Easidew PRO XP Moisture Transmitter User's Manual

KAHN

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Easidew PRO XP

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KAHN INSTRUMENTS, INC.
*Easidew PRO XP- Ex**
Moisture Transmitter
Installation and Maintenance Information

Category II 2 GD

Code Ex d [ia] IIC T6 Gb
Ex tb IIIC T80°C Db IP66
Tamb -20°C to +70°C

Certificate Nos. Sira 14ATEX1007X & IECEx SIR 14.0004X

APPLICATION

The Instrument is mounted within a flameproof (type 'd') enclosure, suitable for use in Zones 1, and 2, Group IIB + H2 hazardous Areas as defined by EN 60079-0:2012, EN60079-1:2007, EN 60079-11:2012, EN60079-31:2009, IEC60079-0:2011, IEC60079-1:2007, IEC 60079-11:2011, IEC60079-31:2008

WARNING

Ensure ALL power is ISOLATED before/during installation/maintenance. Read the instructions and thoroughly understand them before proceeding. Ensure the details on the label comply with the hazardous area specified.

GENERAL

No modification should be made to the instrument without reference to the manufacturer, as unauthorized modification to an approved apparatus will invalidate the certificate/approval. Installation should be carried out in accordance with local regulations valid at the time of installation at that location.

INSTALLATION

1. The instrument is supplied with drilled and tapped entries for cable glands. Threaded ports are also available for gas connections.

2. The surface of the machined/threaded flamepaths between cover and body must be protected from scratches or damage during installation. Any such damage can destroy the validity of the enclosure.

3. Before the cover is refitted, the flamepath/threaded joint between cover and body must be thoroughly wiped clean of dirt, grit or other foreign substances, and then a thin coating of an approved form of non-setting grease applied to joint/threads. Ensure gasket is free from damage.

4. Threaded covers should be screwed on to a minimum of 7 full threads and then locked in position with the locking screw provided.

5. All tapped entries must be fitted with an approved flameproof (Ex d) device, which is equivalent or superior to the gas group of the enclosure.

6. The enclosures may be mounted using appropriate bolts through the clearance holes in the cast lugs.

7. Do not scratch the glass of the front cover (display version).

8. Glanding of cables; Thermo Plastic, Thermosetting and Elastomeric Cables should be installed In accordance with Zone I and Zone 2 – Ex d Barrier Glands mandatory regulations or equivalent.

9. Observe the Special Conditions of Safe Use section of the Certificates.

MAINTENANCE AND INSPECTION

1. Frequent inspection should be made. A schedule for maintenance check should be determined by the environment and frequency of use but should be regular enough to ensure the equipment continues to operate in the designed manner. It is recommended that it should be at least once a year.

2. External parts of the instrument enclosure should be periodically cleaned to ensure dust deposits are not allowed to accumulate

3. Check flamepath/threads on enclosure body and lid for signs of corrosion. If badly pitted replace component.

4. All components that are replaced must be in accordance with the manufacturer's specifications and approvals. Failure to use such components will invalidate the certification/approval on the instrument and may make the instrument dangerous.

5. After inspection and maintenance have been carried out, items 3 & 4 of installation instructions should be adhered to when resealing the enclosure. Always refer to the product manual.

All statements, technical information and recommendations contained herein are based on information and tests we believed to be reliable, the accuracy or completeness thereof are not guaranteed in accordance with Kahn Instruments "Conditions Governing All Sales (CON1 11/97)" and since conditions of use are outside our control, the purchaser must determine the suitability of the product for its intended use and its installation and maintenance, and assumes all risk and liability whatsoever in connection herewith.

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 insure 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 qualified personnel and good engineering practice for all procedures in this manual.

Where this symbol appears in the following sections it is used to indicate areas where potentially hazardous operations need to be carried out and where particular attention to personal and personnel safety must be observed.

Electrical Safety

WARNING:
During the installation of this product insure that all applicable national and local electrical safety regulations are observed.

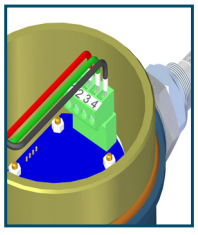
WARNING:
Isolate the power prior to installation.

WARNING:
Always insure that power is switched off prior to accessing the product for any purpose other than normal operation or prior to disconnecting any cables.

In compliance with IEC 61010 Electrical Safety Standard the following applies to this product:

Equipment ratings:

This equipment must be supplied with a voltage between the range of 14 to 28 V DC. Maximum power rating is 1 W.



The power is connected via PL2 on the pcb.

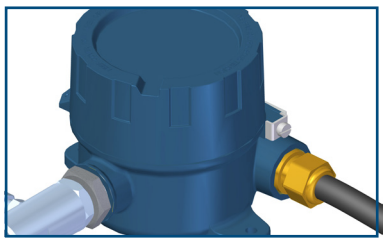
The input and output connector is a 2-part pcb mounted type, rated at 300 V, 10 A.

The detachable, screw terminal half of each connector is designed to accept 0.02 - 0.09 in^2 (0.5-2.5mm^2) [24 -12 AWG] stranded or solid conductors (non-display version only).

Any power connection cable should have a minimum 0.5mm insulation and be rated at 300 V. Insure the power supply can deliver sufficient power consumption requirement.

Insure any power supply terminals and voltages are suitably separated from the other I/O requirements of this product.

Before applying power, perform a continuity test to insure that the power supply screen and product are effectively connected to a ground.



The ground terminal is mounted externally and the ground wire connected to it should never be disconnected. The product enclosure is supplied with a 5mm diameter external ground connection at the lower right hand side. At installation, connect this ground connection to a satisfactory ground by a minimum 0.16 in^2 (4mm^2) ground bonding.

This product is designed to operate, as a minimum, between a temperature range of +23°F and +104°F (-5°C and +40°C), in maximum 80% relative humidity for temperatures up to +88°F (+31°C) decreasing linearly to 50% RH at 50°C. Supply voltages of ±10% and transient over voltages up to Overvoltage Category II. Pollution Degree 2. Altitudes up to 6200 ft (2,000 meters). Outdoor mounting is permitted using suitably rated glands equivalent to NEMA 4 / IP66. See Technical Specification Appendix in this manual for full operating parameters. Do not remove or exchange any of the cables or electrical components supplied with this product. To do so will invalidate all warranties. There are no additional or special electrical safety requirements other than those referred to in this manual.

Refer to the relevant sections of this manual for the location and mounting details.

Installation of this equipment should include the provision of a suitable and locally positioned power isolation switch or circuit breaker. Indication of the purpose of the switch or circuit breaker is strongly recommended. An over-current protection device should be rated to a maximum of 3 A.

Insure this equipment and all power isolation devices are installed in a location and position that allows safe and easy access to their operation and is adequate to rigidly support the equipment.

Do not install this equipment in a location that would expose it impact or high levels of vibration.

Operation of this equipment, other than in a manner as specified by the manufacturer, may impair the safety protections provided.

The safe installation of this equipment and any system incorporating this equipment is the responsibility of the installer. Insure local regulations and requirements are referred to prior to any installation commencing.

Hazardous Area Safety

Appendix B of this manual refers to the Hazardous Area Certification of this product.

This product is equipped with a marking label that contains Hazardous Area information pertinent to the suitable location and installation.

During all installation and operation activities local regulations and permitted working routines must be observed. Installation should only be performed by competent personnel and in accordance with IEC/EN 60079-14:2008 or local equivalent.

Cable glands / conduit seals shall be installed in accordance with the manufacturer's instructions.

Conduit seals used should be suitable for a reference pressure of 6.1 bar (89 psi).

Repair and servicing of this equipment must only be carried out by the manufacturer.

Supplied separately to the manual is an Installation and Maintenance Information Sheet.

WARNING:
This product is Certified safe for use in a Zone 1 and Zone 2 and Class I, Zone 1 and Class I, Division 1 area only. This product must not be installed or used within a Zone 0 area.

WARNING:
This product must not be operated within an explosive atmosphere greater than 16 PSIA (1.1 bar) absolute.

WARNING:
This product must not be operated with enriched Thermal Conductivity gas samples (more than 21% Thermal Conductivity content).

WARNING:
This product must not be operated outside of the temperature range of -4°F and 158°F (-20°C and +70°C).

WARNING:
The enclosure of this product provides Exd protection, partly through the threads used for mounting the lid, stopping plugs and cable gland. At all times effort should be made to ensure these threads are suitably protected from damage and that only appropriately rated mating parts are applied to them, in accordance with the certifying requirements.

Pressure Safety

WARNING:

This product is used in conjunction with pressurized gases. Observe pressurized gas handling precautions.

WARNING:

Pressurized gas is dangerous. Pressurized gas should only handled by suitably trained personnel.

The Easidew PRO XP requires pressurized gas to be connected to it. Observe pressurized gas handling regulations and only suitable trained personnel should carry out tasks that include the use of pressurized gas.

DO NOT permit pressures greater than the safe working pressure to be applied to the instrument. The specified safe working pressure for this instrument is 6500 psig (450 barg) max.

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.

Long exposure to, or breathing of the calibration gases, may be dangerous.

