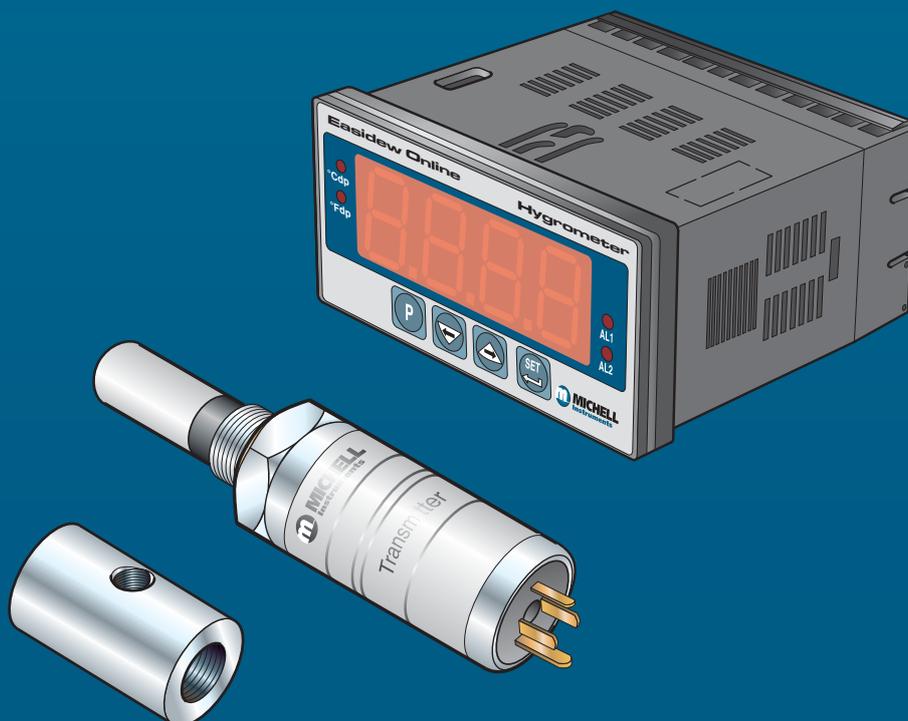




Easidew Online Dew-Point Hygrometer User's Manual



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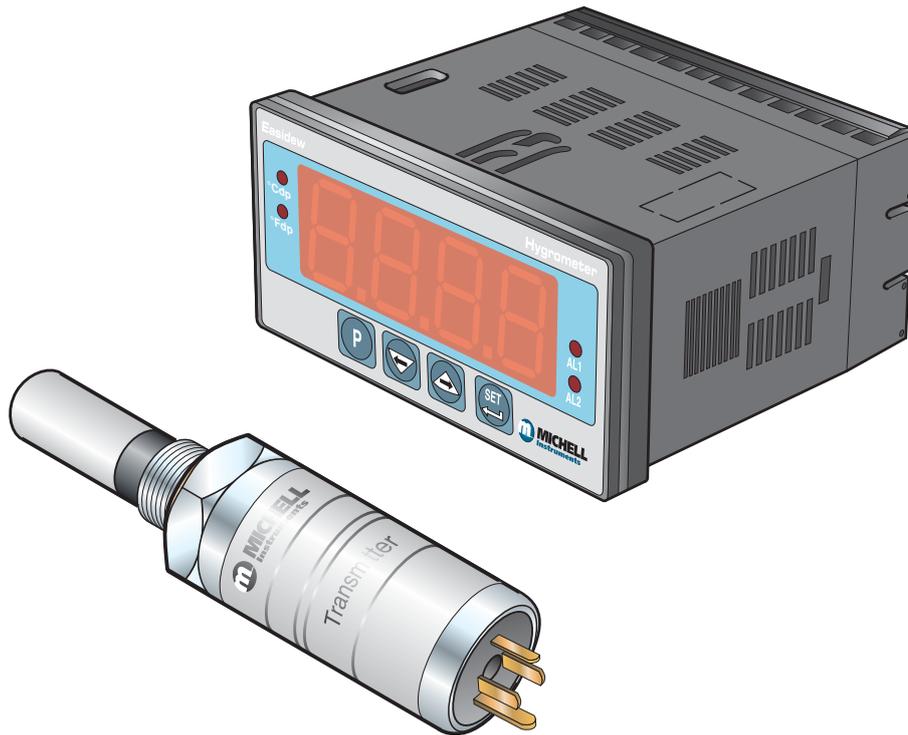
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Easidew Online

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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 (SWP), for this instrument is 45 MPa (450 barg / 6500 psig).

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. For contact information visit the website at www.michell.com.

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 EU and US directives.

Abbreviations

The following abbreviations are used in this manual:

AC	alternating current
atm	pressure unit (atmosphere)
barg	pressure unit (=100 kP or 0.987 atm) gauge
bara	bar absolute
°C	degrees Celsius
°F	degrees Fahrenheit
DC	direct current
ft	foot (feet)
g	gram(s)
Hz	Hertz
lbf-ft	pound force per foot
NI/min	normal liters per minute
m	meter(s)
mA	milliampere
max	maximum
min	minute(s)
mm	millimeter(s)
MPa	megapascal (Pascals x10 ⁶)
m/sec	meters per second
Nm	Newton meter
ppm _v	parts per million (by volume)
RS232	serial data transmission standard
Rx	receive
scfh	standard cubic feet per hour
scfs	standard cubic feet per second
SWP	safe working pressure
sec	second(s)
temp	temperature
V	Volts
Ω	Ohms

Warnings

The following general warnings listed below are applicable to this instrument. They are 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.



Where this symbol appears in the following sections it is used to indicate areas of potential risk of electric shock.

1 INTRODUCTION

The Easidew Online dew-point hygrometer is an instrument designed for the continuous online measurement of moisture content in non-corrosive gases, over an operational range of -100 to +20°Cdp (-148 to +68°Fdp).

The system comprises a programmable monitor configured to accept a 4-20 mA current loop signal from an impedance-type dew-point temperature measurement transmitter. The span of the transmitter is set to cover the dew-point range -100 to +20°Cdp (-148 to +68°Fdp) at operating pressures up to 45 Mpa (450 barg / 6500 psig).

The monitor also has a re-transmission facility which buffers the transmitter output for onward transmission to other systems. The transmitter input to the monitor is configured as a 4-20 mA current loop signal and the re-transmitted output can be configured as either a 4-20 mA or a 0-20 mA current loop signal (ranged as per the input).

Two alarm outputs (high and low) are provided for connection to external systems. Alarm 1 provides a set of single pole make contacts and Alarm 2 provides a set of changeover contacts. Both sets are potential free and Alarm 1 contacts (single pole make) are rated at 250 V, 3 A and the Alarm 2 contacts (changeover) are rated at 250 V, 5 A.

Figure 1 shows the monitor and the transmitter.

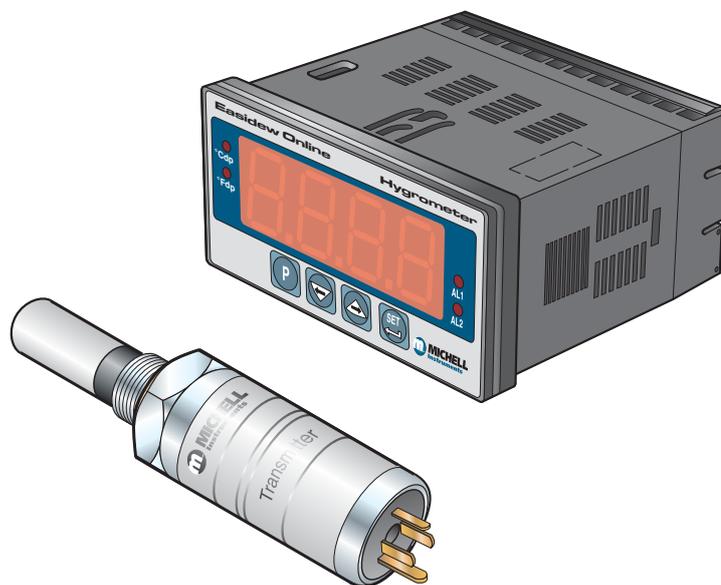


Figure 1 Easidew Online Monitor and Transmitter

1.1 Features

The Easidew Online Hygrometer is simple to use and install, and can be configured to meet specific needs.

- 5/8"- 18 UNF process connections
- Dew-point or ppm_v moisture content
- IP66 (NEMA 4) Sensor and IP65 (NEMA 12) Monitor (front panel only)
- Measurement range -100 to +20°C (-148 to +68°Fdp)
- Dual alarms
- Accuracy ±2°Cdp
- Clear and easy to read display
- Calibration certificate (traceable to NPL and NIST)

2 INSTALLATION



It is essential that the connection of electrical and gas supplies to this instrument be undertaken by competent personnel.

2.1 Unpacking the Instrument

The Easidew instruments and accessories are packed into a box and the method of unpacking is shown as follows:

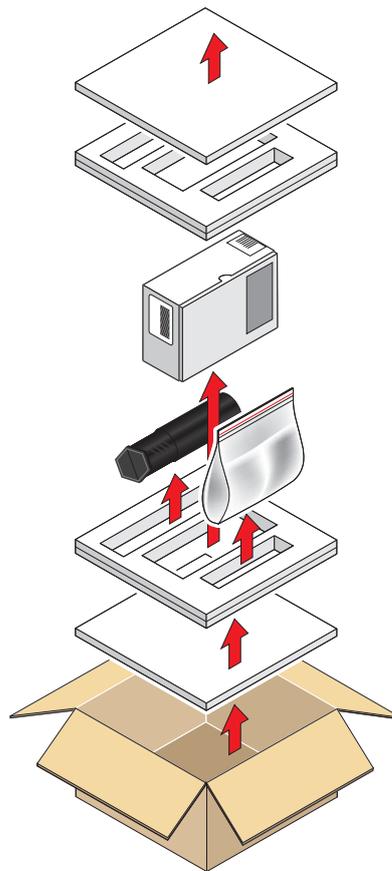


Figure 2 *Unpacking Method*

Open the box and unpack carefully as follows. Save all the packing materials for the purpose of returning the instrument for re-calibration or any warranty claims. Note that the packing method may vary slightly in the U.S.

1. Remove the top packing (1)
2. Remove the dew-point transmitter box (3)
3. Remove the accessories pack (4)
4. Remove the monitor box (2)

2.1.1 Unpacking the Easidew Transmitter

NOTE: For environmental and operating conditions refer to Appendix A.

Unpack the dew-point transmitter box as follows:

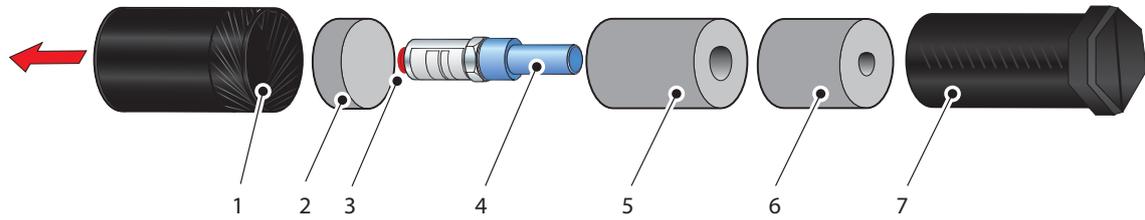


Figure 3 Transmitter Unpacking Method

1. Unscrew the cap (1) from the packing tube (6). Remove the foam block (2).
1. Remove the transmitter from the tube, complete with the body cover (4) and tip cover (5).
2. Remove the body cover (4) and the tip cover (5) but leave the blue plastic protective cover (3) in place until ready for installation.

NOTE: The transmitter sensing element is protected while in transit by a blue cover containing a small desiccant capsule. The connection pins are protected by a red plastic cap. None of these plastic items are required for the operation of the transmitter.

2.1.2 Unpacking the Monitor

The monitor (2) is packed, together with its fixing clamps (1) as shown below.

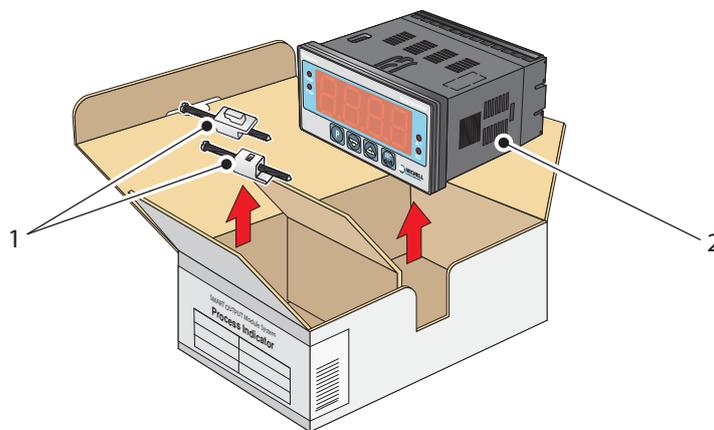


Figure 4 Monitor Unpacking Method

2.1.3 Accessories Pack

The accessories pack is shown below.

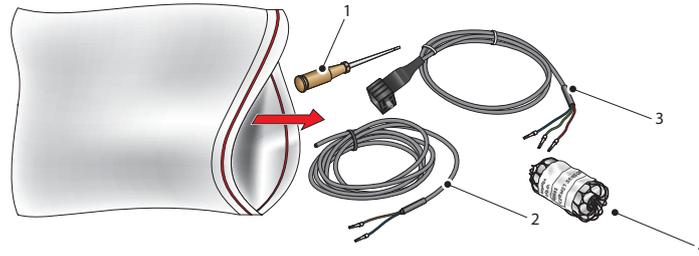


Figure 5 *Accessories Pack*

Remove the screwdriver (1), the two leads (2) and (3) and the sample block (4) from the bag.

2.2 Easidew Online Components

On delivery please check that all the following standard components are present in the packing box. Report any shortages to Michell Instruments, immediately.

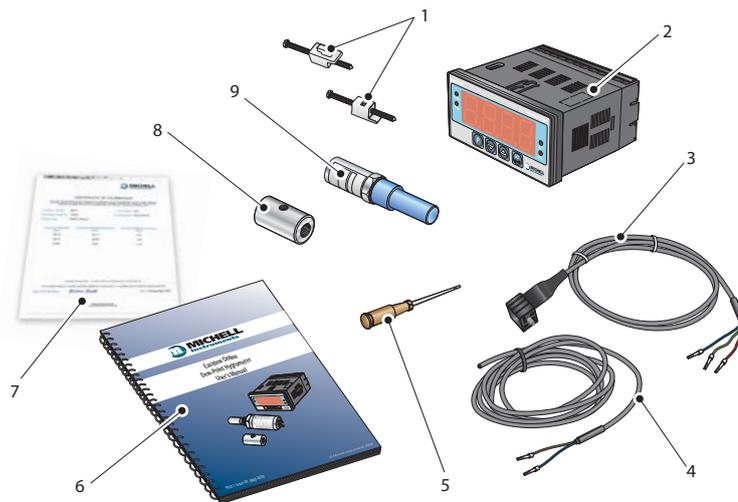


Figure 6 *Easidew Online Components*

1. Monitor clamps (2 off)
2. Easidew Monitor
3. Transmitter cable assembly
4. Power cable
5. Screwdriver
6. User's Manual
7. Calibration certificate
8. Sample block
9. Easidew transmitter

2.3 Easidew Transmitter

NOTE: The transmitter's sensing element is shown for illustration purposes only. Please keep the HDPE or SS guard fitted at all times, if possible.

