr> <td>Under-range dew point</td> <td>4 mA</td> </tr> <tr> <td>Over-range dew point</td> <td>20 mA</td> </tr> </tbody> </table>	Condition	Output	Sensor fault	23 mA	Under-range dew point	4 mA	Over-range dew point	20 mA
Condition	Output								
Sensor fault	23 mA								
Under-range dew point	4 mA								
Over-range dew point	20 mA								

Approved Galvanic Isolators	KFD0-CS-EX1.50P KFD0-CS-EX2.50P KFD2-STC4-EX1.H
Hazardous Area Certification	
Certification Codes *	See Appendix C

* 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

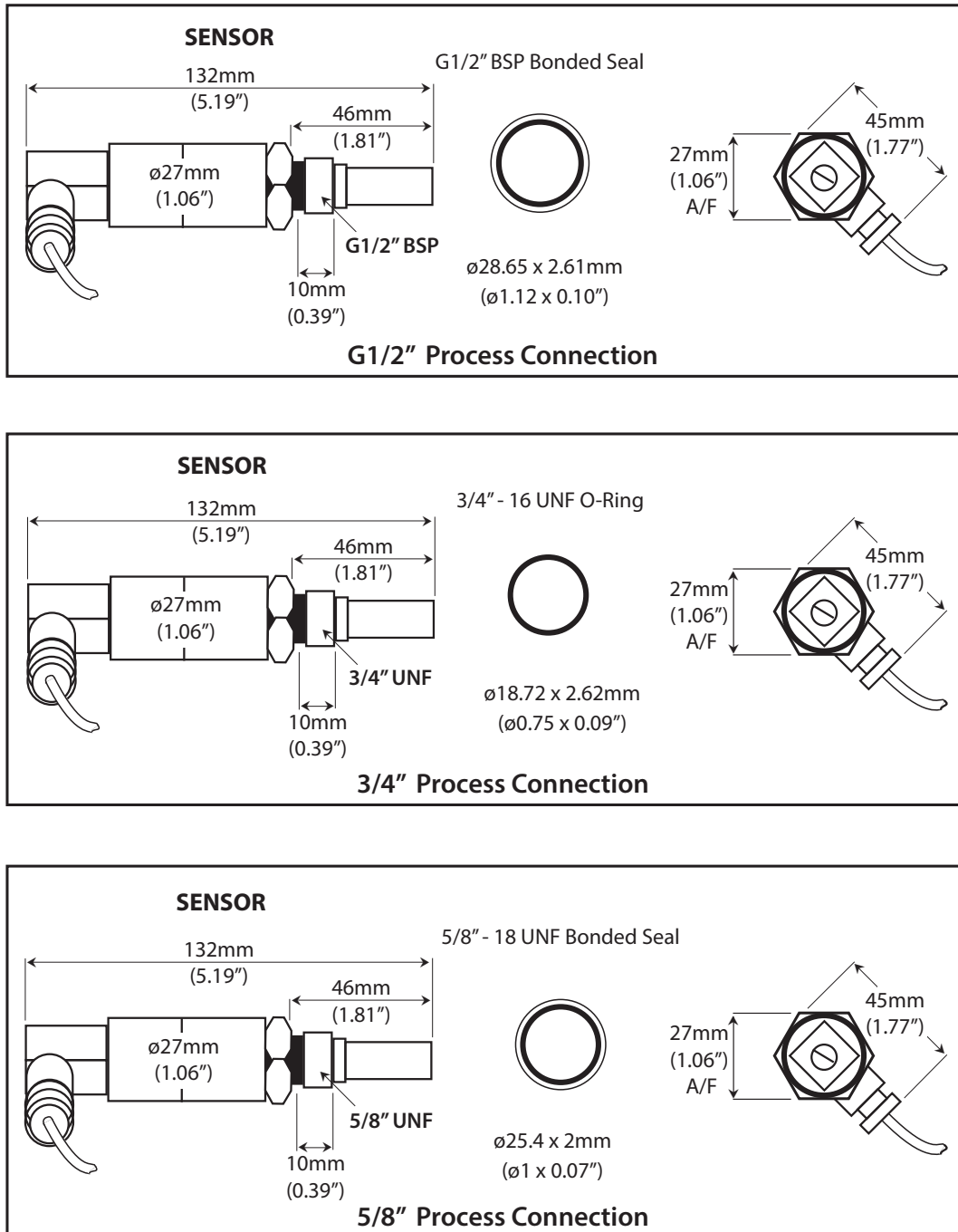


Figure 17 Dimensions

Appendix B

System Drawings

Appendix B System Drawings

B.1 Baseefa Approved System Drawing

TABLE A

Type	Certificate Number	Interface	Connection to Easidew I.S.
Isolated Repeater	BAS99ATEX7343	KFD0-CS-Ex1.50P	Pin 1 (+) Pin 2 (-)
Dual Isolated Repeater	BAS99ATEX7943	KFD0-CS-Ex2.50P	Channel 1 - Pin 1 (+) Channel 1 - Pin 2 (-) Channel 2 - Pin 4 (+) Channel 2 - Pin 3 (-)
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	BAS99ATEX2227	MTL5040	Pin 2 (+) Pin 1 (-) Pin 5 (+) Pin 4 (-)
Repeater Power Supply	BaseefaTEX0213	MTL5541	Pin 2 (+) Pin 1 (-)

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 (pF)	INDUCTANCE (nH)	OR	L/R RATIO (μH/Ω)
IIC	SEE NOTE 1 * 40 nF	4.2nH		54 μH/Ω
IIB	613 nF	12.6nH		217 μH/Ω
IIA	2.11 μF	33nH		435 μH/Ω

THE ISOLATION OF THE SIGNAL WIRES WITH THE EASIDEW 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.

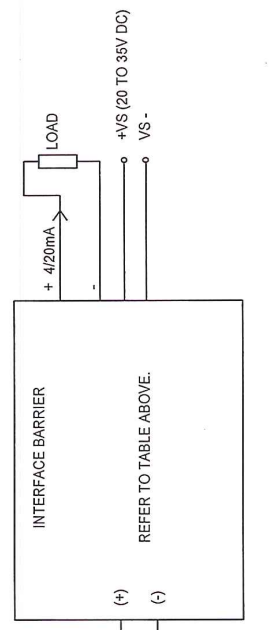