Repair and Maintenance

The instrument must be maintained either by the manufacturer or an accredited service agent. For Kahn Instruments' contact information go to www.kahn.com.

Calibration

Prior to shipment, the transmitter undergoes stringent factory calibration to traceable standards. A calibration certificate traceable to NIST is provided with each transmitter. Due to the inherent stability of the instrument, regular field calibration should not be required under normal operating conditions. However, Kahn Instruments recommends that a calibration be considered at intervals of every 12 months of the instrument's life.

Kahn Instruments recommends annual recalibration traceable to NIST. Please contact Kahn Instruments for further details (www.kahn.com).

Otherwise, the transmitter should perform reliably for many years with just basic maintenance and housekeeping.

Safety Conformity

This product carries the CE mark.

Abbreviations

The following abbreviations are used in this manual:

A	ampere
A/F	across flats
barg	pressure unit (=100 kP or 0.987 atm) gauge
°C	degrees Celsius
°F	degrees Fahrenheit
dp	dew point
DC	direct current
EU	European Union
fps	feet per second
HDPE	high-density polyethylene
ins	inches
I/O	Input/Output
ISO	International Organization for Standardization
K	Kelvin unit of temperature measurement
lb/MMSCF	pounds of water per million standard cubic feet of gas
lb-ft	pound foot
Nl/min	normal liters per minute
m	meters
mA	milliampere
mg/m^3	milligrams per cubic meter
mm	millimeter
mm^2	millimeter squared
Mpa	megapascal
m/sec	meters per second
Nm	Newton meter
pcb	printed circuit board
psig	pounds per square inch (gauge)
ppm_V	parts per million by volume
ppm_W	parts per million by weight
PTFE	Polytetrafluoroethylene
Ra	roughness average (unit of measure of surface finish)
RH	relative humidity
scfh	standard cubic feet per hour
UNF	unified fine thread
µm	micrometer
"	inches
%	percentage
V	Volts

1 INTRODUCTION

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

For questions about the instrument or how to install and operate it, contact Kahn Instruments (www.kahn.com).

There are two variants of the Easidew PRO XP, each available with various options for display, housing, range, etc:

Easidew PRO XP-TX	For gases
Easidew PRO XP-LQ-TX	For liquids

1.1 Features

The Easidew PRO XP is a continuous, on-line, 4-20 mA transmitter for the measurement of moisture content in air, other non-corrosive gases and non-polar liquids. It is designed specifically for use within Zone 1 & 2 and Zone 21 & 22 Hazardous Areas (ATEX & IECEx) and Class I, Division 1, Groups B, C & D, Class II and III, Division 1, Groups E, F & G, Class I, Zone 1 & Zone 21 Hazardous Locations (North America).

Its key features are:

- Dewpoint measurement range -166 to +68°F (-110 to +20°C)
- Global explosion / flameproof certification
- Accuracy ±1.8°F (±1.0°C)
- 2-wire 4-20 mA output
- Traceable 13-point calibration certificate
- 6500 psig (450 bar) pressure rating
- 3/4" UNF industry standard process connection
- EN 10204 3.1 material certification
- Moisture in gases and liquids
- Optional integrated display meter

2 INSTALLATION

2.1 Unpacking the Instrument

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

- Easidew PRO XP Transmitter (EX1 - Non-display OR EX2 - Display)
- Certificate of calibration
- Quantity two ferrules
- 1.5mm A/F Allen key
- Quantity 1 conduit entry blanking plug (equipped hand tight)
- User manual
- Sample block (optional)
- Pipe mounting bracket (optional)
- EN10204 3.1 material certificate (optional)

The Easidew PRO XP is protected within the main packaging with a green cap protecting the sensor guard with a desiccant capsule inside (see *Figure 1)*, and a plastic cap inside the cable entry opening.

Remove and retain these items prior to commissioning.

DO NOT HANDLE THE SENSOR GUARD

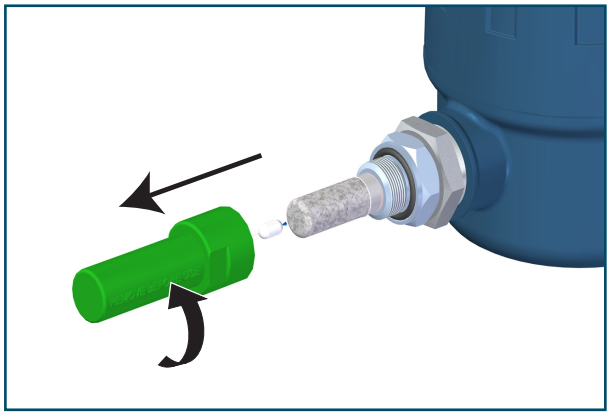


Figure 1 *Sensor Cap Removal*

2.1.1 Wall Mounting

The instrument is housed in an aluminum or stainless steel Exd enclosure suitable for wall or panel mounting. Two mounting points are available with 0.3 in. (ø7mm) clearance holes on locating centers 5.0 in. (127mm) apart. Use quantity 2 max 0.25 in. (6.5mm) diameter mounting fasteners with a minimum length of 1.4 in. (35mm).

The enclosure provides environmental ingress protection of NEMA4/ IP66 and should be mounted vertically in a location free of any appreciable vibration. It is good engineering practice to place it in a shaded location to prevent heating effects through solar radiation.

Conduit entries can accept connection for threaded rigid metal conduit or other wiring methods in accordance with Article 501 of the National Electrical Code ANSI/NFPA 70-2011 and IEC/EN 60079-14:2008.