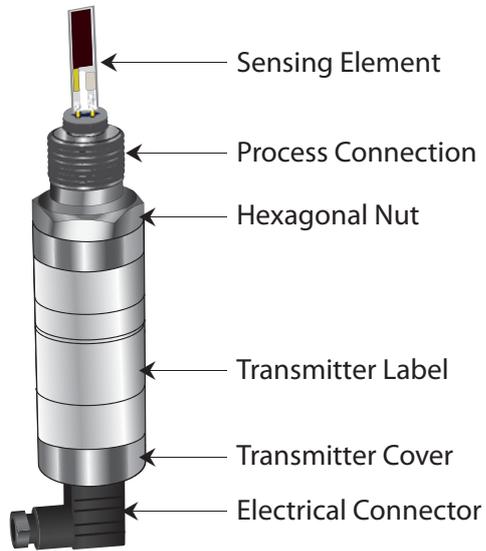


Figure 7 *Easidew Transmitter*

2.4 Monitor

The controls and indicators associated with the Easidew Online are located on the front panel of the monitor.

Connections to the Easidew dew-point transmitter, the RS232 communications port and the external power supply are all made to the rear panel of the monitor.

Figure 8 shows the layout of these controls and Tables 1 and 2 describe their respective operational functions.

Dew-point temperature units are displayed by one of the two LED's located to the left of the display. On delivery, °Cdp is set-up as standard. If required, the units can be changed to °F. The method of configuring the unit for °F is described in Section 3.4.

Optionally, the instrument can be set-up to read dew point in parts per million (ppm_v), range 0 to 3000 ppm_v . This option requires the transmitter to be set-up for ppm_v either at the time of ordering or subsequently via Michell application software. **NOTE: No specific ppm_v LED indicator is provided on the monitor; ppm_v is selected if neither the °Cdp nor the °Fdp temperature indicators are illuminated.**

Two temperature alarm indications are provided by two LEDs located on the right hand side of the display. These are marked AL1 (low) and AL2 (high). Access to the alarm relay contacts is provided on the rear panel. The connection for these alarm relay contacts is shown in Section 2.13.

NOTE: Every display is factory fitted with 2 alarm relays as standard.

2.5 Monitor Panel Layout



Figure 8 Monitor Panel Layout

Item	Description
1	<p>°Fdp</p> <p>When illuminated, this LED indicates that the displayed dew-point reading is in degrees Fahrenheit.</p> <p>Note: If neither the °Fdp or °Cdp LED is lit, ppm_v is selected.</p>
2	<p>°Cdp</p> <p>When illuminated, this LED indicates that the displayed dew-point reading is in degrees Celsius.</p> <p>Note: if neither the °Cdp nor °Fdp LED is lit, ppm_v is selected.</p>
3	<p>Main dew-point temperature display</p> <p>Flashes to alternately indicate ErrL (error low) and temperature reading for low temperatures under-range (lower than -100°Cdp (-148°Fdp) or -129.9°Cdp (199.9°Fdp) for an open loop condition).</p> <p>Flashes to alternately indicate ErrH (error high) and temperature reading for high temperature over-range.</p>
4	<p>AL1</p> <p>When illuminated, this LED indicates that the dew-point temperature programmed for Alarm 1 has exceeded the programmed threshold. Under these conditions the alarm relay contacts associated with this alarm (normally open) will change state (close) and will remain closed until the dew-point temperature moves back within the programmed operational limit.</p> <p>Alarm 1 is usually allocated to the Low alarm setting.</p> <p>These relay contacts are rated at 250 V, 3 A and are connected as shown in Section 2.13.</p> <p>Section 3.3.3 describes the setting up of AL1 trip points.</p>
5	<p>AL2</p> <p>When illuminated this LED indicates that the dew-point temperature programmed for Alarm 2 has exceeded the programmed threshold. Under these conditions the alarm relay changeover contacts associated with this alarm will change state and will remain in this state until the temperature moves back to within the programmed operational limit.</p> <p>Alarm 2 is usually allocated to the High alarm setting.</p> <p>These changeover relay contacts are rated at 250 V, 5 A and are connected as shown in Section 2.13.</p> <p>Section 3.3.3 details the setting up of AL2 trip points.</p>
6	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>The four function keys are used for setting up the monitor.</p> <p>Table 2 describes the operation of the keys.</p> </div> </div>

Table 1 Monitor Front Panel Controls and Indicators

2.6 Function Keys

The function key panel is shown in *Figure 8*.

Table 2 describes the operation of the keys.

Item	Description
	<p>P (Program) key</p> <p>This key is used to access the programming menus and to select sub-menus within the list.</p>
	<p>⇐ Left arrow (decrement) key</p> <p>This key is used to access sub-menus and, within individual sub-menus, to decrease the numeric value of the selected parameter.</p>
	<p>⇒ Right arrow (increment) key</p> <p>This key is used to access sub-menus and, within individual sub-menus, to increase the numeric value of the selected parameter.</p>
	<p>SET key</p> <p>Depending upon the context, this key is used to access the set value of the selected process field and as an Accept key for new parameter values.</p>

Table 2 Function Keys

2.7 Mounting the Monitor

The monitor is designed for panel mounting and requires a panel cut-out of 46 x 92mm (1.8 x 3.6"). The recommended panel thickness is 2 to 5mm (0.08 to 0.2").

To mount the unit, proceed as follows (refer to *Figure 9*):

1. Pass the monitor (1) through the front of the panel (2).
2. Support the monitor and insert the hook on the topside of the clamp (3) into the slot (4) located on top of the monitor casing.
3. Tighten the fixing screw (5) finger tight, against the back of the panel.
4. Insert the hook on the second clamp (6) into the slot located on the underside of the instrument casing and tighten the fixing screw, finger tight, against the back of the panel.
5. Ensure that the monitor is sitting flush to the front of the panel (2) and tighten the fixing screws evenly against the back of the panel.



Caution: Do not overtighten the screws as this could cause the case to crack.

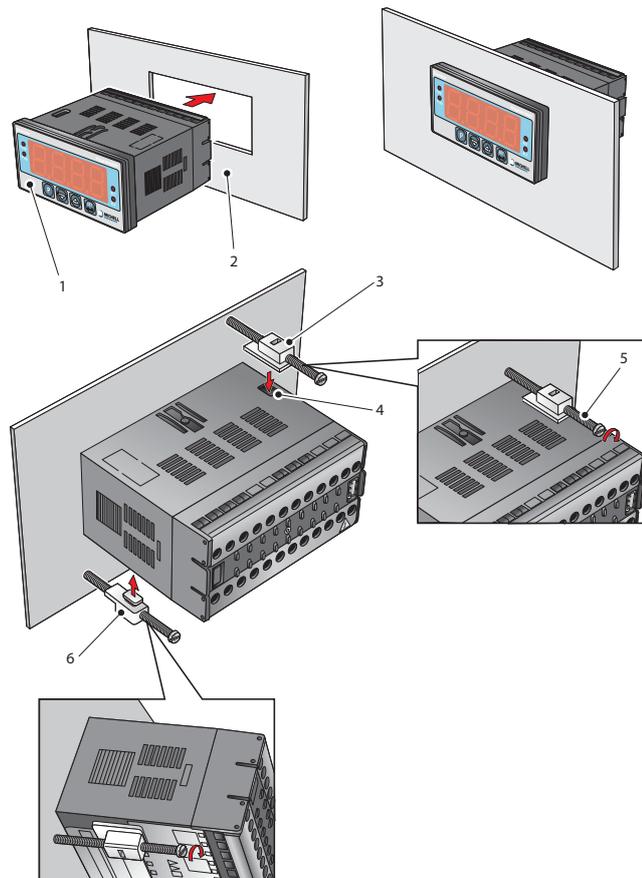


Figure 9 Mounting the Monitor

2.8 Electrical Connections

Electrical connections to the Easidew Online system are as follows:

- AC power supply, 100 to 240 V AC (-15%, +10%), 50/60 Hz, 6 VA. A low voltage (24 V DC) option is also available.
- Transmitter current loop input, 4-20 mA (24 V DC loop power provided by monitor).
- Alarm 1 (Low), potential free contacts, single pole make. Contacts rated at 250 V, 5 A.
- Alarm 2 (High), potential free contacts, single pole changeover. Contacts rated at 250 V, 5 A.
- Re-transmitted input signal from the dew point transmitter 4-20 mA or 0-20 mA.

2.8.1 AC Power Supply Input



It is essential that the connection of electrical supplies to this instrument be undertaken by competent personnel.

Connect the AC power supply to the monitor as shown in *Figure 10*. Refer also to Table 3 which gives a summary of all the connections to the rear panel of the monitor.

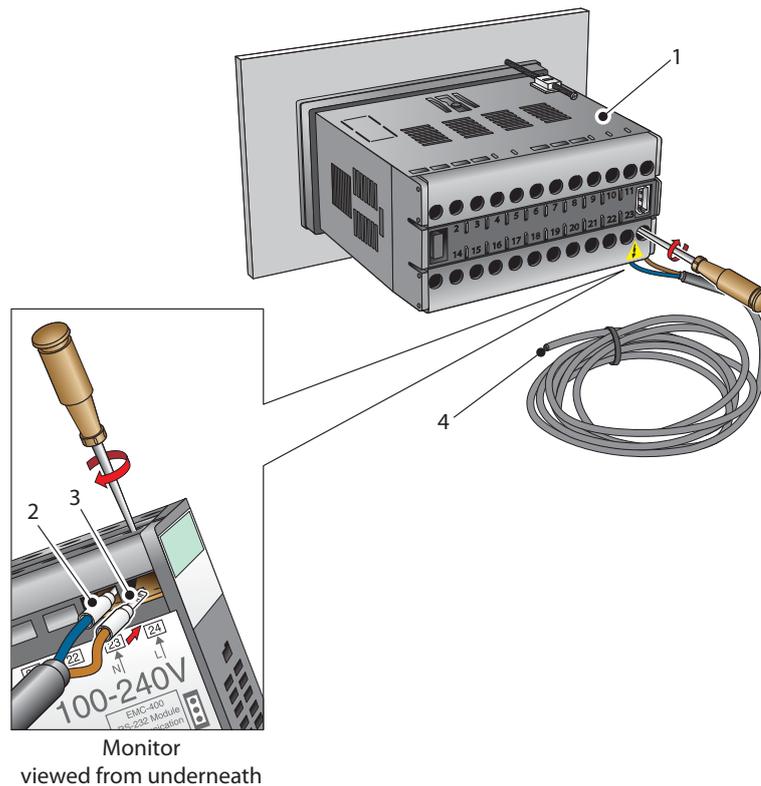


Figure 10 AC Power Supply Connections

1. Ensure that no power is connected to the mains lead.
2. Connect the blue (white - US standard) (neutral) lead (2) to terminal 23 on the rear panel of the monitor.
3. Connect the brown (black - US standard) (live) lead (3) to terminal 24 on the rear panel of the monitor.
4. Strip back the insulation on the free end of the power cable and wire to an appropriate power supply plug (brown lead to live supply terminal, blue lead to neutral supply terminal).
5. Check that the wiring has been completed correctly before connecting to a mains power supply.

2.8.3 Preliminary System Test

Before wiring the external signal outputs and the transmitter (current loop open), perform a system check as follows:

1. Switch off and disconnect the power supply.
2. Connect to an AC or DC supply and switch the supply **ON**. The monitor display should come on. Depending on the version of the monitor there are 2 types of sequential messages appearing on the display.

Type 1: - Digits sequentially tested, each in turn displaying the figure **8** followed by **rUO2** then **oAor** and **Sbr**

Type 2: - Digits sequentially tested, each in turn displaying the figure **8** followed by **ruOO** then **oror** and alternately flashing **ErrL** and **-129.9**

The °Cdp LED will, by default, also be illuminated and it is possible, that even though no alarms are currently set-up, one of the alarm LED's may be illuminated.

NOTE: If the instrument is configured to read ppm_v, neither of the temperature LED indicators will be lit.

3. If a loop calibrator is available, set it to Ext loop and connect to terminal 4 (positive) and terminal 3 (negative) of the process indicator.
4. Set the output current of the loop calibrator to 4 mA, the display should now be reading **-100.0**.
5. Set the output current of the loop calibrator to 20 mA, the display should now be reading **020.0**.
6. Switch off and disconnect the loop calibrator.

Before wiring the external signal outputs and the transmitter, perform a system check as follows:

2.9 Mounting the Sample Block and Transmitter

2.9.1 Sample Block Gas Connections

Sample gas connections are made to the Gas In and Gas Out ports on the sample block see *Figure 12*. Either port on the sample block may be used as the Gas Input port (i.e. for connection purposes the ports are interchangeable).

Normally, connections are made via stainless steel pipework, in which case the sensor block/transmitter assembly will be self supporting. If Teflon tubing is used it may be necessary to support the assembly with a body clip.

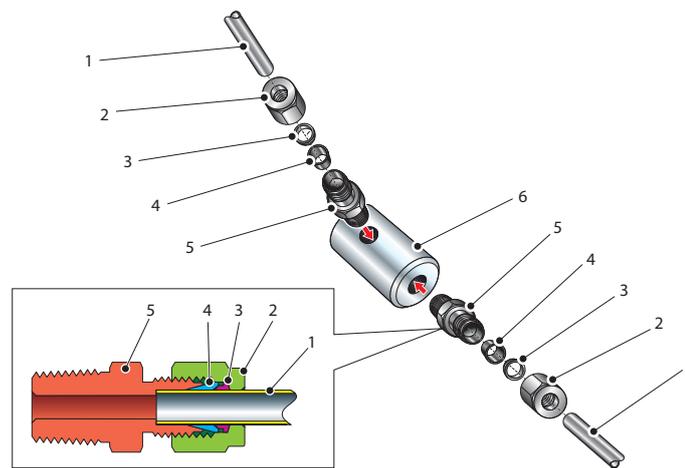


Figure 12 Sample Block Gas Connections

Both the Input and Output gas connections are $\frac{1}{8}$ " NPT. It is recommended that both the Gas Input and Output connections are made via $\frac{1}{8}$ " NPT to 6mm or $\frac{1}{8}$ " NPT to $\frac{1}{4}$ " stainless steel tube adaptors (2 to 5 - Figure 12). The method of connection to the sensor block (6) is as follows:

NOTE: The following description relates to 6mm tube fixings. The sample block ports are both $\frac{1}{8}$ " NPT female process connections. Tube adaptors are not supplied with the equipment but can be obtained by contacting your local distributor or Michell Instruments (see www.michell.com for details).