THE SYSTEM MUST BE MARKED WITH A DURABLE LABEL. THE LABEL SHOULD APPEAR ON OR ADJACENT TO THE PRINCIPAL ITEM OF ELECTRICAL APPARATUS IN THE SYSTEM OR AT THE INTERFACE BETWEEN THE INTRINSICALLY SAFE AND NON-INTRINSICALLY SAFE CIRCUITS. THIS MARKING SHALL INCLUDE THE FOLLOWING INFORMATION:
Baseefa 07Y0027 AND THE WORD SYST OR SYSTEM.

NOTE 1. 46nF 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-CR-Ex1.20200
- KFD0-CR-Ex1.30200
- MTL5041
- MTL5040
- MTL5541

GALVANIC ISOLATION INTERFACE
HAZARDOUS AREA ← → SAFE AREA



TERMINAL NUMBER	TRANSVERSE VERSION	EASIDEW PRO I.S.
3	2	(+)
1	4	(RETURN)

DEWPOINT TRANSMITTER CERTIFICATION No's:
Baseefa06ATEX0330X
IECEX BAS 06.0090X

MICHELL Instruments
EASIDEW I.S. DEWPOINT TRANSMITTER SYSTEM
CERTIFICATE No's: Baseefa07Y0027
Extra IIC T4 (-20C TO +70C)

3/4 ANGLE PROJECTION
UNLESS OTHERWISE STATED
0 DEC. PLACE: ±0.5 HOLE Ø: ±0.0
DIMENSIONS: 1 DEC. PLACE: ±0.2 ANGLES: ±0.5°
FINISH

TOLERANCES:
UNLESS OTHERWISE STATED
0 DEC. PLACE: ±0.5 HOLE Ø: ±0.0
DIMENSIONS: 1 DEC. PLACE: ±0.2 ANGLES: ±0.5°

DRAWING UNITS
mm
SCALE
NTS

ISSUE
01 CERT ISS 26/01/07
02 06/05/17
03 PRO Version 16/02/09
04 11/16/15
05 13/30/15

DATE
26/01/07
27/05/06
16/12/13

VERSION
01
02
03
04
05

PRO
Version

ISSUE
01
02
03
04
05

CERT ISS
26/01/07

DATE
27/05/06

MSB
SIGN

DRAWING NUMBER
EX90352

TITLE
EASIDEW I.S. and EASIDEW PRO I.S. DEWPOINT TRANSMITTER SYSTEM DRAWING

USED ON
MICHELL INSTRUMENTS LTD. CAMBRIDGE ©

SHEET 1 OF 1
A3

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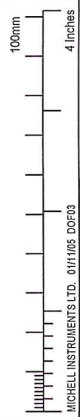
MICHELL Instruments