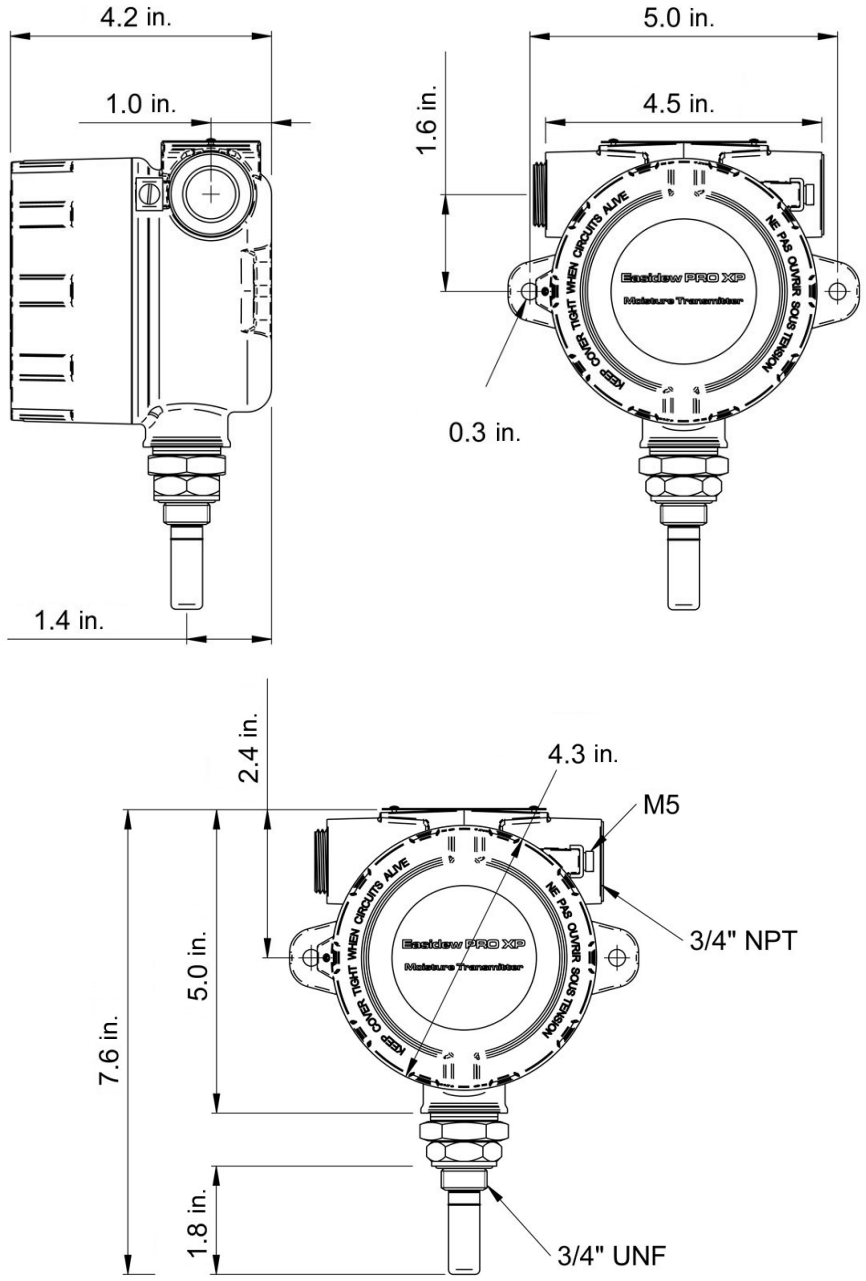


Figure 2 *Outline Dimensions - Wall Mounting (Non-Display)*

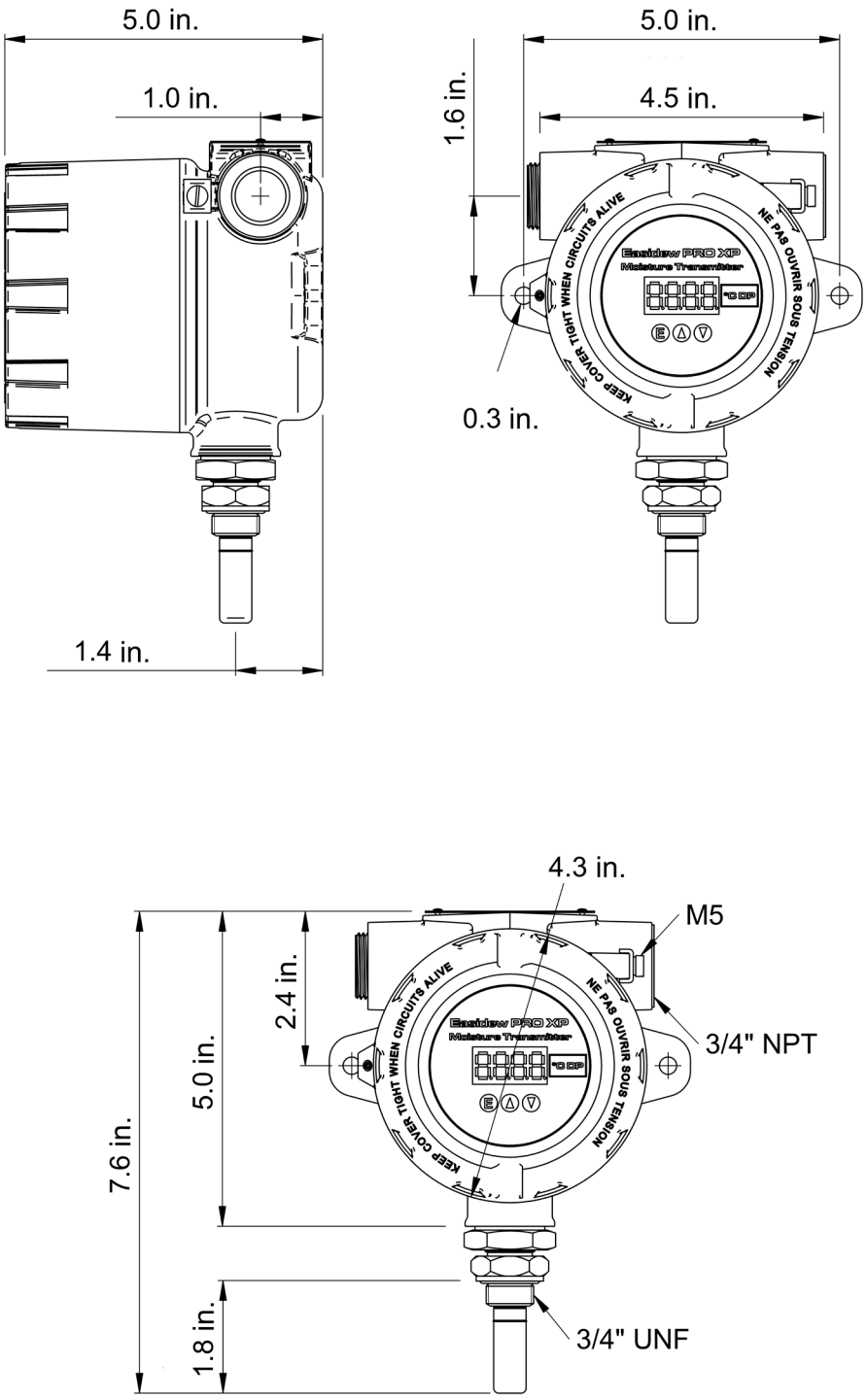


Figure 3 *Dimensions Easidew PRO XP EX2 (Display) - Wall Mounting*

2.1.2 Pipe Mounting

The Easidew PRO XP can be supplied with a pipe mounting bracket as an optional accessory, which allows the transmitter to be installed onto pipe up to 2 inch (51mm) diameter.

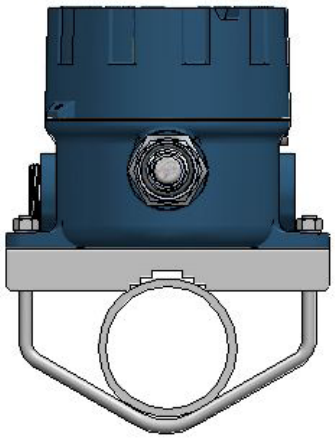


Figure 4 *Transmitter Mounting - Pipe or Duct*

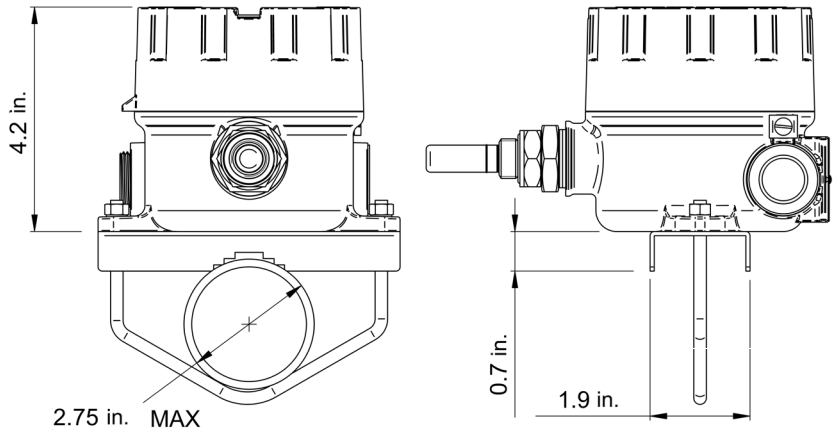


Figure 5 *Outline Dimensions - Pipe or Duct (Non-Display)*

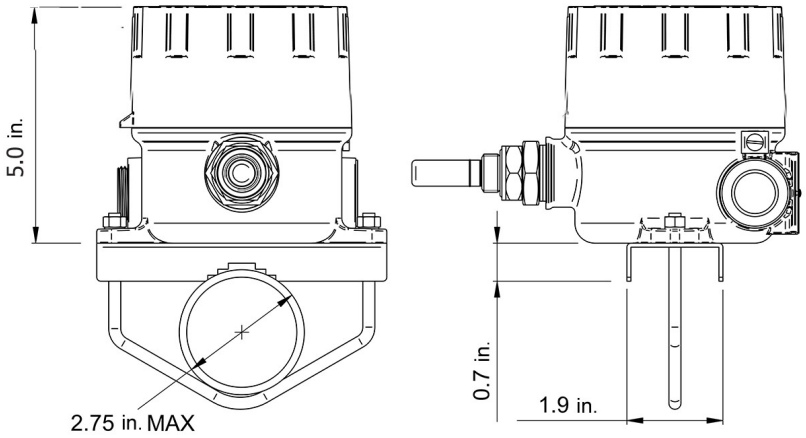


Figure 6 *Dimensions Easidew PRO XP EX2 (Display) - Pipe or Duct*

2.2 Gas Media Process Connection

The Easidew PRO XP transmitter can be mounted in any orientation for the following:

- inserted into a pipe or duct
- inserted into a flow-through sample block (optional).

It can be operated up to 6500 psig (450 barg) when installed correctly.

If the installation is NOT into a Kahn sample block please take note of the following to insure correct installation is undertaken.

The following procedure must be carried out by a qualified engineer to insure the safe operation of the pressure system.

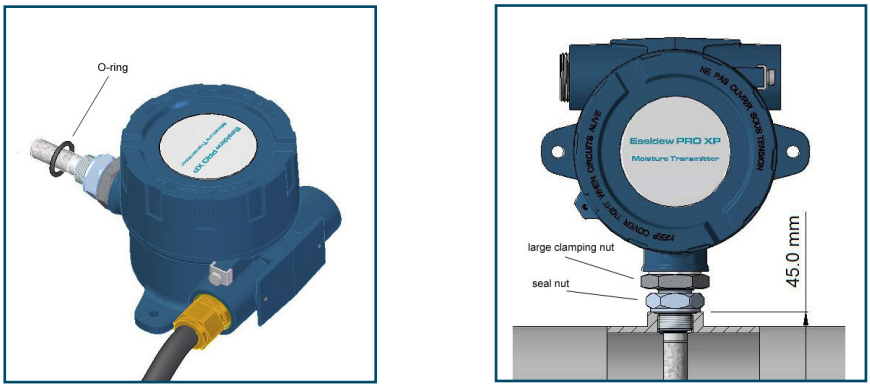


Figure 7 *Transmitter Direct Mounting*

1. Insure the O-ring is located correctly within the O-ring groove of the process connection and that there is no contamination or debris on its exposed surfaces.
2. Insure that the sealing face of the transmitter mounting is normal to the thread 0.003 in./1 in. (0.08mm/25mm) run.
3. Insure that the O-ring mating sealing surface is 0.8 Ra (0.8µm) or better.
4. Insure that the mating connection thread is cut to the correct size (¾ in. UNF x 16) with a minimum chamfer of 0.04 in. (1mm).
5. Screw the transmitter into the sample block and, while holding the block, tighten the seal nut to 29.5 lb-ft (40Nm) to compress the O-ring.