1. Cut a suitable length of 6mm ($\frac{1}{4}$ " U.S.) stainless steel tubing (1) to the correct length and, if necessary, bend to shape to suit the location of the sensor block assembly. **NOTE: To facilitate ease of connection to the port, at least 75mm (3") of the tubing coming out of the Gas In port must be straight.**
2. Clean off any burrs or metal shavings adhering to the tubing.
3. Screw the $\frac{1}{8}$ " NPT ($\frac{1}{4}$ " U.S.) NPT Swagelok adaptor (5) into the $\frac{1}{8}$ " NPT ($\frac{1}{4}$ " U.S.) NPT inlet port in the sensor block (6) and tighten to a torque setting of 35 Nm (25 lbf-ft).
4. Pass the stainless steel tubing (1) through the locking nut (2). **NOTE: Threads towards the gas port.**
5. Fit the back ferrule (3) over the stainless steel tubing (1) with the bevelled end facing the back of the front ferrule (4).
6. Place the front ferrule (4) over the stainless steel tubing (1), bevelled end towards the adaptor (5).
7. Push the stainless steel tubing (1) as far as it will go into the adaptor (5) and tighten up the locking nut (2) finger tight.
8. Hold the adaptor (5) flats with a spanner and tighten up the locking nut (2) to a torque setting of 35 Nm (25 lbf-ft) ($1\frac{1}{4}$ turns). This action compresses the front ferrule (4) and back ferrule (3) onto the tubing to form a gas tight seal.
9. Connect up the other gas port as described in steps 1 to 8 above.

2.10 Preparation of the Transmitter cable

The transmitter cable is supplied as standard. A cable can be obtained by contacting your local distributor or Michell Instruments (see www.michell.com for details).

Cable connection to the Easidew 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.

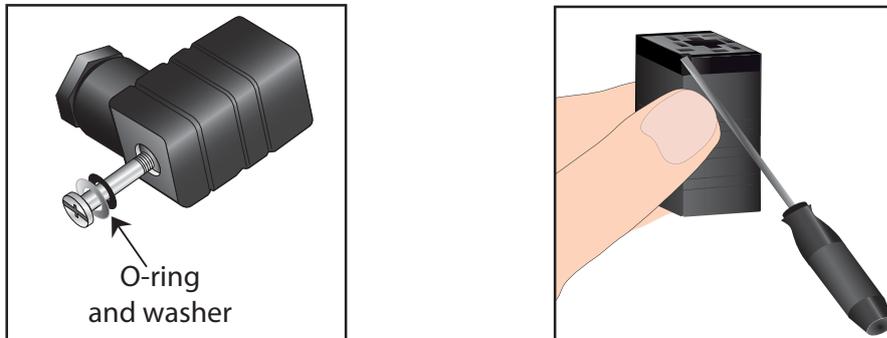


Figure 13 Connector Terminal Block Removal



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.

For the transmitter to work properly, and to achieve maximum performance, the transmitter 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:

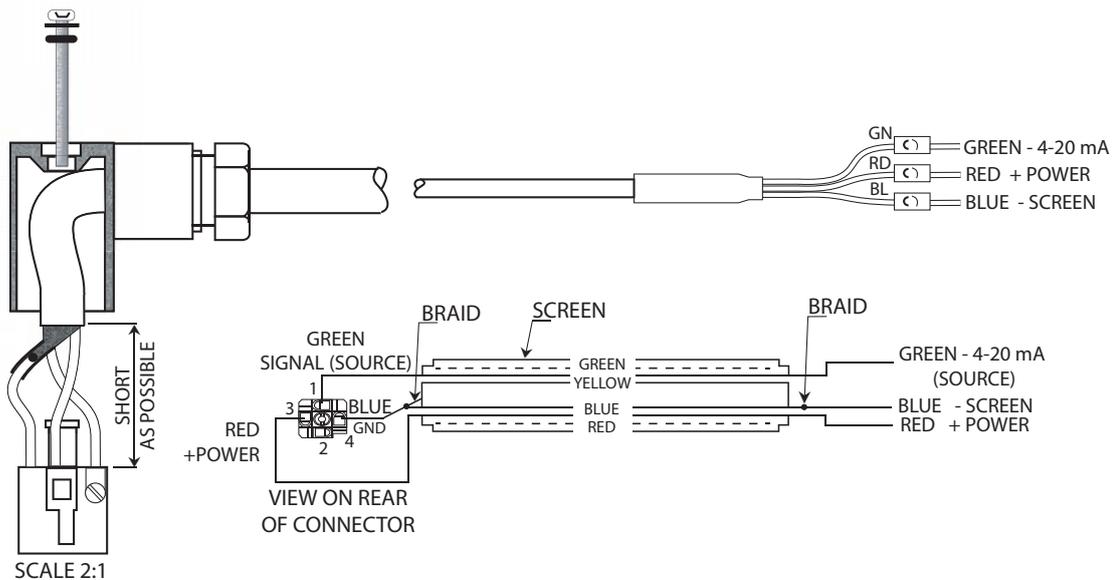


Figure 14 Wiring Connections



Always connect the 4-20 mA return signal to a suitable load (see Figure 14) before the power is applied. Without this connection, the transmitter may be damaged if allowed to operate for prolonged periods.

2.11 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 transmitter cable used must be a minimum diameter of 4.6mm (0.2").

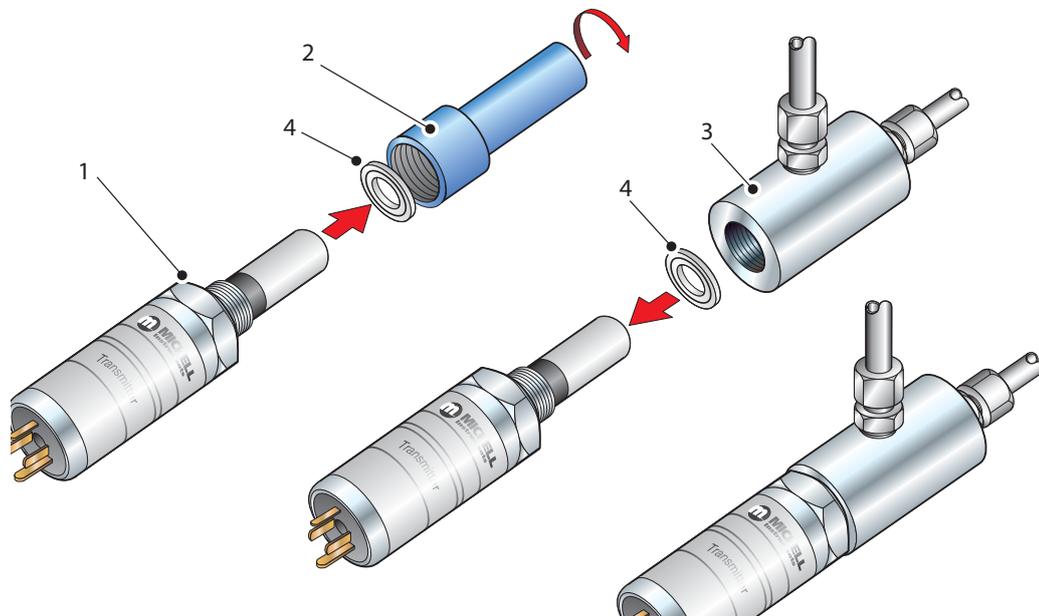


Figure 15 Connector Installation

2.12 Electrical Schematic

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

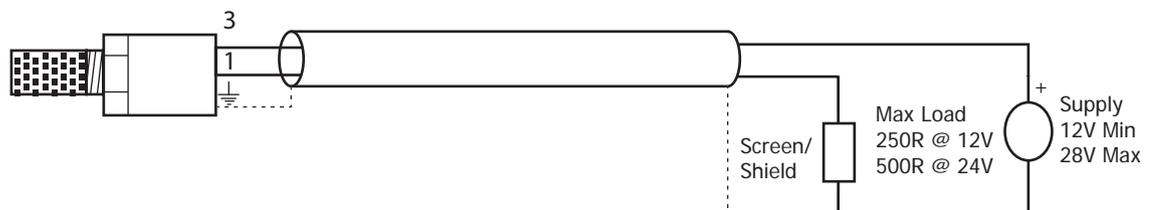


Figure 16 2-Wire Connection Diagram

2.12.1 Electrical Boundaries

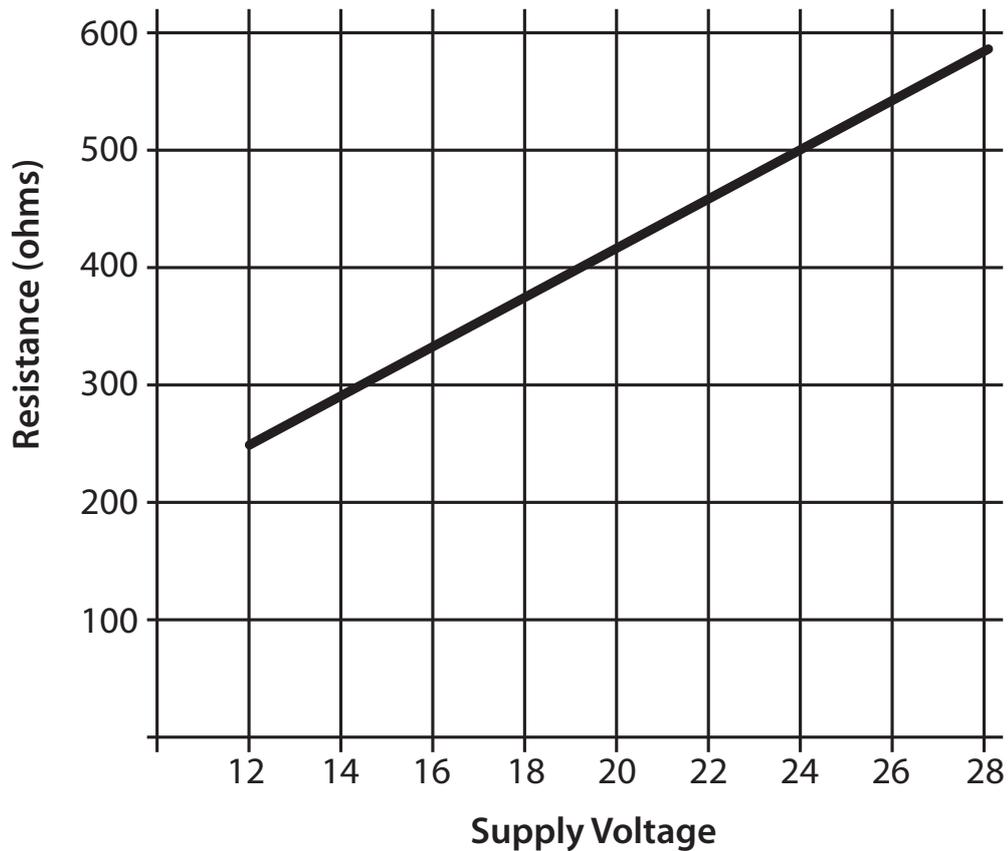


Figure 17 Maximum Load of Easidew - Including Cable Resistance

2.13 Transmitter Mounting

Prior to installation of the transmitter, unscrew and remove the 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 can be mounted into either a flow-through sensor sampling block (optional) or directly inserted into a pipe or duct and can be operated at pressures of up to 45 MPa (450 barg / 6500 psig) when fitted with the bonded seal 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 bonded seal over the 5/8"- 18 UNF 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 setting:

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

2.13.1 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 18*.

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 (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 a minimum torque setting of 30.5 Nm (22.5 ft-lbs). **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).

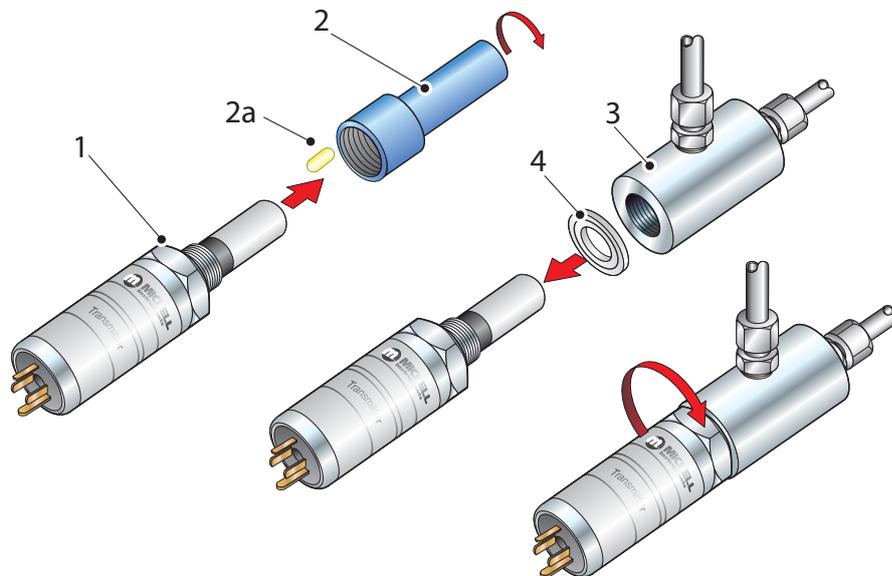


Figure 18 Transmitter Mounting - Sensor Block

2.13.2 Transmitter Mounting - Direct Pipeline Connection

The transmitter may be directly mounted into a pipe or duct, as shown in *Figure 19*.



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 19*. 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 blue 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 (3) 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.**

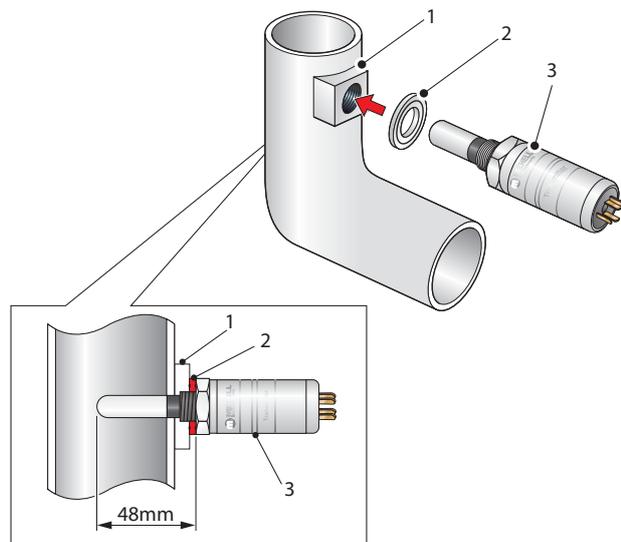


Figure 19 Transmitter Mounting - Pipe or Duct

2.13.3 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 20*) :

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 2.4.1) or pipeline (see Section 2.4.2) 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.

