PURA

Pure Gas Dewpoint Transmitter

Users Guide

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KAHN INSTRUMENTS, INC.
885 Wells Road, Wethersfield, CT 06109
Tel: 860-529-8643; Fax: 860-529-1895
Internet: www.kahn.com
E-mail: info@kahn.com

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E-mail: info@kahn.com

1. PRODUCT OVERVIEW

The PURA is a continuous, on-line instrument for the measurement of moisture content in air and other gases over an operating range of -120°C to -40°C dewpoint. The PURA operates as a 4-20 mA transmitter providing a linear analog output to an external control or monitoring device, and is factory set over the range -120°C to -40°C dewpoint. However, the range can be adjusted using the PURA application software to be supplied with this instrument.

The Pura is supplied with a certificate of calibration traceable to the National Institute of Standards & Technologies (NIST).

2. PREPARATION

Upon receipt, please check that all the items listed under your particular model are present in the packing box:

PURA Premium
1) PURA Dewpoint Transmitter (Double bagged in an inert gas filled bag)
2) User Guide
3) Operating Manual
4) Leak check Certificate

PURA OEM
1) PURA Dewpoint Transmitter (Single bagged)
2) User Guide
3) Certificate of Calibration
4) Leak check Certificate

PURA Sensor
1) PURA Dewpoint Sensor Transmitter (with protective cover)
2) User Guide
3) Certificate of Calibration

3. INSTALLATION

The effective operation of the PURA, in a flowing gas environment, relies on the sensor being installed directly into the gas stream or by having a fully representative gas sample directed over the sensor measurement surface. Where possible avoid installing the sensor in a “dead” or unswept volume.

3.1 PURA Premium and OEM Dewpoint Transmitter Installation only

The PURA Premium has been assembled and packaged within a class 100 clean-room environment. To maintain this level of cleanliness the packaging should only be breached within the same or cleaner environment.

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Kahn Instruments recommends the use of *Swagelok®* retained gasket assemblies, containing silver plated, stainless steel ¼" VCR gaskets, when connecting the PURA into a gas line. The distance between the inlet and outlet gas connection ports is set at a pitch of 120mm.

Install the sealing gasket onto the VCR connections on either the PURA or the connecting gas lines. Insure that the PURA is installed in the gas line with reference to the gas flow direction and the inlet port as indicated on the PURA body. Tighten the female nut firmly finger tight. While holding the PURA stationary with a wrench, tighten the gas line nut 1/8 (one-eighth) of a turn using a second wrench. Repeat this operation on the remaining gas connection port.

CAUTION ***Over tightening the nuts can cause irrecoverable damage to the seals and seatings***.

3.2 PURA Sensor Dewpoint Transmitter Installation

The PURA Sensor is supplied with an open guard. It is recommended that this guard be removed before installation, since it is not manufactured to the same high level of surface finish as the sensor itself. Its purpose is to protect the measurement element of the sensor during handling.

Any use of the sensor with the guard attached will not affect the sensor accuracy but may induce an extended measurement response and provide an opportunity for moisture entrapment points, creating potentially false measurement of the sample.

It is recommended that the guard remain on until the sensor is ready to be installed into the point of measurement. Once removed, the guard should be retained and reinstalled as protection, should the sensor be removed from its point of installation e.g. for re-calibration.

CAUTION: ***Care should be used when withdrawing the guard from the sensor to insure that no contact is made with the sensor's measurement surface. Such contact can affect the performance of the sensor. Similarly, when inserting the sensor into the point of measurement, avoid contact with the sensor measurement surface. Any contact with the sensor measurement surface should be avoided.***

The PURA sensor installation interface is made by use of a ½" VCR sealing face on the body of the sensor. Effective installation can only be completed by mating this sealing face with a similar sealing face and via the use of a metal gasket.

Kahn recommends the use of *Swagelok®* retained gasket assemblies containing silver plated, stainless steel ½" VCR gaskets when connecting the PURA into a measurement point. Gaskets are available from Kahn.

Install the sealing gasket onto the sensor body of the PURA. Tighten the female nut firmly finger tight. While holding the PURA stationary with a wrench, tighten the connecting nut 1/8 (one-eighth) of a turn using a second wrench.

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CAUTION: ***Over tightening can cause irrecoverable damage to the seal and seatings.***

3.3 Sensor Electrical Connections (All models)

The sensor can be connected via the removable connector. The inner section of the connector can be removed by first withdrawing the central screw and then lifting out the terminal block with a small screwdriver. The sensor should be wired as shown in Fig 1 below.

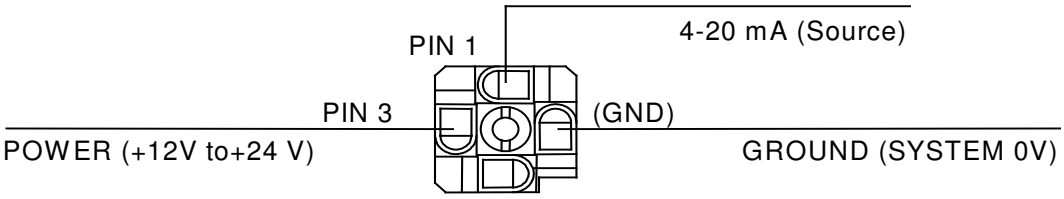

Fig 1. View on rear of connector terminal block

Cable is not supplied as standard, but can be supplied as an option. Standard cable lengths of 3 and 6 feet are available. Longer cable lengths can be supplied on request from Kahn. Alternatively, users can provide their own cable but must insure that it meets the requirements listed under Technical Specifications; see Appendix 1.