6. Rotate the enclosure to the desired position (up to 360° available) and tighten the large clamping nut 1¼ in. (32mm) to 7.4 lb-ft (10Nm) to insure the dowty seal is correctly compressed for environmental protection (see Appendix B.1).

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

The Easidew PRO XP is fitted with a mechanical stop to prevent the accidental over-rotation of the enclosure assembly that would damage the internal sensor wiring.

2.3 Liquid Media Process Connection

When mounting the Easidew PRO XP into a liquid sample the flow rate must be between 0.2 and 0.6 scfh (0.1 and 0.3 l/min).

Consideration should be taken regarding draining the sample fluid at times when the transmitter needs to be removed for maintenance or calibration.
Consideration should be taken regarding draining the sample fluid at times when the transmitter needs to be removed for maintenance or calibration.

It would be beneficial for the Easidew PRO XP to be mounted in a vertical position (with the sensor pointing down) to allow for easy removal when necessary.

2.3.1 Sample Block (Optional)

The following procedure must be carried out by a qualified engineer to insure the safe operation of the pressure system.

1. Remove the green protective cap and desiccant capsule.
2. Insure the O-ring (see *Figure 8)* is located correctly within the O-ring groove of the process connection and there is no contamination or debris on its exposed surfaces.
3. Screw the transmitter into the sample block and, while holding the flats on the block, tighten the seal nut to 29.5 lb-ft (40Nm) to compress the O-ring.
4. Rotate the enclosure to the desired position (up to 360° available) and tighten the large clamping nut 1¼ in. (32mm) to 7.4 lb-ft (10Nm) to insure the dowty seal is correctly compressed for environmental protection (see Appendix B.1).

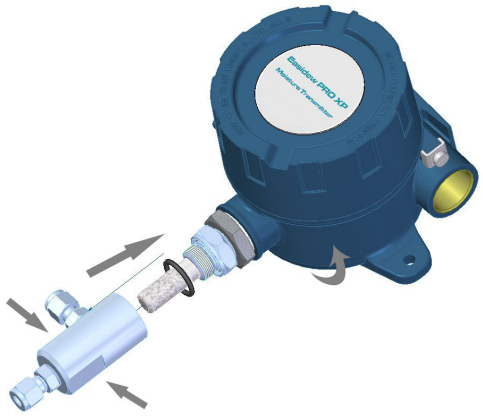


Figure 8 *Transmitter Mounting - Sample Block*

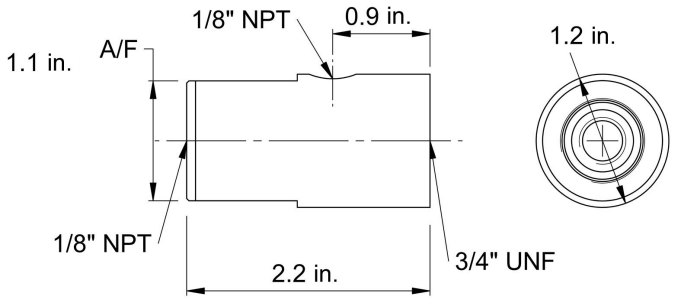


Figure 9 *Outline Dimensions - Sample Block*

2.3.2 Orientating the display

The display can be oriented at 90, 180, 270 or 360º intervals to the process connection.

The procedure to change the orientation of the display is as follows:

- Unscrew the lid from the enclosure
- The display module is located onto two pillars mounted to the base
- Receivers on the underside of the display module are mounted at 90° intervals
- Choose the required display orientation, and ensure that the display is properly located onto the pillars
- Screw the lid back onto the enclosure

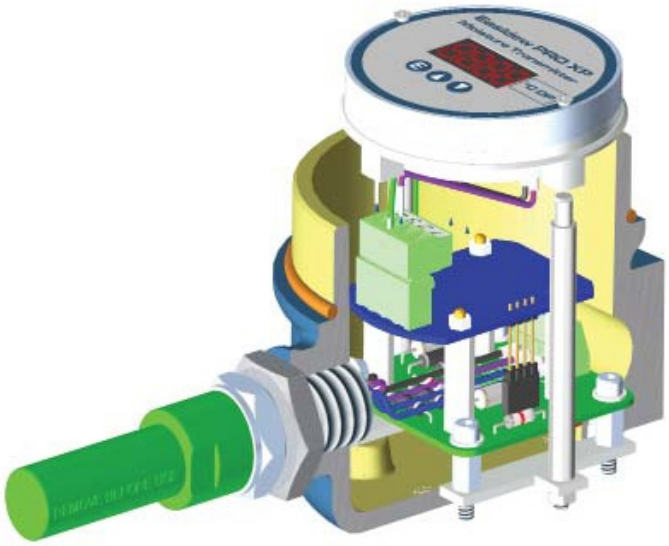


Figure 10 *Orienting the Display*

2.4 Hazardous Area Safety

Appendix B of this manual refers to the Hazardous Area Certification of this product.

This product is equipped with a marking label that contains Hazardous Area information pertinent tothe suitable location and installation.

During all installation and operation activities local regulations and permitted working routines must be observed. Installation should only be performed by competent personnel and in accordance with IEC/EN 60079-14:latest version or local equivalent.

This product is supplied with quantity 1 multi-national approved Exd Stopping Plug. Other suitably Exd approved Stopping Plugs may be used at the choice of the installer.

The installation of Easidew PRO XP will require the use of a suitably approved Exd rated Cable Gland. The Cable Gland is not supplied and the specific type/size must be selected at the choice of the installer and to suit the type of connecting cable used. The Cable Gland may be fitted to either of the Gland entry ports.

For the convenience of the installation process the Stopping Plug supplied is only loosely fitted so that it may finally secured to the spare port opposite the Cable Gland after the Cable Gland installation has been completed. A Stopping Plug must be fitted to the spare port.

The Cable Gland and Stopping Plug must be tightly fitted without the use of any sealing tape or sealing compounds and in accordance with local regulations.

Cable glands / conduit seals shall be installed in accordance with the manufacturer's instructions.

Conduit seals used should be suitable for a reference pressure of 89 psi (6.1 bar).

Repair and servicing of this equipment must only be carried out by the manufacturer.

Supplied separately to the manual is an Installation and Maintenance Information Sheet.

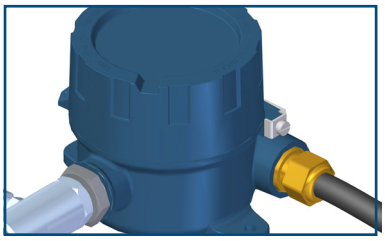
WARNING:
This product is Certified safe for use in a Zone 1 21, and Zone 2 & 22 and Class I, Zone 1 and Class I, Division 1 area only. This product must not be installed or used within a Zone 0 area.

WARNING:
This product must not be operated within and explosive atmosphere greater than 16 psia absolute (1.1 bar).

WARNING:
This product must not be operated with enriched oxygen gas samples
(more than 21% oxygen content).

WARNING:
This product must not be operated outside of the temperature range of -40 and +140 ^{0}F (-40 and +60 ^{0}C).

WARNING:
The enclosure of this product provides Exd protection, partly through the threads used for mounting the lid, stopping plugs and cable gland. At all times effort should be made to ensure these threads are suitably protected from damage and that only apporpriately rated mating parts are applied to them, in accordance with the certifying requirements.



The protective ground terminal is mounted externally and the ground wire connected to it should never be disconnected. The product enclosure is supplied with a 0.2" (5mm) diameter external ground connection at the lower right hand side. At installation, connect this ground connection to a paln y ground by a minimum 0.16 in^2 (4mm^2) .

This product is designed where applicable and possible, to be in compliance with EN/BS/IEC61010 safety requirements or electrical equipment or measurement, control and laboratory use. This product is designed to be safe at lease under the following conditions: between a temperature range of +23 to +104^{0}F (-5 to +40^{o}C)., in maximum 80% relative humidity for temperatures up to +88^{0}F (+31^{0}C) decreasing linearly to 50% RH at +122^{0}F (+50^{0}C). Supply voltages of $\pm$ 10% and transient over voltages up to Overvoltage Category II. Polution Degree 2. Altitudes p to 6000 feet/ 2000 m. Outdoor mounting is permitted using suitably rated glands equivalent to NEMA 4 / IP66. See Appendix A, Technical Specification, for full operating parameters.

NOTE: Do not remove or exchange any of the calbes or electrical components supplied with this product. Doing so will invalidate all warranties.

Refer to the relevant sections of this manual for the location and mounting details.

Installation of this equipment should include the provision of a suitable and locally positioned power isolation switch or circuit breaker. Indication of the purpose of the switch or circuit breaker is strongly recommended. An over-current protection device should be rated to a miximum of 3 A.

Insure this equipment and all power isolation devices are installed in a location and position that allows safe and easy access to their operation and is adequate to rigidly support the equipment.

Do not install this equipment in a location that would expose it impact or high levels of vibration.

Operation of this equipment, other than in a manner as specified by the manufacturer, may impair the safety protections provided.