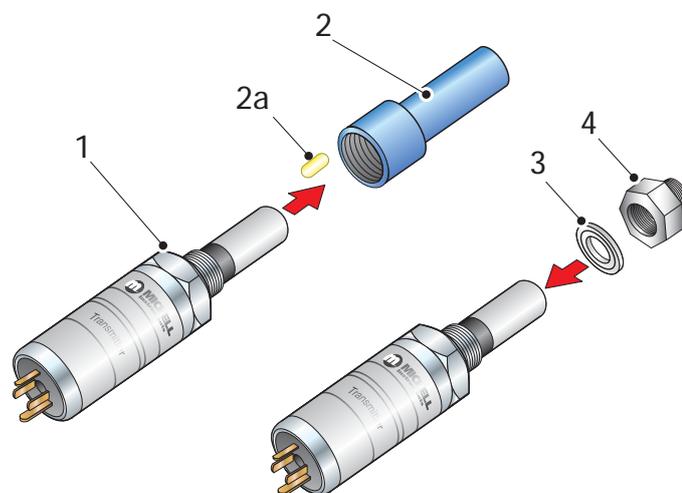


Figure 20 Transmitter Mounting with Adapter

2.13.4 Monitor Connection

Connect the transmitter cable to the monitor as shown below:

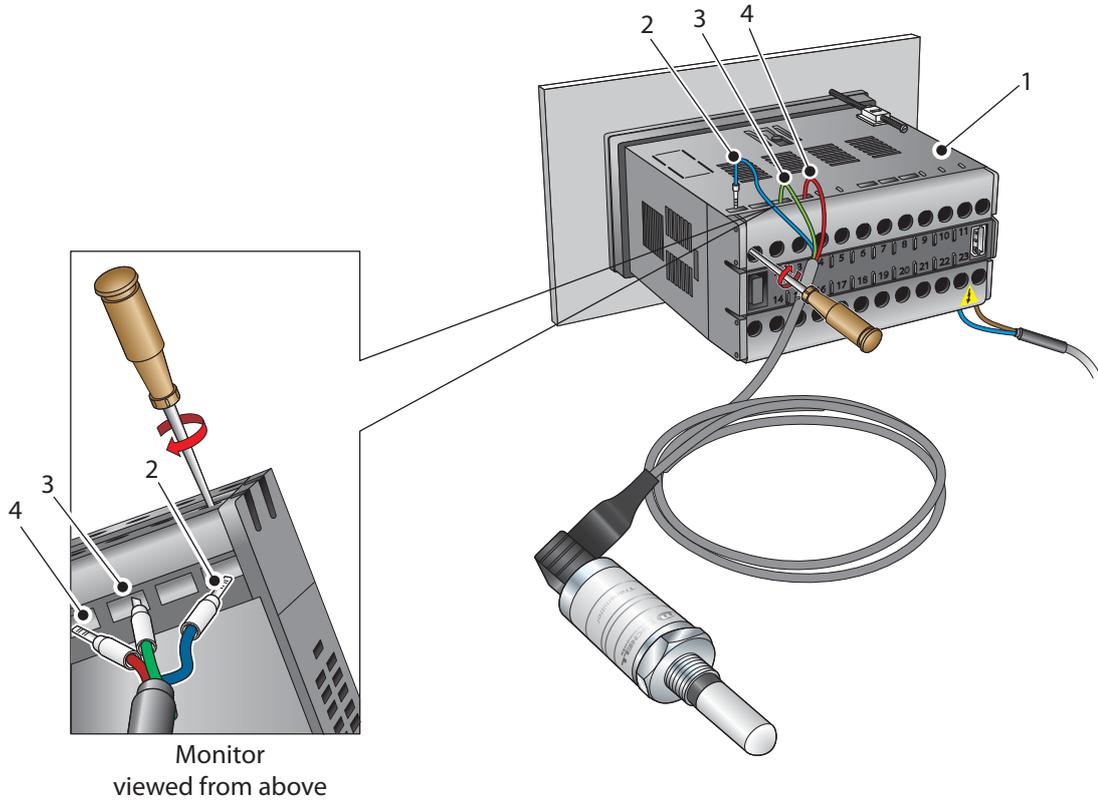


Figure 21 *Transmitter Connections*

1. Connect the blue wire (2) of the transmitter cable to terminal 1 on the monitor (1).
2. Connect the green wire (3) of the transmitter cable to terminal 3 on the monitor.
3. Connect the red wire (4) of the transmitter cable to terminal 4 on the monitor.
4. Check that the transmitter cable wiring has been completed correctly.

2.14 Signal Output Connections

The Easidew Online system has three signal outputs, Alarm 1 (ALr1), Alarm 2 (ALr2) and the re-transmitted input signal (4-20 mA or 0-20 mA current loop signal depending upon instrument configuration).

Figure 22 shows the relevant rear panel connections. Table 3 shows a summary of all the electrical connections to the monitor.



The signal outputs will be connected to external systems that can potentially influence the operation of the process.

Alarm level signals could be at mains potential so it is essential that, before connecting these signal lines, checks are made to ensure that these inputs are not live and that it is safe to handle them.

Alarm Outputs

Alarm 1 is a single pole make contact. Connect incoming signal lines to terminal 16 (common) and terminal 17 (normally open).

Alarm 2 comprises a set of changeover contacts. Connect incoming signal lines to terminal 9 (common), terminal 8 (normally open) and terminal 7 (normally closed).

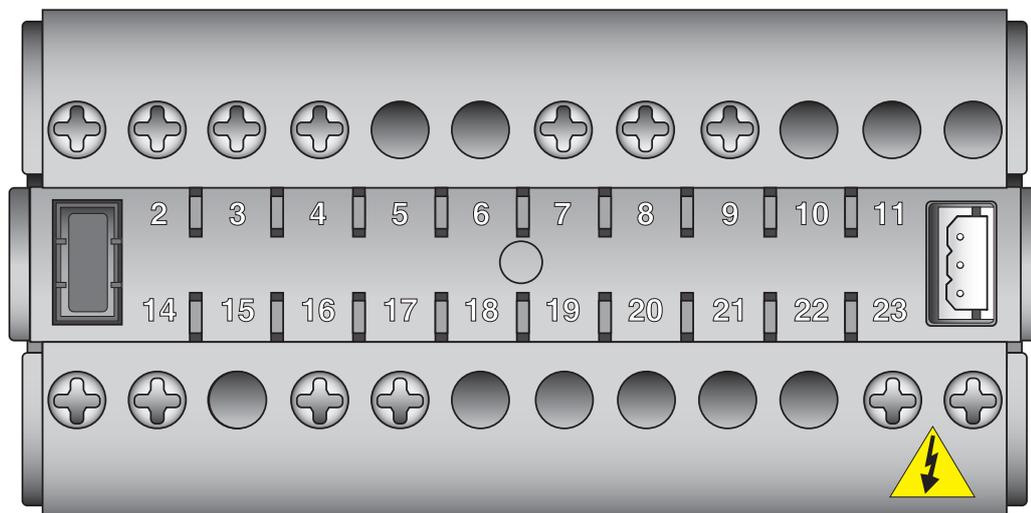


Figure 22 Monitor Rear Panel Connections

Re-transmission Output

The re-transmission output is current sourcing. Connect the positive output to terminal 14 and the negative output to terminal 13. Use appropriately colored wires eg, red (positive), black (negative).

Terminal	Wire Color	Signal	Supply Information
1	Blue	0 V (GND)	
3	Green	4-20 mA loop current	Default 4-20 mA
4	Red	Transmitter loop supply (+ve)	+24 V DC w.r.t. terminal 1
7	User defined	ALR2 (normally closed)	
8	User defined	ALR2 (normally open)	
9	User defined	ALR2 (common)	
13	User defined	Current loop out (-ve)	Default 4-20 mA
14	User defined	Current loop out (+ve)	Default 4-20 mA
16	User defined	ALR1 (common)	
17	User defined	ALR1 (normally open)	
23 (AC Version)	Blue	Power in (neutral)	100 – 240 V, 50/60 Hz
24 (AC Version)	Brown	Power in (live)	100 – 240 V, 50/60 Hz
23 (DC Version)	Blue	Negative (-)	0 V
24 (DC Version)	Brown	Positive (+)	24 V
NOTE: There are no terminals in positions 5, 6, 10, 11, 12, 15, 18, 19, 20, 21 and 22			

Table 3 Summary of Electrical Connections

3 OPERATION

As supplied, the instrument is ready for operation and has been set-up with a set of default parameters. This section describes both the general operation of the instrument and the method of setting it up and changing the default parameters should this become necessary.

The default parameters are as follows:

- Span -100 to +20°Cdp (-148 to +68°Fdp) or 0 to 3000 ppm_v
- Temperature units °Cdp
- Current loop input, 4-20 mA (7.5°C/mA or 13.5°F/mA)
- Re-transmission current loop output, 4-20 mA (7.5°C/mA or 13.5°F/mA)
- Alarm 1 set-point -20°Cdp (-4°Fdp)
- Alarm 2 set-point -40°Cdp (-40°Fdp)
- Data communications, Unit address 1, Baud rate 9600, Parity None, Stop bits 1

For the supplied dew-point transmitter, the span and current loop input setting should not be changed. The span will require changing if the instrument is to be ranged in °F, if a different transmitter is employed, if the user chooses to re-range the Easidew transmitter or if ppm_v is selected.

The instrument must also have been installed as detailed in Section 2 and connected to a sample gas supply that is representative of the process being monitored.

3.1 General Operational Information

Operation of the Easidew Online is completely automatic and once set-up requires little or no operator intervention.

The dew-point transmitter is designed to operate in a flowing gas stream of between 1 and 5 NI/min (2.1 and 10.6 scfh) when mounted in a sample block, at operating pressures up to a maximum of 45 MPa (450 barg / 6500 psig). Direct pipeline mounting requires 1 to 10m/sec (0 to 32.8fps) at pressures dependant on the type of material used (customer defined).

The sample gas is taken into the sample block via the Gas In port and, in flowing through the sample block, comes into contact with the dew-point transmitter which, in turn, produces a current loop output signal proportional to the measured dew-point temperature. This output signal is converted to a real time analog dew-point temperature reading by the monitor.

If data logging is required, the monitor will need to be connected to a suitable host and temperature readings extracted via the RS232 interface.

The gas flow through the sample block must be controlled outside the instrument, typically by means of a needle valve located in the sample gas input line.

3.2 Preparation For Operation

3.2.1 First Time Operation

To commence operation, proceed as follows:

1. Check that electrical power supply and the relevant analog and alarm outputs are connected to external systems as required and as described in Sections 2.8 and 2.13.
2. Check that the gas sample flow rate through the sample block, or the pipeline in which the transmitter is located, is within the operational limits. (Adjust any external flow control valves, located in the gas sample input line to the instrument to achieve required flow rate.)
3. Switch on the power supply to the instrument. The instrument display will now come on, typically showing the default parameters and units as detailed in *Figure 23*.

The instrument is now operational and after a few seconds, in which all the segments of the display are tested, the monitor will display the measured dew-point temperature as a steady reading within the range -100 to +20°Cdp (-148 to +68°Fdp) or 0 to 3000 ppm_v depending upon how the instrument has been set-up. The default setting is degrees Celsius.

In the absence of any error indications the instrument will now be operational using the default parameters.



Figure 23 *Typical Display*

If the display is flashing, a fault condition exists. The following operational error conditions may be encountered:

ErrL - If the display is alternately flashing (e.g.) **ErrL** and **-103.3**, this indicates that the measured dew point is outside the lower operational limit (-100°Cdp/-148°Fdp).

If the display is alternately flashing **ErrL** and **-129.9** (**-199.9** if set-up to read temperature in °F), this could be an indication that the input current loop to the monitor is open or that there may be a transmitter fault. Check that the transmitter is wired correctly as detailed in Sections 2.10 and 2.12.

ErrH - If the display is alternately flashing (e.g.) **ErrH** and **021.4**, this indicates that the measured dew point is outside the upper operational limit (+20°Cdp/+68°Fdp).

3.3 System Alarms

3.3.1 Alarm Switching Logic (Default)

The Easidew Online system has two alarm outputs. As supplied, the default alarm set-points and the alarm switching logic are as follows (the default temperature units are degrees Celsius):

Low Alarm - Alarm 1 (AL1) set to -20°Cdp

High Alarm - Alarm 2 (AL2) set to -40°Cdp

Alarm 1 (Low Alarm) is set-up to switch **ON** when the temperature reading is lower (gas drier) than the alarm set-point value. For the default set-points therefore, the default switching logic for these alarms is as follows:

Alarm 1 Temp < -20 Alarm 1 = ON

Temp > -20 Alarm 1 = OFF

Alarm 2 (High Alarm) is set to switch **ON** when the temperature reading is higher (gas wetter) than its set-point value. For the default set-points therefore, the operation of this alarm would be as follows:

Alarm 2 Temp < -40 Alarm 2 = OFF

Temp > -40 Alarm 2 = ON

Depending upon the application, if required, it is possible to reverse the switching logic for either or both of the alarm channel outputs to provide the following alarm output configurations:

Alarm 1 Temp < -20 Alarm 1 = OFF

Temp > -20 Alarm 1 = ON

Alarm 2 Temp < -40 Alarm 2 = ON

Temp > -40 Alarm 2 = OFF

Section 3.3.2 describes the method for reversing the default switching logic and Section 3.3.3 describes the method for setting up individual alarm set-points.

3.3.2 Reversal of Alarm Switching Logic

As described in Section 3.3.1, the switching logic for the alarm channels may, if required, be individually reversed. Starting at the default state, the method of reversing the switching logic for both alarms is as follows:

Figure 24 shows the operational key sequence.

For Alarm 1:

1. Press the **P** key once and the display will read **tECH**.
2. Press the **SET** key and the display will flash between **ConF** and **PinP**.
3. Press the \Rightarrow key twice and the display will flash between **ConF** and **Alr1**.
4. Press the **SET** key twice to display **Alt1**.
5. Press the \Rightarrow key once to display a flashing 4 digit number. For the Alarm 1 default setting this will be 0001.
6. Press the \Leftarrow key once to change the display to 0000.
7. Press the **SET** key to accept the new value. The default setting for Alarm 1 is now reversed.
8. Either press the **P** key twice to return to the main display or press the **P** key once followed by the \Rightarrow key to move to the **Alr2** setting sequence from step 4 above.

To reverse the switching logic for Alarm 2 ONLY, proceed as follows:

1. Press the **P** key once and the display will read **tECH**.
2. Press the **SET** key and the display will flash between **ConF** and **PinP**.
3. Press the \Rightarrow key three times and the display will flash between **ConF** and **Alr2**.
4. Press the **SET** key twice to display **Alt2**.
5. Press the \Rightarrow key once to display a flashing 4 digit number. For the Alarm 2 default setting this will be 0000.
6. Press the \Rightarrow key once to change the display to 0001.
7. Press the **SET** key to store the new value.
8. Press the **P** key twice to return to the main display. The default setting for Alarm 2 is now reversed.