CHECKED
MSB

DATE
20/12/13

APPROVED
JG

DATE
22/12/13



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:

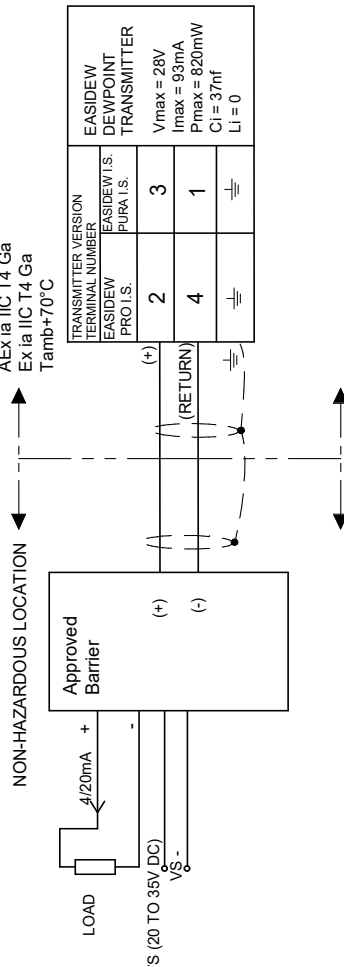
GROUP	CAPACITANCE (µF)	INDUCTANCE (mH) OR	L/R RATIO (µH/ohm)
AB	46 nF	4.2mH	54 I _H /Ω
C	613 nF	12.6 mH	217 µH/Ω
D	2.11 µF	33mH	435 µH/Ω

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(entity), 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:

$$V_{CS} \leq V_{max}, I_{SC} \leq I_{max}, C_{\Sigma} \leq C_{\text{cable}}, L_{\Sigma} \geq L + L_{\text{cable}}$$

Transmitter entity parameters are as follows:

$$V_{max} < 2.8Vdc$$

$$I_{max} < 93mA$$

$$C_i = 37nF$$

$$L_i = 0uH$$

- 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:	DRAWING UNITS	SCALE	09	OPS	30/06/21	IMA
	UNLESS OTHERWISE STATED	mm	NTS	08	Pi increased	02/11/17	IMA
	0 DEC. PLACE ± 0.5 HOLE Ø: 0.0			07		16/12/13	IMA
	1 DEC. PLACE ± 0.2			06		11/081	06/04/11
	2 DEC. PLACE ± 0.1			05		CERT ISS	15/06/09
	ANGLES: ± 0.5°			04		CERT ISS	25/03/09
	FINISH			03		CERT ISS	16/06/08
	MATERIAL			02		ISSUE	MOD. No. DATE SIGN
TITLE EASIDEW I.S. & EASIDEW PRO I.S. DEWPOINT TRANSMITTER SYSTEM DRAWIN. QPS							
USED ON MICHELL INSTRUMENTS LTD. CAMBRIDGE ©							
DRAWING NUMBER Ex90385QPS							
SHEET 1 OF 1 A3							

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DRAWN	MSB	CHECKED	APPROVED
DATE	10/03/06	DATE	DATE



Appendix C

Hazardous Area Certification

Appendix C Hazardous Area Certification

The Easidew 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 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 0 Hazardous Locations and has been assessed as being so by QPS.

C.1 ATEX / UKCA

Certificate: Baseefa06ATEX0330X / BAS21UKEX0014X

Certification: II 1 G
Ex ia IIC T4 Ga
Tamb -20 °C...+70 °C

Standards: EN 60079-0:2012+A11:2013, EN 60079-11:2012

C.2 IECEx

Certificate: IECEx BAS 06.0009X

Certification: Ex ia IIC T4 Ga
Tamb -20 °C...+70 °C

Standards: IEC 60079-0:2011, IEC 60079-11:2011

C.3 North American (cQPSus)

Certificate: LR1507-10

Certification: Class I, Division 1, Groups ABCD T4
Class I, Zone 0
AEx ia IIC T4 Ga / Ex ia IIC T4 Ga
Tamb +70 °C

Standards: UL 60079-0 7th ed., UL 60079-11 6th ed., FM 3600:2018, FM 3610:2018,
UL 61010-1 3rd ed

CSA C22.2 No. 60079-0:19, CSA C22.2 No. 60079-11:14,
CSA C22.2 No. 61010-1:12

These certificates can be viewed or downloaded from our website, at:
www.ProcessSensing.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 of Use

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 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 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.ProcessSensing.com/en-us/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
- RoHS
- WEEE
- 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	



F0121, Issue 2, December 2011

NOTES



www.ProcessSensing.com