The safe installation of this equipment and any system incorporating this equipment is the responsibility of the installer. Insure local regulations and requirments are referred to prior beginning to any installation.

2.5 Electrical Safety

WARNING:
During the installation of this product insure that all applicable national and local electrical safety regulations are observed.

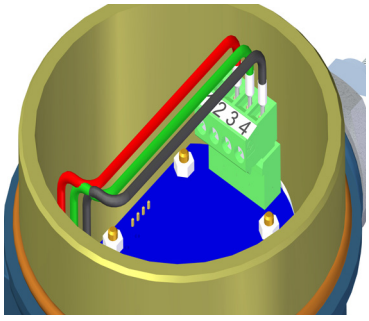
WARNING:
Isolate the power prior to installation.

WARNING:
Always insure that power is switched off prior to accessing the product for any purpose other than normal operation or prior to disconnecting any cables.

In compliance with IEC 61010 Electrical Safety Standard the following applies to this product:

2.5.1 Equipment Ratings and Installation Details

This equipment must be supplied with a voltage between the range of 14 to 28 V DC. Maximum power rating is 1 W.



The power is connected via PL2 on the pcb.

The input and output connector is a 2-part pcb mounted type, rated at 300 V, 10 A.

The detachable screw terminal half of each connector is designed to accept 0.02-0.09^2" (0.05-2.5mm^2) [24 - 12 AWG] stranded or solid conductors (non-display version only.)

Any power connecton cable should have a minimum 0.02" (0.5mm) insulation and be rated at 300 V. Insure the power supply can deliver sufficient power consumption requirement.

Insure any power suply terminals and voltages are suitably separated from the other I/O requirements of this product.

Before applying power, perform a continuity test to insure that the power supply screen and product are effectively connected to a suitable ground.

2.6 Pressure Safety

WARNING:

This product is used in conjunction with pressurized gases. Observe pressurized gas handling precautions.

WARNING:

Pressurized gas is dangerous. Pressurized gas should only handled by suitably trained personnel.

The Easidew PRO XP requires pressurized gas to be connected to it. bserve pressurized gas handling regulations and only suitable trained personnel should carry out task that include the use of pressurized gas mediums.

DO NOT permit pressures greater than the safe working pressure to be appied to the instrument. The specified safe working pressure for this instrument is 450 barg (6525 psig) max.

2.7 Electrical Schematic

2.7.1 Easidew PRO XP EX1 (Non-Display)

NOTE: To insure compliance with EMC standards, insure that the screen of the power supply/signal cable or the power supply/signal conduit is connected to ground.

With the cable entry option, a conductive cable entry gland is recommended, allowing the transmitter housing to be grounded via the cable screen connection.

Always connect the 4-20 mA return signal to a suitable load (see *Figure 12)* before the power is applied. Without this connection, the transmitter may be damaged if allowed to operate for prolonged periods.

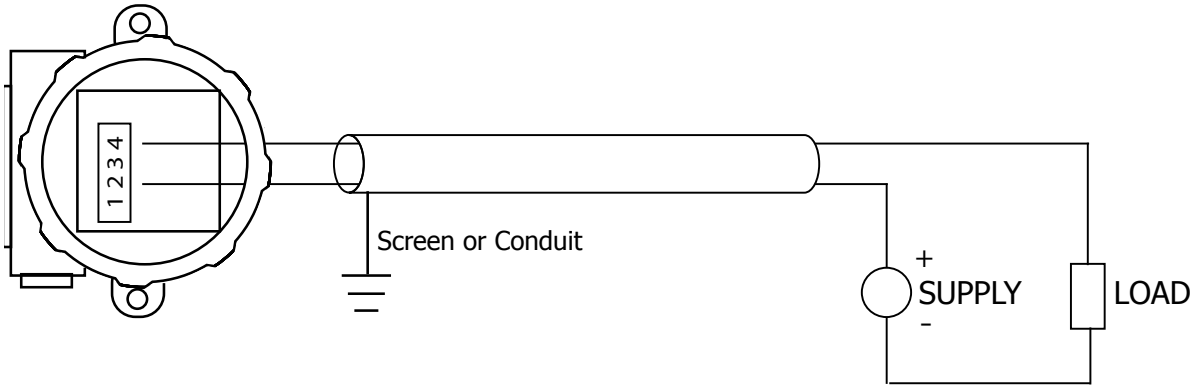


Figure 11 Electrical Schematic - Easidew PRO XP EX1 (Non-Display)

2.7.2 Easidew PRO XP EX2 (Display)

NOTE: To insure compliance with EMC standards, insure that the screen of the power supply/signal cable or the power supply/signal conduit is connected to ground.

With the cable entry option, a conductive cable entry gland is recommended, allowing the transmitter housing to be grounded via the cable screen connection.

Always connect the 4-20 mA return signal to a suitable load (see *Figure 12)* before the power is applied. Without this connection, the transmitter may be damaged if allowed to operate for prolonged periods.

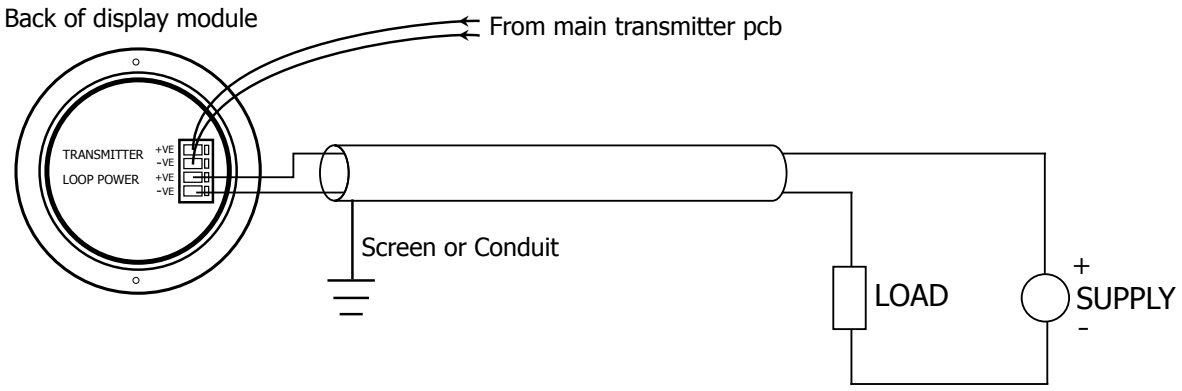


Figure 12 Electrical Schematic - Easidew PRO XP EX2 (Display)

2.7.3 Electrical Boundaries

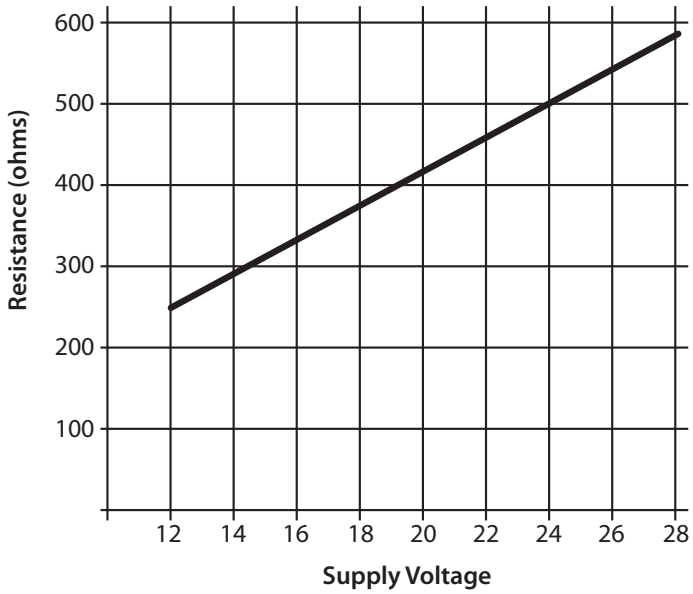


Figure 13 Maximum Load of Easidew PRO XP - Including Cable Resistance

2.8 Preparation of the Sensor Cable

The sensor cable is not supplied with the Easidew PRO XP, but there are quantity 2 ferrules supplied. Maximum conductor size is 0.75mm².

Correct preparation of the cable conductors is essential to insure a reliable connection to the sensor terminals.

1. Strip the insulation from each conductor to 8mm, without damaging any wire strands.
2. Using a crimping tool to correctly attach each ferrule.