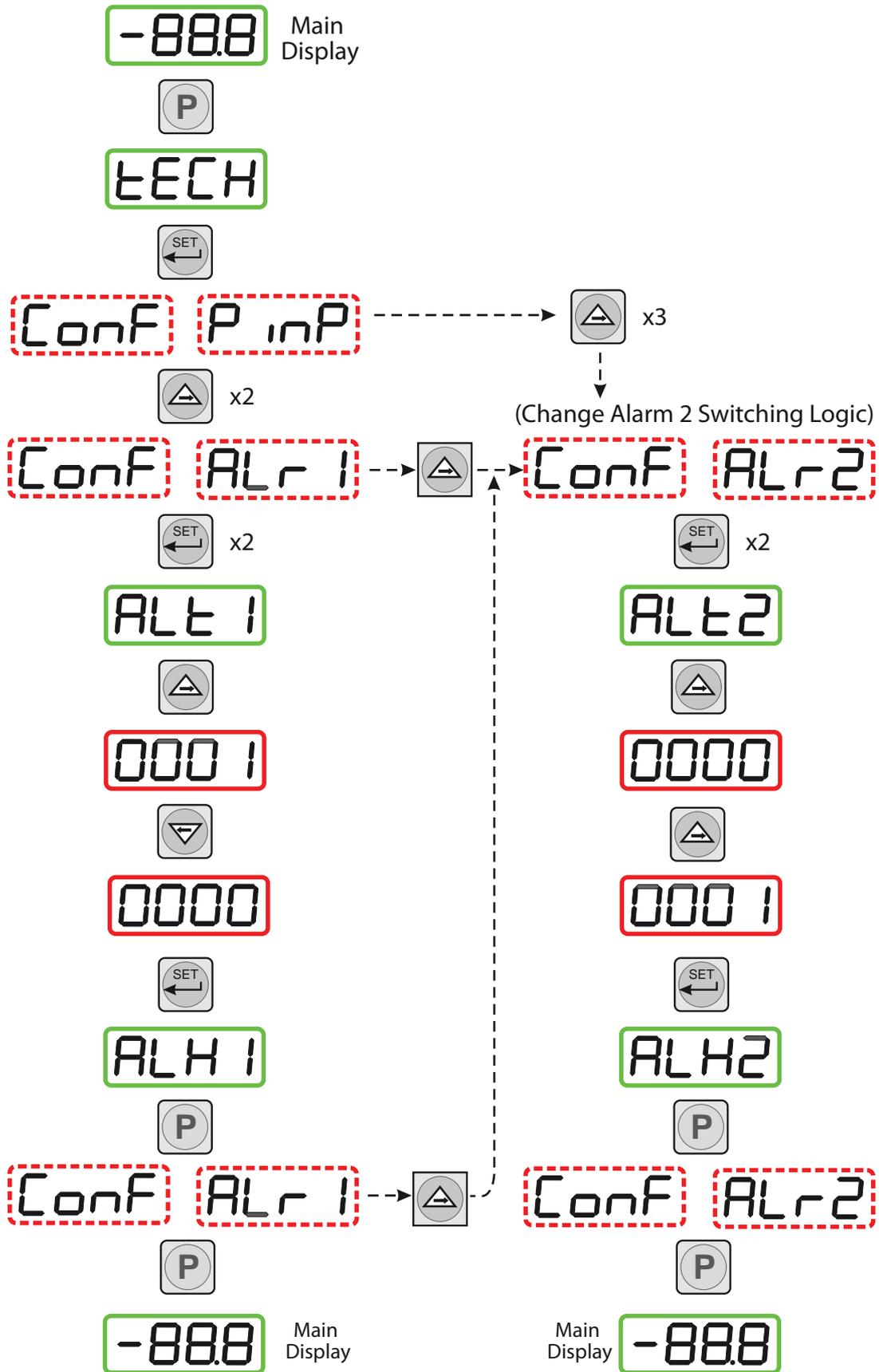


Figure 24 Change Alarm Switching Logic

3.3.3 Alarm Level Set-Up

The alarm set-point levels are set-up from the program menu as follows (to exit to the main display without saving any new settings press the **P** key):

Figure 25 shows the operational key sequence.

To set-up both alarm set-points:

1. Press the **SET** key once, **ALr1** will be displayed. (To set Alarm 2 only, press the **SET** key twice and follow the Alarm 2 branch instead).
2. Press the \Rightarrow key to display the flashing current Alarm 1 set-point (-20°C in this example).
3. Use the \Rightarrow and \Leftarrow keys to set the required value (-25.5°C in this example).
4. Press the **SET** key once to store the new (or existing) value for Alarm 1 and to enter the set-up menu for Alarm 2, **ALr2**. (To exit to the main display without changing Alarm 2 set-point levels, press the **P** key.)
5. Press the \Rightarrow key to display the flashing current Alarm 2 set-point (-40°C in this example).
6. Use the \Rightarrow and \Leftarrow keys to set the required value (-50°C in this example).
7. Press the **SET** key once to store the new value for Alarm 2. The display then returns to the main dew-point temperature display.

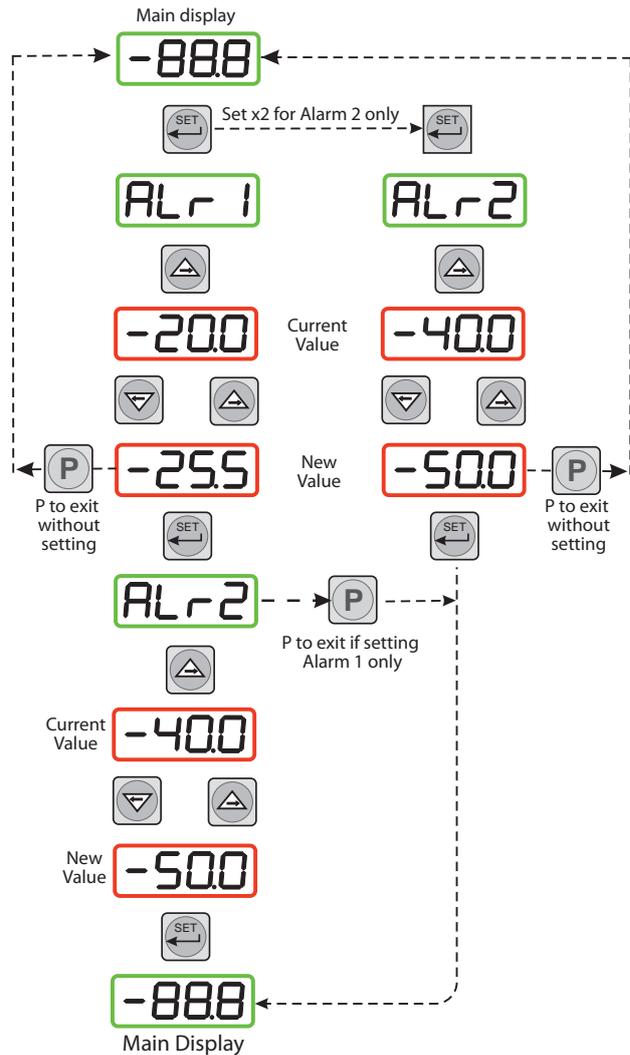


Figure 25 Set-up Alarm Levels

3.3.4 Re-Transmitted Output Current Range Set-Up

The Easidew Online is provided with an analog current loop output module which buffers and re-transmits the current loop input signal from the dew-point transmitter.

By default, the re-transmission output is set as a 4-20 mA current loop (to exactly follow the input signal, i.e. 4 mA in, 4 mA out).

For certain system processes, a 0-20 mA current loop output may be required. The set-up method is as follows:

Figure 26 shows the operational key sequence.

To change output from 4-20 mA to 0-20 mA:

1. Press the **P** key once, the display will read **tECH**.
2. Press the **SET** key and the display will flash between **ConF** and **PinP**.
3. Press the \Rightarrow key and the display will flash between **out1** and **ConF**.
4. Press the **SET** key to display **oAt1**.
5. Press the \Rightarrow key once to display a flashing 4 digit number. For the default setting (4-20 mA) this will be 0001.
6. Press the \Leftarrow key once to change the display to 0000. This selects the re-transmission output to be 0-20 mA.
7. Press the **SET** key to accept the new value. The output current loop is now 0-20 mA. The display will flash between **out1** and **ConF**.
8. Press the **P** key once to return to the main dew-point temperature display.

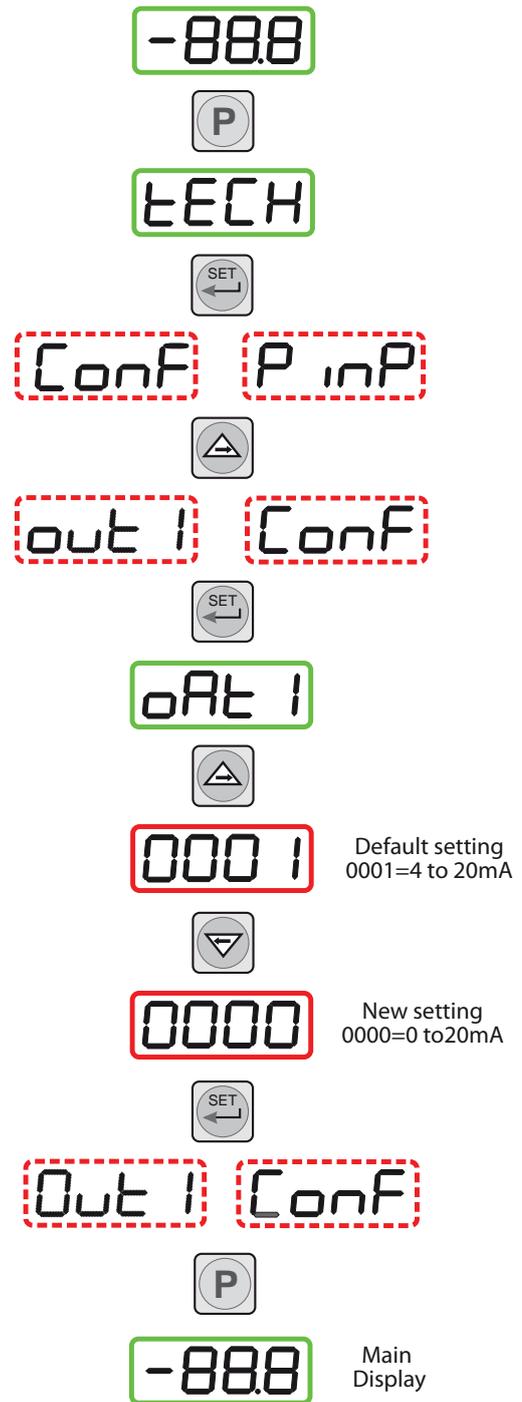


Figure 26 Configure Analog Output

Note: The transmitter current loop output signal is now scaled at 6 mA per °C input, while the transmitter input remains scaled at 7.5°C per mA.

3.4 Operating Temperature / ppm_v Range

3.4.1 Temperature Range Default

The default temperature unit for the Easidew Online instrument is in degrees Celsius. This is indicated by the °Cdp LED indicator. The default settings associated with this temperature scale are as follows:

- Span -100 to +20°Cdp
- Lower and upper span limits -100 and +20 (display flashes outside this range)
- Minimum alarm set-point -100°Cdp
- Maximum alarm set-point +20°Cdp



To range the instrument for °F, all the above parameters need to be changed to their Fahrenheit equivalent values (-148 and +68°F). It is not sufficient just to change the °F/°C units.

To change the range to Fahrenheit follow the procedures in Sections 3.4.2 and 3.4.3.

3.4.2 Span and Unit Settings

To change the span and unit settings, proceed as follows. Figure 27 shows the operational key sequence.

1. Press the **P** key once, the display will read **tECH**.
2. Press the **SET** key six times and the display will read **tPoL**.
3. Press the \Rightarrow key and the display will flash with the current minimum span limit (-100.0).
4. Use the \Rightarrow and \Leftarrow keys to set the required equivalent Fahrenheit value (-148.0) and press the **SET** key. **tPoH** is then displayed.
5. Press the \Rightarrow key, the display will flash the current maximum span limit (020.0).
6. Use the \Rightarrow and \Leftarrow keys to set the required equivalent Fahrenheit value (068.0) and press the **SET** key twice. **unit** is then displayed.
7. Press the \Rightarrow key, the display will flash the current unit (°C).
8. Use the \Rightarrow and \Leftarrow keys to set the required scale units (°F in this example) and press the **SET** key. **LoL** is then displayed.
9. Press the \Rightarrow key and the display will flash with the current alarm lower range limit (-100.0).
10. Use the \Rightarrow and \Leftarrow keys to set the required equivalent Fahrenheit value (-148) and press the **SET** key. **uPL** is then displayed.
11. Press the \Rightarrow key, the display will flash the current alarm upper range limit (020.0).
12. Use the \Rightarrow and \Leftarrow keys to set the required equivalent Fahrenheit value (068.0) and press the **SET** key. **PUoF** is then displayed.
13. Press the **P** key twice to return to the main menu.

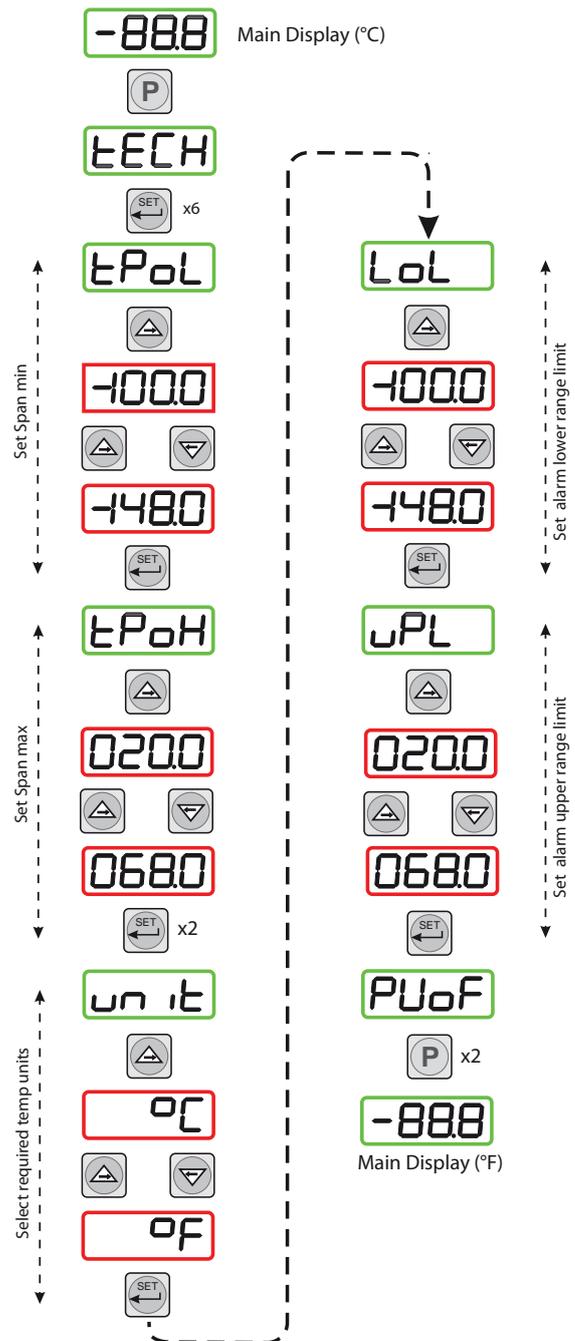


Figure 27 Span and Unit Settings

The maximum and minimum alarm level limits should now be changed to suit the new (Fahrenheit) unit values (refer to Section 3.4.3).