4. WHICH GASES TO MEASURE?

The PURA is suitable for measurement of the moisture content of a wide variety of gases. In general, if the gas (in conjunction with water vapour) is not corrosive to ceramics or base metals then it will be suitable for measurement by the PURA.

5. MAINTENANCE

Routine maintenance of the PURA is confined to regular re-calibration. This work can only be done by exposure of the PURA to sample gases of known moisture content. Calibration services traceable to the **N**ational **P**hysical **L**aboratory (UK), the **N**ational **I**nstitute of **S**tandards and **T**echnology (USA) are provided by Kahn Instruments. In most applications, annual re-calibration ensures that the stated accuracy of the PURA is maintained. PURA's are fully interchangeable. PURA interchangeability is not affected by cable length; therefore, this method of maintaining calibration can be used for all PURA installations. For applications where the PURA is not required for continuous operation, re-calibration of the PURA can be achieved by return of the complete instrument to Kahn Instruments.

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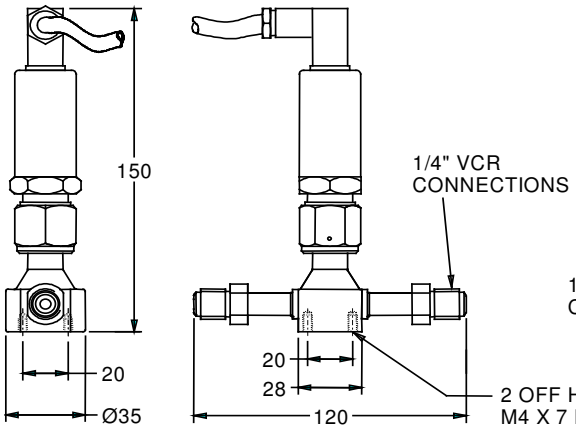

Fig 2. PURA Premium & PURA OEM

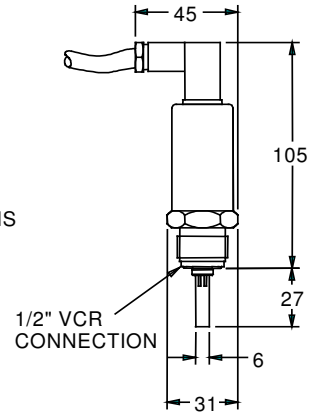

Fig 3. PURA Sensor

CAUTION: ***For the Pura Premium & Pura OEM models do not remove the sensor from the block. Doing so will invalidate the product warranty. The complete unit should be returned to Kahn Instruments for service / recalibration.***

6. FAULT CONDITIONS

Symptom	Cause	Action
1. Current output is 0mA constantly	Power failure	Check power supply to transmitter. Check cable for continuity/damage. Rectify/replace cable.
	Instrument failure	Refer to Kahn or your local representative for repair.
2. Current output is 4mA constantly	Sensor desiccated	Check gas source supply.
	Sensor contaminated	Replace/Recalibrate sensor
3. Current Output is 20mA constantly	Gas is wetter than -40°C dp.	Check gas source supply.
	Sensor contaminated	Replace/Recalibrate sensor.
4. Current Output is 23mA constantly	Instrument failure	Return to Kahn or your local representative for repair.

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APPENDIX 1 Technical Specifications

Type:	Kahn Ceramic Sensor
Calibration range:	-100 to -40°C dewpoint
Measurement range:	-120 to -40°C dewpoint
Power supply:	12 to 28 V DC (25 mA max)
Output:	4-20 mA current source over the entire dewpoint range
Dewpoint accuracy:	±1.0°C from -40 to -60°C ±2.0°C from -61 to -100°C ±4.0°C estimated from -101 to -120°C
Temperature Ranges:	Gas Temperature: -40 to +60°C Operating Environment: -20 to +50°C Storage Temperature: -40 to +75°C
Gas wetted surfaces:	316 Cold Drawn Stainless Steel, 0.25 micron electro-polished
Gas connection ports:	PURA Premium & PURA OEM ¼" VCR fixed Male ports
Installation profile:	PURA Premium & PURA OEM: 120mm between inlet and outlet sealing face PURA Sensor: ½" VCR Male
Temperature coefficients:	Temperature compensated from 0°C to +40°C
Operating pressure:	10^{-9} torr to 24 Mpa
Flow rate:	1 to 5 liters/minute
Traceable certification:	-75 to +20°C dewpoint traceable to the National Institute of Standards and Technology. [For dewpoints < -75°C: Direct reference to a fundamental optical hygrometer].
Environmental protection:	IP65
Weight:	PURA Premium & PURA OEM 450g PURA Sensor 180g

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Fault conditions:

Condition	*Output*	
Sensor fault	23 mA	Factory programmed
Under range dewpoint	4 mA	
Over range dewpoint	20 mA	

NOTE: The current output range and the fault conditions are user programmable. To enable re-ranging, a software and a Communications Kit are required. Software is available from Kahn Instruments.

Sensor Cable (Supplied separately on request):

A pair of 7/0.25 mm (22 a.w.g.) stranded tinned copper conductor insulated with polypropylene, twisted together with common tinned copper guard wire, wrapped in polyester tape and together with a second similar pair in a PVC outer sheath Max length 800 meters.

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