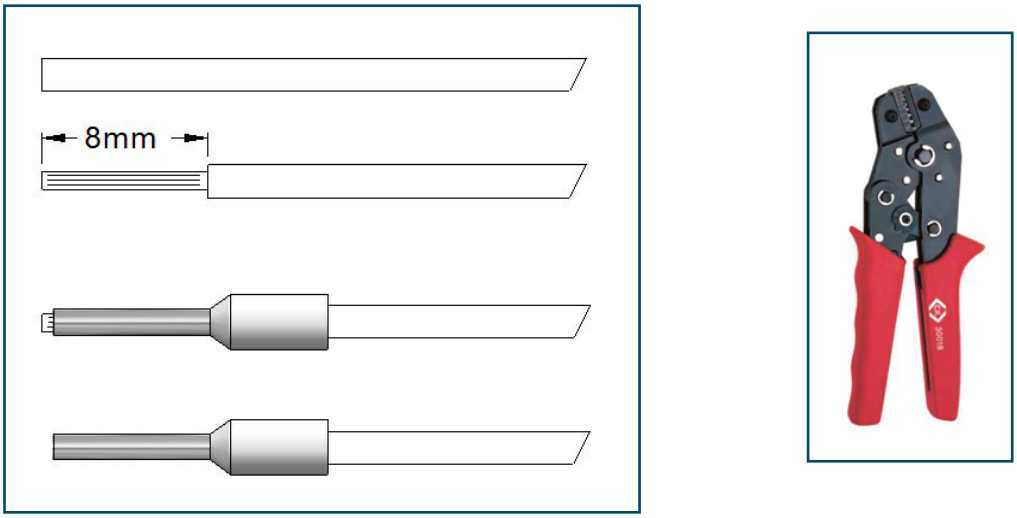


Figure 14 Wire and Crimp Details

2.8.1 Terminal Block Connection - Easidew PRO XP EX1 (Non-Display)

1. Remove the enclosure lid by carefully unscrewing counter-clockwise
2. Remove the 4-way terminal block from its header on the pcb, being careful not to put any strain onto the ground wire already attached.
3. Mount each of the power and return wires into positions 2 and 4 as shown, and tighten with a flat-blade screwdriver (min torque 0.2 lb-ft (0.25Nm)).

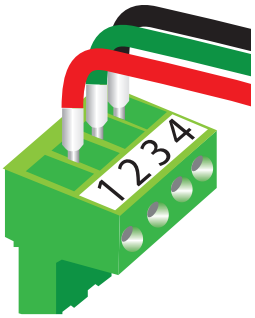


Figure 15 Terminal Block Connection - Easidew PRO XP EX1 (Non-Display)

4. Plug the terminal block back into the header.

5. Reattach the enclosure lid in a clockwise direction until it stops and secure in place by tightening the set screw with a 0.6" (1.5 mm) A/F Allen key.

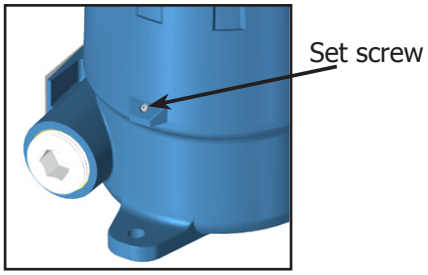
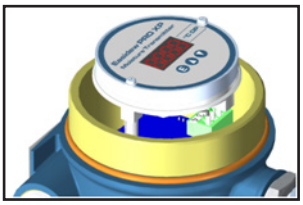


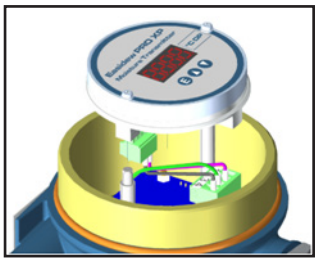
Figure 16 Set Screw

2.8.2 Terminal Block Connection - Easidew PRO XP EX2 (Display)

1. Remove the enclosure lid by carefully unscrewing counter-clockwise.



2. Lift off the display meter and integral mounting bracket from the 2 mounting posts and disconnect the terminal block connector from the underside.



3. Mount each of the power and return wires into positions +VE and -VE as shown, and tighten with a straight screwdriver (min torque 0.2 lb - ft/ 0.25Nm).

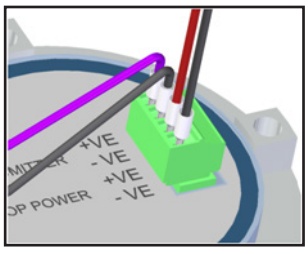


Figure 17 Terminal Block Mounting - Easidew PRO XP EX2 (Display)

4. Plug the terminal block back into the underside of the display meter and drop it back onto its posts. Align the display meter in relation to the housing, as required.

5. Reattach the enclosure lid in a clockwise direction until it stops and secure in place by tightening the set screw with a 0.06" (1.5mm) A/F Allen key.

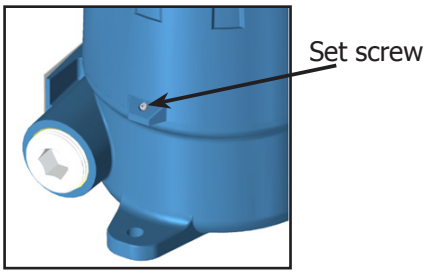


Figure 18 Set Screw

3 OPERATION

3.1 Measurement and Configuration

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

Dew point	-166 to +68°F (-110 to +20°C)
Moisture content in gas	0 - 3000 ppm_V (and equivalent lbs. / MMSCF, mg / m^3)
Moisture content in liquids	0 - 1000 ppm_W

The Easidew PRO XP can be purchased factory configured as required. Alternatively, the Easidew PRO XP can be configured by the customer, using the Easidew XP Communications Kit (XP-CK) and Easidew Application Software. The Easidew Communications Kit can be purchased from Kahn Instruments. For a free copy of the Application Software contact Kahn Instruments (www.kahn.com).

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

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

The transmitter requires a 6-point look-up table for saturation constants up to 1000 ppmW over the temperature range +32 to +122°F (0 to +50°C). Saturation constants for 8 common liquids can be programmed into the Easidew PRO XP via the Application Software. Alternatively, the user can program saturation constants manually. The Application Software Help file provides detailed instructions on how to perform this task.

Easidew PRO XP EX2 (Display) Only

The display meter is simple in design and is a slave display to the measurement and configuration of the main transmitter pcb. It can be scaled linearly equating to the circulating 4-20 mA signal output from the main transmitter pcb.

In order to re-configure the display, the enclosure lid should be removed by unscrewing it in a counter-clockwise direction.

Care should be taken when unscrewing and replacing the enclosure lid as the threads form an important part of the Ex compliance regulations and therefore must not be damaged.

The lid must be replaced after using the display meter and the set screw tightened.

A full explanation of the operation and configuration of the integral display meter is detailed in Appendix D.

3.2 Sampling Hints

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

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

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

Minimize Dead Space in Sample Lines:

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

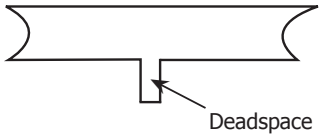


Figure 19 Indication of Dead Space

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 propection. For more demanding applications Kahn Instruments offers a range of sampling systems (for more information contact www.kahn.ocm).

Use High Quality Sample Tube and Fittings:

Kahn 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 tubing or pipe wlals, slowing down repsonse 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 and work within the maximum pressure rating of this 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 (particularly solar radiation during daylight hours).

4 MAINTENANCE

The power to the enclosure must be turned off before any work is carried out in the measurement system enclosure.

Observe de-energize durations.

Gas line connections to the measurement system must be isolated and de-pressurized before any work commences.

4.1 Calibration

Routine maintenance of the Easidew PRO XP is confined to regular re-calibration by exposure of the transmitter to sample gases of known moisture content to insure that the stated accuracy is maintained. Calibration services traceable to the US *National Institute of Standards and Technology* (NIST) are provided by Kahn Instruments.

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

4.2 Sensor Guard Replacement

The sensor is supplied with either a stainless steel sintered or HDPE guard.

The stainless steel guard provides >80µm protection to the dew-point sensor, whereas the HDPE protects to >10µm. 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 minimize touching the guard which should be handled by the threaded part. Replacement guards can be obtained by contacting Kahn Instruments (www.kahn.com) or your local distributor.

Please note the sensor tile should not be touched.

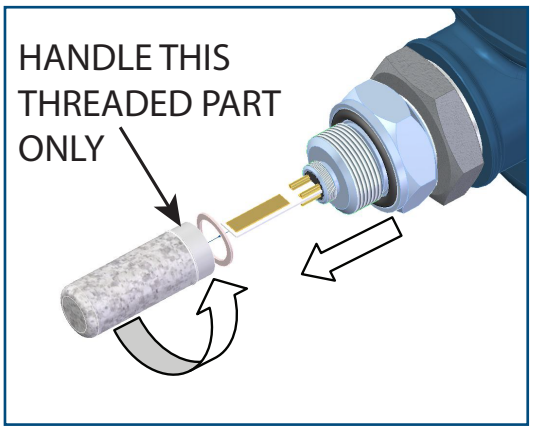


Figure 20 Replacement of Sensor Guard

4.3 Display Replacement

1. Unscrew the locking screw on the enclosure cap with a 1.5mm Allen key.
2. Unscrew the cap, lift the display and mounting ring clear from the quantity 2 mounting pillars, and unplug the connector.

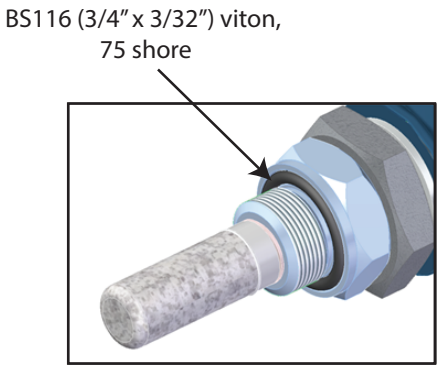
3. Remove the quantity 2 small screws holding the display onto its mounting ring. Lift the display clear.