3.4.3 Alarm Set-Point Limit Configuration

The following procedure is used to set limits to which the alarm levels can be set (usually after re-configuring the instrument's range for Fahrenheit readings).

Figure 28 shows the operational key sequence.

1. Press the **P** key once, the display will read **tECH**.
2. Press the **SET** key once and the display will flash between **ConF** and **PinP**.
3. Press the \Rightarrow key four times and the display will flash between **ConF** and **GEnn**.
4. Press the **SET** key once, the display will read **SU-L**.
5. Press the \Rightarrow key once to display a flashing 4 digit number representing the current minimum alarm level setting. (The default setting for the °C range is -100.0).
6. Use the \Rightarrow and \Leftarrow keys to set the required new value (e.g. -148.0).
7. Press the **SET** key to accept the new value. The display will read **SU-u**.
8. Press the \Rightarrow key once to display a flashing 4 digit number representing the current maximum alarm level setting. (The default setting for the °C range is 020.0)
9. Use the \Rightarrow and \Leftarrow keys to set the required new value (e.g. 068.0).
10. Press the **SET** key to accept the new value, followed by the **P** key to return to the main display.

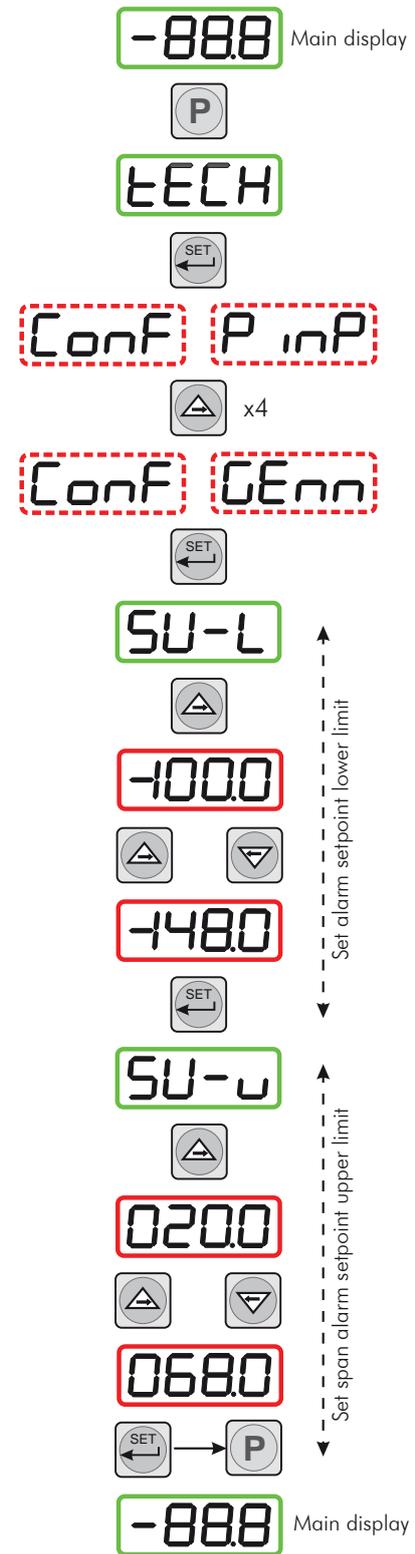


Figure 28 Set-up Alarm Set-Point Limits

3.4.4 Scale Units to ppm_v Set-Up

To change the monitor to read parts per million by volume (ppm_v) proceed as follows:

Figure 29 shows the operational key sequence.

NOTE: The dew-point transmitter must be configured to provide an output proportional to ppmV which can be set up at the time of order or by using the Michell application software. Contact Michell Instruments for information (for contact details see www.michell.com).

1. Press the **P** key once, the display will read **tECH**.
2. Press the **SET** key four times and the display will read **dPnt**.
3. Press the **⇒** key, the display will flash the current decimal point position (0001).
4. Press the **⇐** key to set 0000 on the display (no decimal point), and press the **SET** key twice. **tPoL** is then displayed.
5. Press the **⇒** key, the display will flash the current minimum span limit (-1000)
6. Use the **⇒** and **⇐** keys to set the required ppmV minimum reading (0000) and press the **SET** key. **tPoH** is then displayed.
7. Press the **⇒** key, the display will flash the current maximum span limit (0200).
8. Use the **⇒** and **⇐** keys to set the required ppmV maximum reading (3000) and press the **SET** key twice. **unit** is then displayed.
9. Press the **⇒** key, the display will flash the current unit (°C).
10. Press the **⇒** key three times to set the display reading to **'_'** (ppmV) and press the **SET** key. **LoL** is then displayed.
11. Press the **⇒** key, the display will flash the current alarm lower range limit (-1000) (formerly -100.0 with no sign or decimal point showing).
12. Use the **⇒** and **⇐** keys to set the required alarm lower range limit (point where display starts to flash) (0 or different value), and press the **SET** key. **uPL** is then displayed.
13. Press the **⇒** key, the display will flash the current alarm upper range limit (0200) (formerly 020.0 with no decimal point showing).
14. Use the **⇒** and **⇐** keys to set the required alarm upper range limit (point where display starts to flash) (3000 or different value), and press the **SET** key. **PUoF** is now displayed.
15. Press the **P** key twice and the main display, now reading ppmV will show.
NOTE: Neither the °C nor the °F LED indicators on the front panel of the monitor are now lit.

On completion of the above procedure, appropriate alarm levels (relevant to the new ppm_v scale) will need to be set-up (refer to Section 3.4.3).

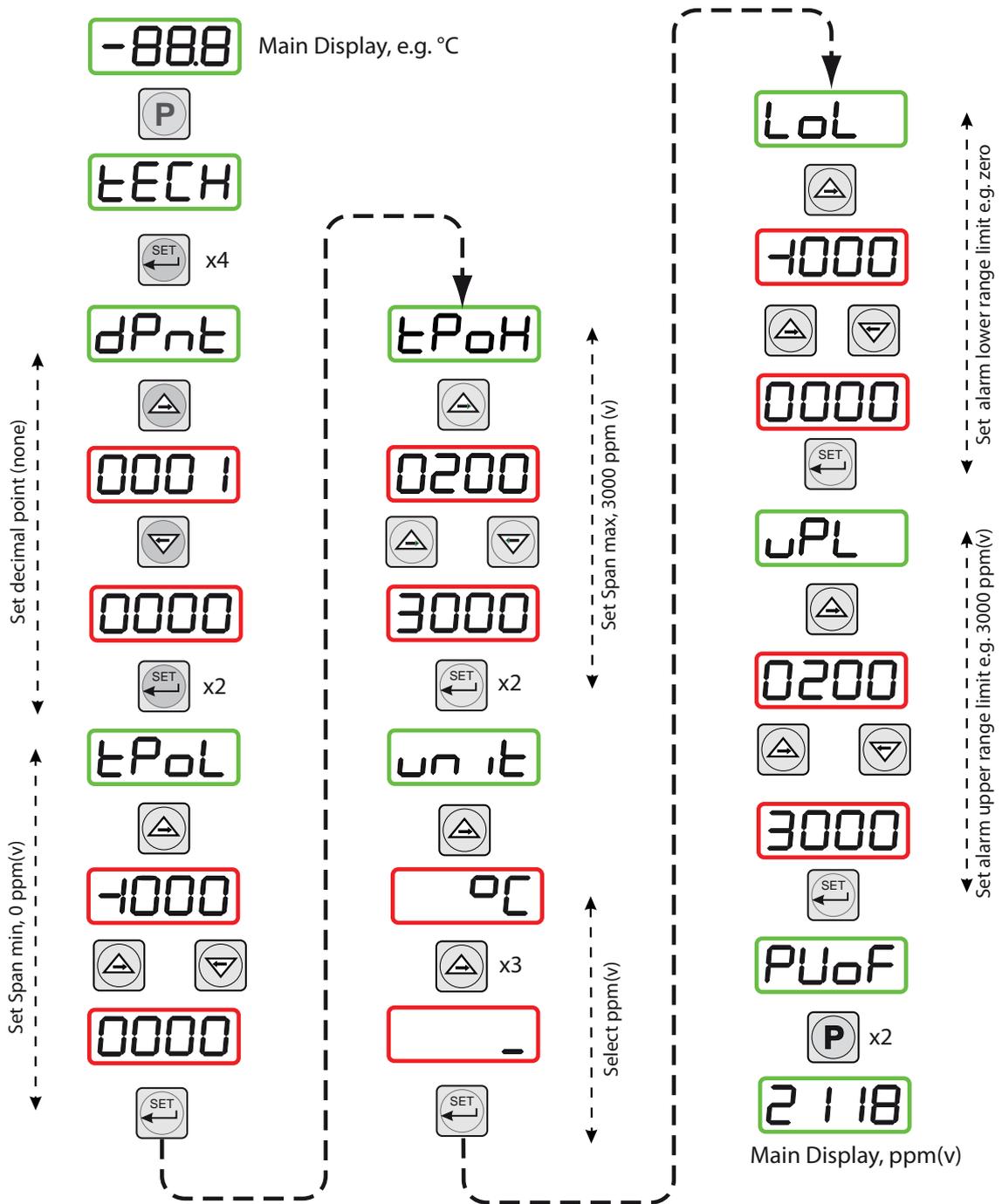


Figure 29 Set-up Monitor (to read ppm_v)

3.4.5 Monitor Limits When Unit Scaled to ppm_v

When unit is scaled to ppm_v the display will read zero when the mA input signal is between 3 and 4 mA.

NOTE: On displays supplied before December 2011 the display will show negative ppm_v values when the sensor input signal is between 3 and 4 mA.

3.5 Digital Communication Parameters Set-Up

The default parameters for the Easidew Online instrument are as follows:

Default Address = 1, Baud rate = 9600, Parity = None, Stop bits = 1

To change these parameters, proceed as follows:

Figure 29 shows the operational key sequence.

1. Press the **P** key once, the display will read **tECH**.
2. Press the **SET** key and the display will flash between **ConF** and **PinP**.
3. Press the \Rightarrow key five times, the display will flash between **ConF** and **Corn**.

Set-up instrument address

4. Press the **SET** key once to display **SAdr**.
5. Press the \Rightarrow key once to display a flashing 4 digit number. The default setting is 0001.
6. Use the \Rightarrow and \Leftarrow keys to give the required new value (e.g. 0002). **NOTE: The range of possible addresses is between 1 and 247.** Press the **SET** key to accept the new value.

Set baud rate

7. **bAud** will now be displayed. Press the \Rightarrow key once to display a flashing 4 digit number. The default setting is 0003, representing 9600 baud.
8. Use the \Rightarrow and \Leftarrow keys to give the required new value (the range is 0 to 4). 0 = 1200 baud, 1 = 2400 baud, 2 = 4800 baud, 3 = 9600 baud, 4 = 19200 baud. Press the **SET** key to accept the selected value.

Set parity

9. **Prty** will now be displayed. Press the \Rightarrow key once to display a flashing 4 digit number. The default setting is 0000, representing no parity (none).
10. Use the \Rightarrow and \Leftarrow keys to give the required new value (the range is 0 to 2). 0 = none, 1 = Odd, 2 = Even. Press the **SET** key to accept the selected value.

Set number of stop bits

11. **StPb** will now be displayed. Press the \Rightarrow key once to display a flashing 4 digit number. The default setting is 0000, representing 1 stop bit.
12. Use the \Rightarrow and \Leftarrow keys to give the required new value (the range is 0 - 1) 0 = 1 stop bit, 1 = 2 stop bits.
13. Press the **SET** key to accept the selected value, followed by the **P** key to return to the main display.

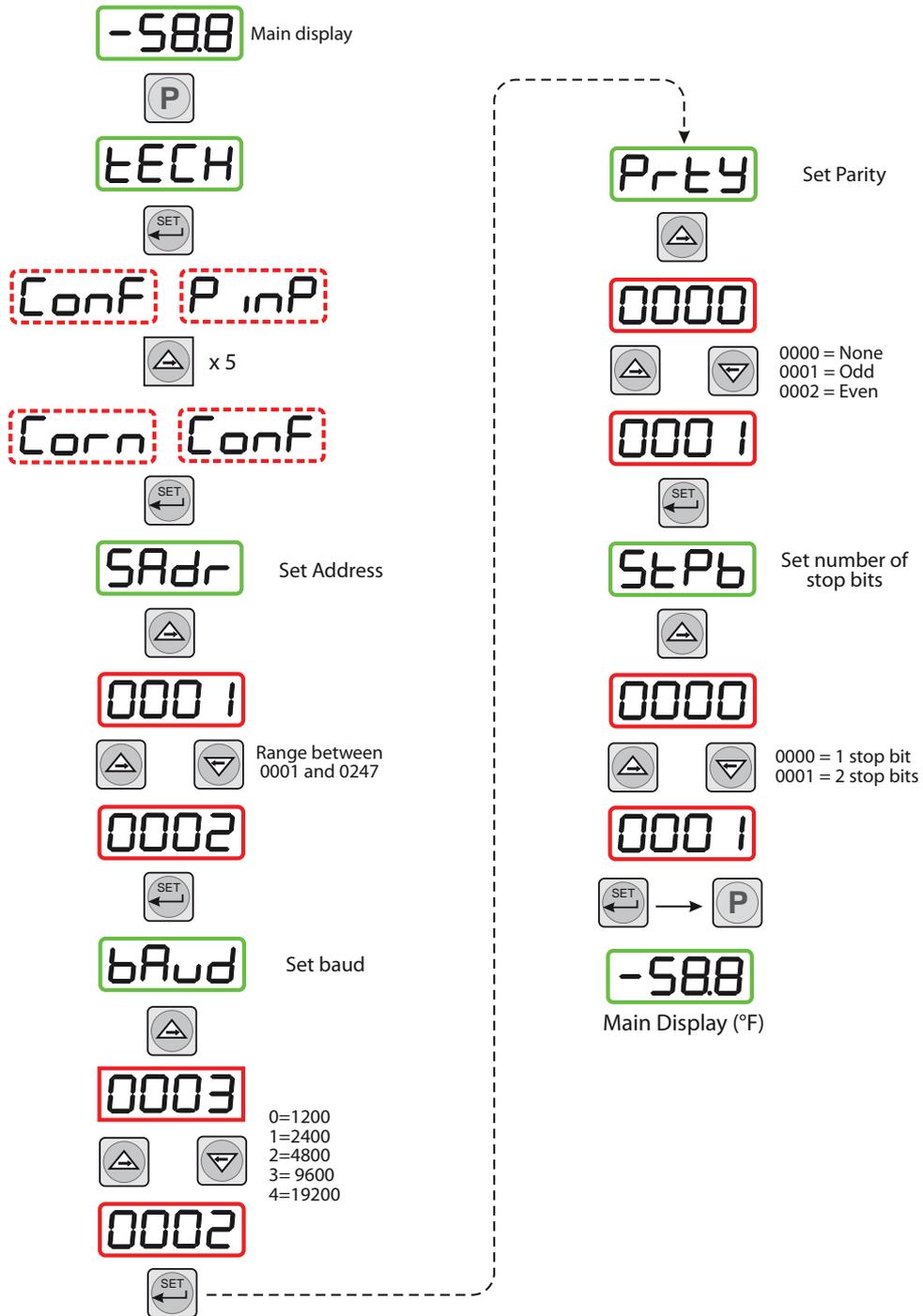


Figure 30 Set-up Data Communications Parameters

3.6 Monitor – Reading the Displayed Value Using Modbus RTU Over RS232

It is possible to communicate with the online monitor using Modbus RTU over RS232. The monitor has a three pin serial port connection on the back – the required cable can be supplied by Michell (see Appendix B for set-up information).

To read the value displayed on the monitor a byte array must be created, containing the following bytes:

Instrument Address	Command	Reg Address High	Reg Address Low	Number of Reg High	Number of Reg Low	LRC	CRC
0x01	0x04	0x00	0x00	0x00	0x01	0x31	0xCA

Send this to the instrument with the correct delays between characters:

Baud Rate (bps)	Min Delay (ms)	Max Delay (ms)
1200	9.17	13.76
2400	4.59	6.88
4800	2.30	3.44
9600	1.15	1.72
19200	0.57	0.86

After a few seconds the instrument will send back the following response:

Instrument Address	Command	Number of bytes	Display High	Display Low	LRC	CRC
0x01	0x03	0x02	0x00	0x67	(Varies)	(Varies)

Data MSB * 256 + Data LSB = 0 * 256 + 103 = 103

This code, written in c, can be used to convert the 103 into a real dew-point value or 10.3:

```
float ConvertToReal(int Value) //convert dew-point value to real dew-point result
{
    float result; //declaration
    if (Value > 32767) Value=(Value-65536); //convert to negative number
    result = (float)(Value/10.0); //divide number by 10 to convert to float
    return result; //return real value}

```

4 GOOD MEASUREMENT PRACTICE

The Easidew Online Hygrometer is designed to operate in a flowing gas stream and is suitable for the measurement of the moisture content of a wide variety of gases. In general, if the gas (in conjunction with water vapor) is not corrosive to ceramics or base metals then it will be suitable for measurement by the Easidew Online.

The transmitter is designed for operation with sample gas flow rates of 1-5 NI/min (sample block), 1-10 NI/min (direct connection). Ideally, the flow rate should be set-up between 4 and 6 NI/min (8.5 and 12.7 scfh), (5 NI/min (10.6 scfh) is the recommended optimum. Flow regulation is not provided within the Easidew Online system. Sample gas flow must therefore be regulated outside the instrument, on the input side of the sample block by means of a precision needle valve. Always use high quality valve gear, coupling connections and pipework.

The transmitter will operate successfully at flow rates within its operational range and it is important to ensure that the flow rate through the sample block is high enough to avoid long time lags in response to humidity changes at the sample source.

Avoid pressure gradients in the system by placing excessive flow restriction on the output side of the sample block. In applications where the test gas has a very high flow rate, an instrument by-pass arrangement is preferable to flow restriction after the transmitter.

4.1 General Operational Guidelines

General guidelines to be followed when setting-up a sampling system are as follows:

- **Transmitter Positioning**

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.

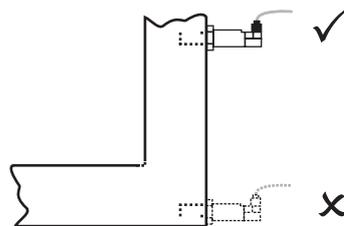


Figure 31 *Installation Location*

- **Avoidance of Dead Spaces**

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.

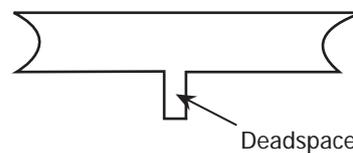


Figure 32 *Indication of Dead Space*

- **Particulate and Oil Removal**

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.

- **High Quality 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.

- **Complexity avoidance (tee pieces, in-line couplings, etc.)**

Sample pipework should, ideally, be specially designed for each application rather than adapted from that previously installed for another application. Dead space in sample lines increases response time by holding water molecules which are more slowly released to the passing gas sample.

- **Sample Gas Selection**

Generally, if the sample gas (in conjunction with water vapor) is not corrosive to base metals, it will be suitable for measurement by the Easidew Online system. Gases containing entrained solids should be filtered before application to the sample block.

Care should be taken with gas mixtures containing potentially condensable components in addition to water vapor, e.g. oil, to ensure that only water vapor is present in the sample.

4.2 Maintenance and Calibration

Routine maintenance of the Easidew Online Hygrometer is confined to regular re-calibration. For most applications, annual re-calibration ensures that the stated accuracy of the Easidew Online Hygrometer is maintained.

Specialist calibration instrumentation is required to calibrate the transmitter and a true calibration can only be performed by exposure of the dew-point sensor to a reference gas of known dew point.

Calibration services are offered by Michell Instruments at their accredited calibration laboratories. All calibrations are traceable to national standards either via the National Physical Laboratory (UK) or the National Institute of Standards and Technology (USA).

The Easidew transmitter can be returned to Michell Instruments either directly or via the authorized distributor, for calibration at 13 points across the range -100 to +20°Cdp (-148 to +68°Fdp).

Alternatively, Michell Instruments can provide an exchange transmitter. Prior to re-calibration, an exchange transmitter can be ordered from Michell Instruments or an authorized distributor.

Once the replacement transmitter and calibration certificate have been received, the original transmitter can be disconnected from the sample line and the monitor and the replacement transmitter fitted in its place. Refer to Section 2.1.1. The original transmitter should be packed in its original packing (see *Figure 3*) and returned to Michell Instruments, either directly, or via their authorized agent.

Easidew transmitters are fully interchangeable and can be used with any Easidew Online monitor. Transmitter interchangeability is not affected by cable length.

4.2.1 Clean Monitor

The front panel of the monitor should be cleaned with a moist lint free cloth. Mild detergent may be used to remove any stubborn marks or stains but **DO NOT** use any type of solvent, e.g. acetone, which could damage the instrument.

4.3 Fault Conditions

Message Displayed	Cause	Action
ErrL	Sensor failure	Check power supply to transmitter. Check transmitter cable for continuity/damage. Rectify/replace cable
	Instrument failure	Refer to Michell or local representative for repair
Sbr	Sensor failure or break in sensor connection	Check transmitter cable for continuity/damage. Rectify/replace cable
ErrH	Gas is wetter than +20°Cdp	Check gas source supply
	Sensor contaminated	Replace/re-calibrate transmitter
outR	Input out of range	Check gas source supply. Re-calibrate/replace transmitter
rurC	Reverse input connection	Swap input connections from the transmitter to the monitor

Appendix A

Technical Specifications

Appendix A Technical Specifications

Monitor	
Performance	
Measurement Range (Dew Point)	-100 to +20°C (-148 to +68°F) dew point
Electrical Specifications	
Input Signal	4-20 mA input from Michell dew-point transmitter
Output Signal	4-20 mA (or -20mA) (2-wire connection, current source) User configurable over range
Alr 1 Relay	Single pole make contact, rating 3 A @ 250 V AC
Alr 2 Relay	Changeover contacts, rating 5 A @ 250 V AC
Output	Dew point or moisture content for ppm _v
Analog Output Scaled Range	Dew point: -100 to +20°C Moisture content in gas: 0-3000 ppm _v Non-standard available upon request
Power Connection	2 wire, length 2m (6.6ft)
Supply Voltage	100 to 240 V AC (+10%, -15%), 50/60 Hz (Optional 24 V DC) (-15%, +10%) 6W
Over Voltage Category	III, fixed installation category
Display	20.3mm red 4 digit LED display
Temperature and Alarms Indicators	Red LED's
Load Resistance	Max 600 Ω
Current Consumption	AL1, AL2, °C, °F
Power Connection	60 mA max
Transmitter cable	Copper braid screened cable; 4 core 7 / 0.2 (0.22mm ²), stranded, tinned copper conductors, PVC, insulated, Melinex taped, Black PVC outer. Max length 800m (2,624 ft)
Operating Specifications	
Environmental Ratings	Standard, indoor at an altitude of less than 2000 meters with non-condensing humidity
Operating Temperature	0 to +50°C (+32 to +122°F) 90% RH max (non condensing)
Operating Mode	Continuous
Mechanical Specifications	
Ingress Protection	IP65 (NEMA 4X) at front, IP20 at rear
Housing Material	1/8 DIN 43700 plastic housing
Dimensions	96 X 48 x 86.5mm (3.8 x 1.9 x 3.4") horizontal
Mounting	Panel mounting (cut out 92 x 46mm (3.6 x 1.8"))
Weight	Approximately 210g (7.4oz)

Transmitter									
Performance									
Measurement Range (Dew Point)	-100 to +20°Cdp (-148 to +68°Fdp)								
Accuracy (Dew Point)	±2°Cdp (±3.6°Fdp)								
Response Time	5 mins to T95 (dry to wet)								
Repeatability	0.5°Cdp (0.9°Fdp)								
Calibration	13 point calibration with traceable 7 point calibration certificate								
Electrical Specification									
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 to +20°C (-148 to +68°F) OR Moisture content in gas: 0 - 3000 ppm _v Non-standard available upon request								
Supply Voltage	12 to 28 V DC								
Load Resistance	Max 250 Ω @ 12 V (500 Ω @ 24 V)								
Current Consumption	20 mA max								
CE Marked	Certified								
Operating Specifications									
Operating Temperature	-40 to +60°C (-40 to +140°F)								
Operating Pressure	45 MPa (450 barg / 6500 psig) max								
Flow Rate	1 to 5 NI/min (2.1 to 10.6 scfh) mounted in standard sampling block; 0 to 10 m/sec (0 to 32.8 fps) direct insertion								
Temperature Coefficient	Temperature compensated across operating temperature range								
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 ø45mm (5.19" x ø1.77")								
Sensor Guard	Standard: HDPE Guard < 10µm Optional: 316 stainless steel sintered guard < 80µm								
Process Connection & Material	5/8" - 18 UNF 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								
Digital Diagnostic Communications	RS485, 2-wire Modbus RTU								

A.1 Dimensions

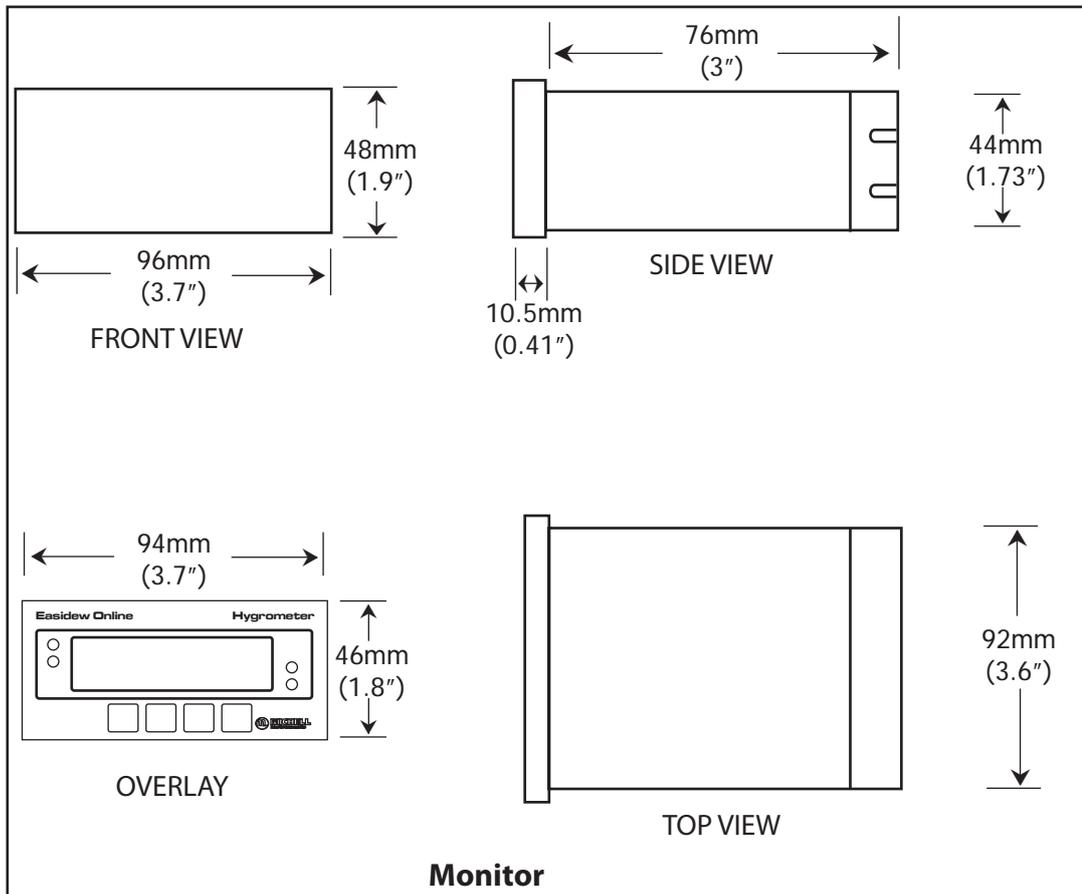
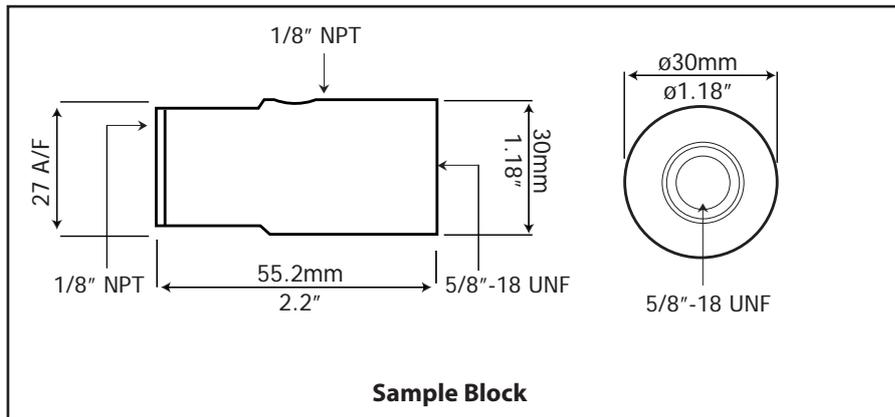
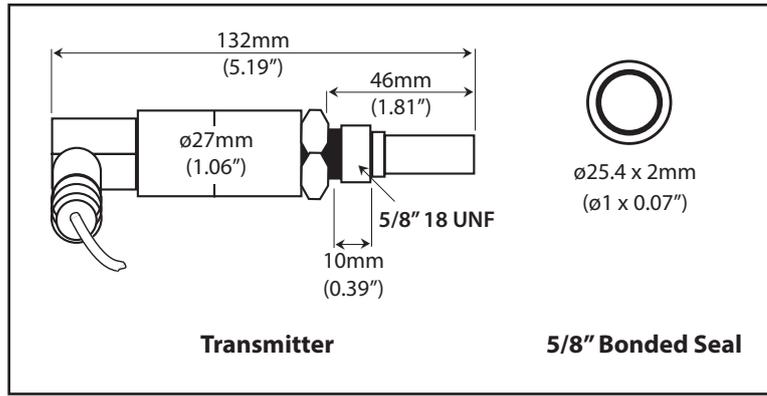


Figure 33 Dimensions

Appendix B

RS232 Data Communications Port Connections (Optional)

Appendix B RS232 Data Communications Port Connections (Optional)

The Easidew Online instrument has an RS232 port, situated on the rear panel of the monitor. This port enables remote access to the instrument's configuration and the indicated dew-point temperature.