4. Re-assemble as above, in reverse order, being careful not to overtighten the screws. Insure that the connector is fully mated.
5. Reattach the enclosure cap and tighten the locking screw.
6. The display is supplied with a default configuration. Refer to Appendix D.4 'Re-configuration Steps' if required.

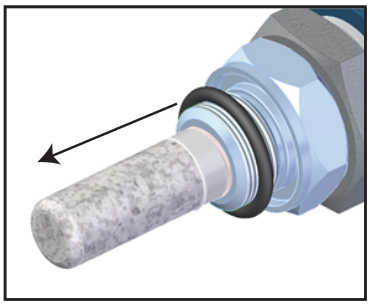
4.4 O-Ring Replacement

Do not touch the filter with bare hands

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



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

Product	Easidew PRO XP for Gases	Easidew PRO XP LQ for Liquids
Performance Specifications		
Measurement Range	-166 to +68°Fdp (-110 to +20°Cdp) -148 to +68°Fdp (-100 to +20°Cdp)	0 to 1000 ppm_W Non-standard available upon request
Accuracy	±1.8°F (±1°C) dew point +68 to -76°F (+20 to -60°C) ±3.6°F (±2°C) dew point -76 to -166°F (-60 to -110°C)	
Response Time	5 mins to T95 (dry to wet)	
Repeatability	±0.9°Fdp (0.5°Cdp)	
Calibration	Traceable 13-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 in ppm_V	Moisture content
Analog Output Scaled Range	Dew point -166 to +68°F (-110 to + 20°C) Moisture content in gas: 0 to 3000 ppm_V , Non-standard mg/m^3, lbs/MMSCF, natural gas	Moisture content in liquid: 0 to 1000 ppm_W Non-standard available upon request
Supply Voltage	14 to 28 V DC	
Load Resistance	Max 250 Ω @ 14 V (500 Ω @ 24 V)	
Current Consumption	23 mA (depending on signal output)	
Saturation Constants (for moisture in liquids measurements only)		6-point look-up table for saturation constants up to 1000 ppm_W over the temperature range +32 to +122°F (0 to +50°C) Saturation constants for 8 common liquids can be programmed into the Easidew PRO XP LQ via the Application Software Alternatively, the user can program saturation constants manually
Operating Specifications		
Operating Temperature	-40 to +140°F (-40 to +60°C)	
Operating Pressure	6500 psig (45 MPa / 450 barg) max	

Product	Easidew PRO XP for Gases	Easidew PRO XP LQ for Liquids
Flow Rate	2.1 to 10.6 scfh (1 to 5 Nl/min) mounted in standard sampling block 0 to 32.8 fps (0 to 10 m/sec) direct insertion	0.2 - 0.6 cfh (0.1 -0.3L/min through Easidew sample block 0.3 to 3 f/s (0.1 to 1.0 m/s) direct insertion
Temperature Coefficient	Temperature compressed from -4 to +120^{0}F (-20 to +50^{0}C)	
Mechanical Specifications		
Ingress Protection	NEMA 4 in accordance with standard NEMA 250-2003 IP66 in accordance with standard BS EN 60529:1992	
Canadian Pressure Vessel Cert	C.R.N. - all Canadian provinces	
Housing Material	**Standard:** Aluminum (copper free), epoxy and polyurethane powder coated, blue RAL 5009 **Optional:** 316 stainless steel (supplied with BS EN 10204 3.1 material certification if option F2 requested) ATEX, IECEx and QPS	
Dimensions	Refer to diagrams in Section 2.1.1	
Filter (Sensor Protection)	**Standard:** Stainless steel sintered guard (for protection against fine particulate >80µm) **Optional:** HDPE guard (for protection against fine particulate >10µm)	
Process Connection & Material	3/4" - 16 UNF with recessed Viton® O-ring 316 stainless steel	
Weight	Aluminum: 3.5lbs (1.6kg) 316 stainless steel: 5.3lbs (2.4kg)	
Electrical Connections	Dual 3/4" NPT gland	
Diagnostic conditions (factory programmed)	**Conditions Output** Sensor fault 23 mA Under-range dew point 4 mA Over-range dew point 20mA	
Display Meter		
Programmable Display Range	**Optional**: -1999 to +9999	
Programmable Decimal Point	**Optional**: 0 to 3 decimal places	
Overload Limits	**Optional**: 3.6 mA & 20.4 mA	
Programmable Display Scales	**Optional**: °C, °F, %, No scale	

Appendix B

Hazardous Area Certification

Appendix B Hazardous Area Certification

The Easidew PRO XP is certified compliant to the ATEX Directive (2014/34/EU) and IECEx for use within Zone 1 & 2 and Zone 21 & 22 Hazardous Areas and has been assessed so by SIRA Certification (Notified Body 0518).

The Easidew PRO XP is certified compliant to the North American Standards (USA and Canada) for use within Class I, Division 1, Groups A, B, C & D, Class II and III, Division 1, Groups E, F & G, Class I, Zone 1 & Zone 21 Hazardous Locations and has been assessed so by cCSAus prior to November 1, 2019 and cQPSus after November 1, 2019.

B.1 Product Standards

This product conforms to the Standards:

EN60079-0:2018
EN60079-1:2014
EN60079-11:2012
EN60079-31:2014
FM Class 3600.2018
FM Class 3610.2010
FM Class 3615.2018
FM Class 3616.2011
IEC 60079-0:2017
IEC 60079-1:2014-06
IEC 60079-11:2011
IEC 60079-31:2013
CAN/CSA-C22.2 No. 25-2017
CAN/CSA-C22.2 No. 60079-0:19
CAN/CSA-C22.2 No. 60079-1:16
CAN/CSA-C22.2 No. 60079-11:14
CAN/CSA-C22.2 No. 60079-31:15
ISA 60079-0:2013
ISA 60079-1:2009 (R2013)
ISA 60079-11:2014
ISA 60079-31:2015
CSAC22-2 No. 61010-1:12
UL 61010-1 3rd

B.2 Product Certification

This product is attributed with the product certification code:

	Standard: Aluminium	**Optional: 316 stainless steel**
ATEX:	II 2 GD Exdb [ia] IIC T6 Gb Ex tb IIIC T80^{0}C Db IP66 Tamb -20^{0}C to +70^{0}C	II 2 GD Exdb [ia] IIC T6 Gb Ex tb IIIC T80^{0}C Db IP66 Tamb -20^{0}C to +70^{0}C
IECEx:	Exdb [ia] IIC T6 Gb Ex tb IIIC T80^{0}C Db IP66 Tamb -20^{0}C to +70^{0}C	Exdb [ia] IIC T6 Gb Ex tb IIIC T80^{0}C Db IP66 Tamb -20^{0}C to +70^{0}C
cQPSus:	CLS I, Div1, GRPS ABCD T6 CLS II & III, Div 1, GRPS EFG CLS I, Zone 1 AEx/Exdb [ia] IIC T6 Tamb -20^{0}C to +70^{0}C	CLS I, Div1, GRPS ABCD T6 CLS II & III, Div 1, GRPS EFG Tamb = -20^{0}C to +70^{0}C

B.3 Global Certificates/Approvals

ATEX	SIRA14ATEX1007X prior to November 1, 2019
ATEX	CML 19ATEX1411X after November 1, 2019
IECEx	IECEx SIR 14.0004X prior to November 1, 2019
IECEx	CML 19.0149X after November 1, 2019
cCSAus	2679645 prior to November 1, 2019
cQPSus	LR1507-3 after November 1, 2019
INMETRO	NCC 14.03240 X

These certificates can be viewed or downloaded from our website at:
http://www.kahn.com

B.4 Special Conditions

1. The equipment has been assessed with a U_m of 28V and shall be installed in accordance with the latest installation requirements of IEC/EN 60079-14 for intrinsically safe equipment for EPL "Gb".
2. The transmitter shall not be installed in such a manner that the sensing probe is in a dust environment.
3. WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD. The equipment must only be wiped with a damp cloth.
4. When installing the transmitter a torque of 10 Nm must be applied to the sensor body/housing positioning lock nut to secure it. See manufacturer's instructions for further details.

B.5 Maintenance and Installation

The Easidew PRO XP 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 Kahn Instruments.

Appendix C

EC Declaration of Conformity

Appendix C EC Declaration of Conformity

EU Declaration of Conformity

MICHELL Instruments

Manufacturer: Michell Instruments Limited

Address: 48 Lancaster Way Business Park
Ely, Cambridgeshire
CB6 3NW. UK.

CE

Equipment Type: **Easidew PRO XP -Ex1 & -Ex2 Dew-point Transmitter**

Directive 94/9/EC ATEX & **Directive 2014/34/EU ATEX** (effective date 20th April 2016)

Provisions of the Directive fulfilled by the Equipment:

Group II Category 2 GD **Ex d [ia] IIC T6 Gb**
Ex tb IIIC T80°C Db IP66
Tamb -20°C to +70°C

Notified Body for EC-Type Examination
SIRA Certification, Chester. UK. Notified Body No. 0518

Notified Body for Production (QAN & QAR):
Baseefa, Buxton. UK. Notified Body No. 1180

EC-Type Examination Certificate:
Sira14ATEX1007X

Standards used:
EN 60079-0:2012
EN60079-1:2007
EN 60079-11:2012
EN60079-31:2009

IECEx

Certificate of Conformity No.