The method of connection is shown in *Figure 34* and the following items will be required (these are not supplied with the Easidew system):

- Matching connector for monitor output port
- Screened RS232 communications cable (max length permitted 12m (39.4ft))
- 9-pin, D-Type RS232 connector

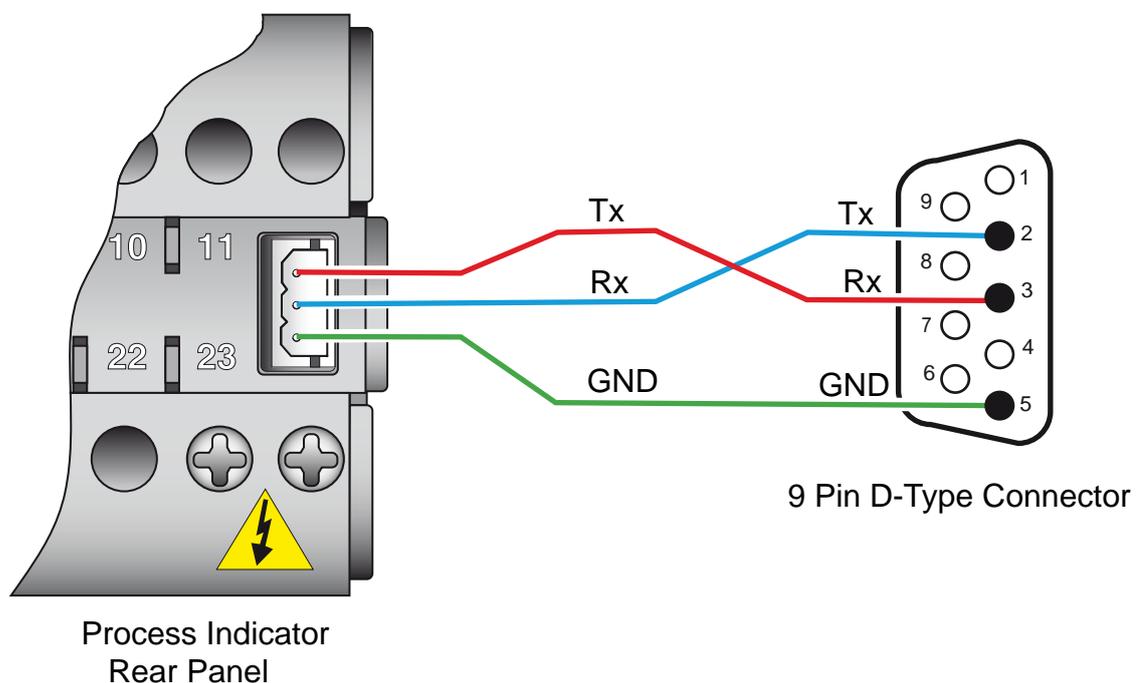


Figure 34 RS232 Connections

1. Strip both ends of the communications cable to expose the individual cable cores and the cable screen.
2. Trim off the cable screening at the monitor end.
3. Connect the Tx, Rx and ground (GND) cable cores to the monitor connector as shown.
4. On the 9-pin D-type PC connector, connect the Tx line to pin 3, the Rx line to Pin 2 and the GND connection to Pin 5. Connect the Screen to Pin 5 and/or the frame of the connector.
5. Check that the cable wiring has been completed correctly.

Appendix C

EC Declaration of Conformity

Appendix C EU Declaration of Conformity

EU Declaration of Conformity



Manufacturer: **Michell Instruments Limited**
48 Lancaster Way Business Park
Ely, Cambridgeshire
CB6 3NW. UK.



On behalf of the above named company, I declare that, on the date that the equipment accompanied by this declaration is placed on the market, the equipment conforms with all technical and regulatory requirements of the listed directives.

Easidew Online

and complies with all the essential requirements of the EC directives listed below.

2004/108/EC EMC Directive
2006/95/EC Low Voltage Directive (LVD)

and (effective from 20th April 2016)

2014/30/EU EMC Directive
2014/35/EU Low Voltage Directive (LVD)

and (effective from 22nd July 2017)

2011/65/EU Restriction of Hazardous Substances Directive (RoHS2)

RoHS2 EU Directive 2011/65/EU (Article 3, [24]) states, "*industrial monitoring and control instruments means monitoring and control instruments designed exclusively for industrial or professional use*". (mandatory compliance effective date 22nd July 2017).

and has been designed to be in conformance with the relevant sections of the following standards or other normative documents.

EN61326-1:1997 Electrical equipment for measurement, control and laboratory use – EMC requirements –Class A (emissions)[Monitor] Class B (emissions) [Sensor] and Industrial Locations (immunity).

EN61010-1:2010 Safety Requirements for Electrical Equipment for . Measurement, Control, and Laboratory Use - Part 1: General Requirements

Andrew M.V. Stokes, Technical Director

Anril 2016

EUD EAOL Issue 02

Appendix D

UL Certification

Appendix D UL Certification

Below are listed the requirements of UL Certification:

Standards:	UL 61010-1, 2nd edition, 2005-07-22 (Electrical Equipment for Measurement, control, and laboratory use: Part 1: General requirements) CAN/CSA-C22.2 No. 61010-1 2nd edition, 2004,-07, (Electrical Equipment for Measurement, control, and laboratory use: Part 1: General requirements)
Temperature:	Maximum ambient temperature rating +50°C (+122°F)
Maximum Relative Humidity:	95%
Power Supply Source:	To be powered by a certified NEC Class 2 or LPS output power supply source or equivalent.
Pollution Degree:	2

Appendix E

Quality, Recycling & Warranty Information

Appendix E Quality, Recycling & Warranty Information

E.1 Pressure Equipment Directive (PED) 97/23/EC

The above Directive has been implemented in United Kingdom Law by the Pressure Equipment Regulations 1999.

The Regulations require that all pressure equipment and assemblies within the scope of the Pressure Equipment Directive must be safe when placed on the market or put into service.

Michell Instruments' products have been assessed and, as referenced against the Classification Charts detailed in Annex II of the Directive, do not fall into the requirements for CE marking compliance with the Pressure Equipment Directive.

Article 3, paragraph 3 states that any product containing a pressurized fluid that does not qualify for compliance should, nevertheless, be constructed with Sound Engineering Practice (SEP).

Michell Instruments attests here that its products have been designed, manufactured & tested to assure safe operation, and in accordance with Sound Engineering Practices.

E.2 Recycling Policy



Michell Instruments is concerned with the protection of the environment. It is our commitment to reduce and eliminate from our operations, wherever possible, the use of substances which may be harmful to the environment. Similarly, we are increasingly using recyclable and/or recycled material in our business and products wherever it is practical to do so.

To protect natural resources and to promote material reuse, please separate batteries from other types of waste and recycle responsibly. If batteries are not properly disposed of, these substances can cause harm to human health and the environment.

The product that you have purchased may contain recyclable and/or recycled parts and we will be happy to provide you with information on these components if required. For further information please see the following sections.

E.3 WEEE Compliance

Directive 2012/19/EU 4 July 2012 on Waste Electronic and Electrical Equipment (WEEE)

The Waste Electronic and Electrical Equipment (WEEE) Directive places rules upon European manufacturers of electrical and electronic equipment. The directives' aim is to reduce the impact that electronic devices have on the environment.

Michell Instruments is in full compliance with the WEEE Directive and is registered with an approved recycler (Registration No. WEE/JB0235YW) and treats the requirement of the directive and the protection of the environment with the utmost importance. All Michell Instruments' products are appropriately marked indicating their requirement for recycling.

It may be required to return certain instruments for treatment at the end of their working life.

Feb 2013

E.4 RoHS2 Compliance

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011

The Restriction of Hazardous Substances (RoHS) Directive places rules upon European manufacturers of electrical and electronic equipment. The directives' aim is to reduce the impact that electronic devices have on the environment.

According to the EC Directive 2002/95/EC, Michell Instruments' products qualify as Category 9, Control and Monitoring Equipment. Under the 2002/95/EC Directive, Category 9 products are exempt from compliance with the Directive.

However, the careful design of all Michell Instruments' products takes into consideration the requirements of the Directive and, wherever possible, compliance is achieved. All future products will be developed entirely using compliant materials. Furthermore, Michell Instruments is taking active steps to remove non-compliant materials and components from existing products wherever these may occur. Presently, none of the non-compliant materials are known to occur in Michell Instruments' products.

The new Directive 2011/65/EU (RoHS2) entered into force on 21 July 2011 and required all Member States to transpose the provisions into their respective national laws by 2 January 2013.

Under the provisions of the RoHS2 EU Directive 2011/65/EU (Article 3, [24]) defines 'Control and Monitoring Equipment' specifically as 'monitoring and control instruments designed exclusively for industrial or professional use'.

RoHS2 EU Directive 2011/65/EU states the closing date for compliance of any Control and Monitoring Equipment product sold into the EU market place as 22nd July 2017.

However, the careful design policy of all Michell Instruments' products continues to attain compliance in the shortest practical timescales and strives to ensure that less than 0.1% of total mass per product, of all non-compliant materials, appear within them. Michell Instruments continues to monitor suppliers and material sources to ensure that compliance of goods provided is maintained.

January 2013

E.5 Warranty

Unless otherwise agreed, the Supplier warrants that, as from the date of delivery for a period of 12 months, the goods and all their component parts, where applicable, are free from any defects in design, workmanship, construction or materials.

The Supplier warrants that the services undertaken shall be performed using reasonable skill and care, and be of a quality conforming to generally accepted industry standards and practices.

Except as expressly stated, all warranties whether express or implied, by operation of law or otherwise, are hereby excluded in relation to the goods and services to be provided by the Supplier.

All warranty services are provided on a return to base basis. Any transportation costs for the return of a warranty claim shall reside with the Customer.

E.6 REACH Compliance

Regulation (EC) No. 1907/2006

Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Michell Instruments is a manufacturer of moisture measurement and gas analysis instrumentation and is a 'downstream' user of chemicals, as described by the EU Council Directive 76/769/EEC. The products we supply are not raw chemical products (goods).

Under normal and reasonably foreseeable circumstances of application, the goods supplied to you shall not contain or release any prohibited chemicals. No listed SVHC (Substances of Very High Concern) appear within products manufactured by Michell Instruments. Therefore the 0.1% mass per product, or total usage of 1 tonne/year, will never be exceeded. For these reasons we are neither required by obligation for registration nor for the creation of material safety data sheets (MSDS) for our products.

Our continued review of the SVHC Candidate List and latest additions is to ensure we remain compliant.

Michell Instruments maintains a hazardous material register in which MSDS data sheets are collated, and we will check that our suppliers will comply to REACH requirements for all materials and substances we use in the processes of our manufacturing.

In the unlikely event that any chemicals of concern appear in our products in quantities greater than 0.1% of total mass per product we will immediately inform you by correspondence according to the REACH Article 33 requirements. Our current appraisal is, however, that we do not expect or foresee such an incidence.

January 2013

E.7 Calibration Facilities

Michell Instruments' calibration facilities are among the most sophisticated in the world and have been recognized for their excellence.

Traceability to the National Physical Laboratory (NPL) UK is achieved through our UKAS Accreditation (Number 0179). This covers dew point over the range -90 to +90°C (-130 to +194°F) and also Relative Humidity.

Dew-point calibrations are also traceable to the National Institute for Standards & Technology (NIST) USA over the range -75 to +20°C (-103 to +68°F).

NOTE: Standard traceable calibration certificates for instruments and sensors are not issued under our UKAS accreditation. UKAS certificates are usually to special order and are clearly identified.

E.8 Return Policy

If a Michell Instruments' product malfunctions within the warranty period, the following procedure must be completed:

1. Notify a Michell Instruments' distributor, giving full details of the problem, the model variant and the serial number of the product.
2. If the nature of the problem indicates the need for factory service then the instrument should be returned to Michell Instruments, carriage prepaid, preferably in the original packaging, with a full description of the fault and the customer contact information.
3. Upon receipt, Michell Instruments will evaluate the product to determine the cause of the malfunction. Then, one of the following courses of action will be taken:
 - If the fault is covered under the terms of the warranty, the instrument will be repaired at no cost to the owner and returned.
 - If Michell Instruments determines that the fault is not covered under the terms of the warranty, or if the warranty has expired, an estimate for the cost of the repairs, at standard rates, will be provided. Upon receipt of the owner's approval to proceed, the product will be repaired and returned.

E.9 Manufacturing Quality

Michell Instruments is registered with the British Standards Institute for Quality Assurance to:

BS EN ISO 9001: 2008

Rigorous procedures are performed at every stage of production to ensure that the materials of construction, manufacturing, calibration and final test procedures meet the requirements laid down by our BSI approved Quality System.

Please contact Michell Instruments (www.michell.com) if the product does not arrive in perfect working order.

Appendix F

Return Document & Decontamination Declaration

Appendix F 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	
<p>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.</p> <p>Work will not be carried out on any unit that does not have a completed decontamination declaration.</p>				
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:



<http://www.michell.com>