IECEx SIR 14.0004X (Issue No. 0) **Ex d [ia] IIC T6 Gb**
Ex tb IIIC T80°C Db IP66
Tamb -20°C to +70°C

Standards used:
IEC60079-0:2011
IEC60079-1:2007
IEC 60079-11:2011
IEC60079-31:2008

Other Directives

2004/108/EC EMC Directive & **2014/30/EU EMC Directive** (effective date 20th April 2016)
Is in conformity with the following Standard(s) or Normative Document(s):
EN61326-1:2006 *Electrical equipment for measurement, control and laboratory use - EMC requirements. Class B (emissions) and Industrial Locations (immunity).*

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).

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 above listed directives.

Andrew M.V. Stokes, Technical Director.
April 2016

ECD Easidew PRO XP Issue 04

Appendix D

Fully Programmable Loop Powered 4-Digit LED Display Meter

Appendix D Fully Programmable Loop Powered 4-Digit LED Display Meter

In order to re-configure the display meter, the enclosure lid should be removed by unscrewing it in a counter-clockwise direction.

Care should be taken when unscrewing and replacing the enclosure lid as the threads form an important part of the Ex compliance regulations and therefore must not be damaged.

The lid must be replaced after using the display meter, and the set screw tightened.

D.1 Display Meter Parameter Limits

The programmable display meter is designed for current loops of 4-20 mA. It is powered from the loop and does not require any other supply. The display can be configured by set-up menus to show physical values measured by the sensor.

Display will indicate low (-**LO**-) when the input current is lower than the overload limit (3.6 mA).

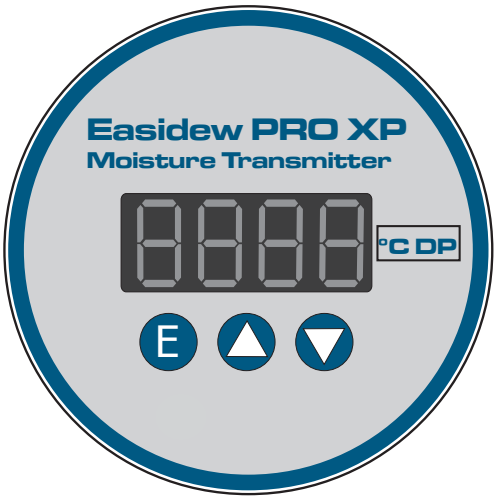
Display will indicate high (-**HI**-) when the input current is higher than overload limit (20.4 mA).

Display will indicate (----) when displayed value is <1999 or >9999.

D.2 Display Meter Operating Range

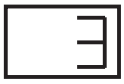
Operating Range	from 3.6 to 20.4 mA
Maximum Voltage Drop Out	3.7 V
Display LED	4 digits, height 9.5mm
Indication Limits	from -1999 to 9999
Variable Sampling Time	from 1 to 10 seconds

D.3 Display Meter View



D.4 Re-Configuration Steps

To enter menu press the **E** button for 2 seconds.

Displayed Text	Description
	Setting decimal point DP Press **E** button Press ▲ and ▼ buttons to change decimal position 1.234 (value 3) 12.34 (value 2) 123.4 (value 1) Factory default 1234 to decimal point (value 0) Press **E** button. Press ▼ to go to Zero Setting
	

Displayed Text	Description
	Setting low limit Zero (set-up of the low limit) Press **E** button Press ▲ and ▼ buttons to change the value between -1999 and 9999 *(the value chosen will be displayed at input current of 4 mA-point low)* **NOTE: For 1 decimal place resolution set this value to 10 times the actual required value, e.g. -1000 for -100.0 / -1100 for -110.0** Press **E** button. Press ▼ to go to Span Setting

Displayed Text	Description
	Setting high limit SPAN (setup of the high limit) Press **E** button Press ▲ and ▼ buttons to change the value between -1999 and 9999 *(the value chosen will be displayed at input current of 20 mA-point high)* **NOTE: For 1 decimal place resolution set this value to 10 times the actual required value, e.g. 200 for 20.0** Press **E** button. Press ▼ to go to Li Setting

Displayed Text	Description
	Setting overload limit Li (set-up of the overload limit) Press **E** button Press ▲ and ▼ buttons to change the value 0 for 4-20 mA the display shows -**LO**- when current < 4 mA and -**HI**- when current >20 mA 1 for 3.6 mA - 20.4 mA Factory default the display shows -**LO**- when current <3.6 mA -**HI**- when current >20.4 mA Press **E** button. Press ▼ to go to St Setting

Displayed Text	Description
St	**Setting sampling rate St** Press **E** button Press ▲ and ▼ buttons to change the sampling rate from 1 to 10 seconds 1 = Factory default Press **E** button. Press ▼ to go to Engineering Unit

Displayed Text	Description
Unit	**Set-up Engineering Unit** Press **E** button Press ▲ and ▼ buttons to select the unit - **nonE** - for no unit on the display (factory default setting) see D.5 - °C, °F, K, % *(There is a 6 second cycle* *- measured value is displayed for 4 seconds* *- the unit is displayed for 2 seconds)* Press **E** button

Exit from menu and save settings:

Press ▲ and ▼ buttons (possible from each page)

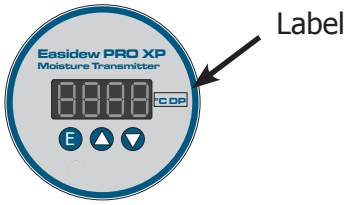
D.5 Moisture Scaling Label

The Easidew PRO XP has 3 standard ranges and scales which are as follows:

EA-XP-TX -110 to +20°Cdp output range
-100 to +20°Cdp output range

EA-XP-LQ-TX 0-3000ppm$_W$

The EA-XP-TX units will be configured for the range/scale ordered (as above) and will constantly display the measured value. The display meter will have a stick-on label defining the scale in °C DP.



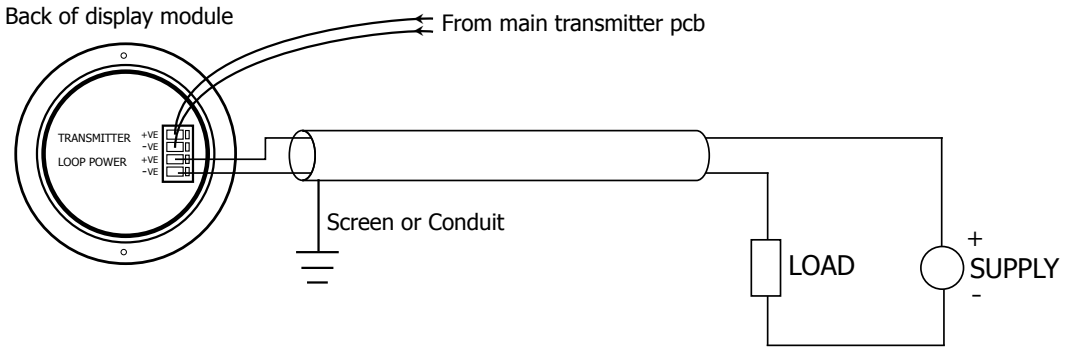
If ordered with a non-standard range/scale the unit could be set up with the following:

°F DP
lbs/MMSCF
ppm$_V$
ppm$_W$
mg/m^3

Alternatively, an Easidew PRO XP Communication Kit (XP-CK) can be used to change the range/scale and this Kit will be shipped with its own manual and 2 additional sets of scaling labels so that the label can be changed as required.

D.6 Technical Specifications - EX2 LED Display

The display meter is simple in design and is a slave display to the measurement and configuration of the main transmitter pcb. It can be scaled linearly equating to the circulating 4-20 mA signal output from the main transmitter pcb.



Performance	
Reference Operating Condition	25°C
Maximum Measured Error	0.1% of the programmed range ± 1 digit
Influence of Ambient Temperature (temp drift)	20 ppm / °C of measuring range at 20°C as reference temperature
Output Signal	4-20 mA
Supply Voltage	24 V (10 to 30 V)
Voltage Drop Out	3.3 V at 4 mA and 3.7 V at 20 mA
Minimum Current of LED Activation	3.6 mA
Digits	LED, 4 digits 7 segments, height 9.5mm
Display Characteristics	6400ucd for If=10 mA
Storage Period	10 years (non-powered)
Operating Conditions	
Ambient Temperature	-4 to +176°F (-20 to +80°C)
Storage Temperature	-22 to +176°F (-30 to +80°C)
Functionality	
Parameters	Zero, span, decimal, point, refresh rate, unit
Indication Limit	-1999 to +9999
Programmable Range	-1999 to +9999
Decimal Points Position	0, 1, 2, 3 decimals
Overload Limits	From 3.6 to 20.4 mA
Refresh Rate	From 1 to 10 seconds
Unit	°C, °F, K, % in cycle: 4 second value - 2 second unit
Mechanical Construction	
Electrical Loop Connection	2 terminals, max wire section 1mm^2 (16 AWG)