P/N 31427 - Low Range Dew Point Sensor

General Specifications:

Total Measurement Range:	-148°F to +32°F (-100°C to 0°C)
Optimal Measurement Range:	-112°F to -22°F (-80°C to -30°C)
Measurement Range for Analog Output:	-148°F to +32°F (-100°C to 0°C)
Accuracy (Within Optimal Range):	+/- 3.6°F (+/- 2°C)
Accuracy (Outside Optimal Range):	+/- 5.4°F (+/- 3°C)
Operating Temperature Range:	-40°F to +140°F (-40°C to +60°C)
Operating Pressure Range:	0-725 psi / 0-50 bar
Operating Humidity:	Non-Condensing
Calibration Interval:	One year
Sensor Housing Classification:	IP65 – NEMA4 (AISI316L)
Power Requirements:	24V DC
Current Consumption	20 mA (normal operation). Maximum consumption is 220mA pulsed.
Sensor Mounting:	½" Male Pipe Thread
Power / Communications Ports:	2 x 4-Pin M8
Communication Cable:	SSI P/N 31434 or equivalent

General Description:

This device is used to measure very low dew points with high accuracy and excellent long-term stability. It can be used across a wide range of temperatures and pressures, and it measures dew point in a variety of non-corrosive gases including Nitrogen, Argon, Hydrogen, and Sulfur Hexafluoride (SF6).

This sensor utilizes an advanced, patented measurement technology to ensure accurate measurement with excellent long-term stability. This results in very low maintenance requirements for the transmitter. The lasting performance is achieved with microprocessor technology and software that automatically performs self-diagnostic functions in addition to the normal dewpoint measurement. The self-diagnostic procedures that are conducted are called auto-calibration, sensor purge and sensor warming.

Auto-Calibration

The auto-calibration feature of the DMT152 transmitter is an automatic procedure which greatly reduces the possibility of drift in the dry end of the dewpoint measurement. The auto-calibration is performed:

- at 45 minute intervals
- when the transmitter is powered up
- when the measured environment changes rapidly

During auto-calibration the sensor is warmed for a short period (<1 min) and the sensor capacitance values are evaluated at the elevated temperature. The possible dry end drift is then corrected to correspond to the calibrated values. During the auto-calibration the transmitter outputs the dew point value that was measured prior to the procedure. When the auto-calibration is

done, normal measurement and output is resumed. Auto-calibration is carried out only if several criteria for the measurement environment are fulfilled. This ensures the reliability of the adjustments, and maintains the excellent long term stability that the patented technology offers.

Sensor Purge

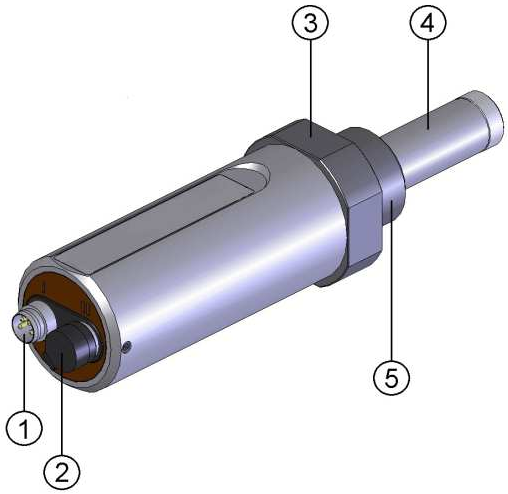
Sensor purge is also an automatic procedure that minimizes the drift at the wet end readings of the dewpoint measurement. Sensor purge is performed once a week or when the power is switched on. The sensor is heated for several minutes which will then evaporate all excess molecules out of the sensor polymer. This, together with the auto-calibration, results in a very small drift. Due to the very linear behavior of the polymer technology, corrections made at the dry end and the wet end correct the readings across the entire measurement range.

Sensor Warming

The tip of the sensor is warmed, which prevents the sensor and filter from becoming wet in high humidities. High humidity may be present when the dewpoint temperature rises close to the temperature of the measured gas. The advantage of sensor warming is the rapid response of dewpoint measurement. A wet sensor and filter would otherwise result in a dewpoint equal to ambient temperature (that is RH = 100 %). If the sensor gets soaked, it will recover fully back to normal operation after it dries out.

Sensor Technology:

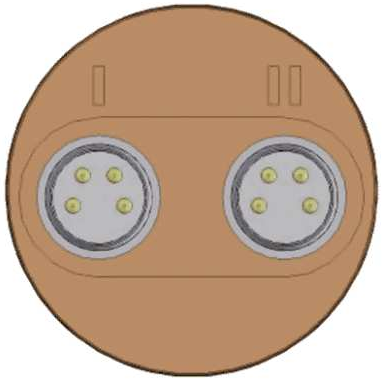
The dew point measurement is based on a capacitive thin film polymer. Water molecules in the surrounding air or gas diffuse into the polymer layer through the permeable upper electrode, which changes the capacitance of the sensor. Changes in capacitance can be directly correlated to the quantity of water molecules in the gas.

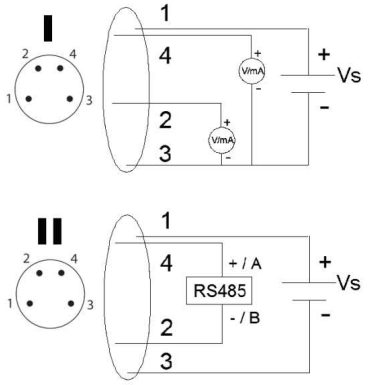


Product Description:

1	4-pin M8 connector I: analog output channels and operating power
2	4-pin M8 connector II (shown with protective cap): digital output (RS-485) and operating power
3	30mm nut
4	Sensor tip protected with stainless steel mesh filter
5	Connection thread: 1/2" Male NPT (use PTFE tape or PTFE paste sealant)

Note: The power supply lines are internally connected. You can use either one of them, but do not connect more than one supply voltage in permanent installations. Temporary simultaneous use with the USB serial interface cable or a handheld display is acceptable.





Pin No.	Port I Function	Port II Function	Wire Color
1	VDC Supply +	VDC Supply +	Brown
2	Output Voltage #1 + (Dew Point, 0-1VDC)	RS 485 -	White
3	GND	GND	Blue
4	Output Voltage #2 + (AutoCal Notification, 0-1VDC)	RS 485 +	Black

Sensor Installation

1. Remove the yellow transport protection cap from the transmitter. Do not touch the filter with your hands.
2. Apply PTFE tape or suitable paste sealant to the mounting threads.
3. Fasten the sensor into the measurement point. Use your hands to turn the probe until it feels tight.
4. Use a 30mm wrench to tighten the connection to 25 N m. If you do not have a 30mm wrench, use a 1 3/16" wrench or an adjustable wrench. Only tighten the probe from the 30mm nut. Do NOT apply force to other points in the probe body.
5. Connect the wires of the connection cable.
6. Cover the unused port on the sensor with the rubber plug that is attached to the sensor.
7. Turn on the power supply. The sensor performs self-diagnostics at start-up, and the output will be frozen for several minutes. The sensor will output an approximated reading after one minute, but accurate measurement will only be available after the start-up procedure is complete. Normal operation is typically achieved in 10 to 15 minutes. If the measurement environment changes during the startup, it may takelonger.

Leak Tightness and Materials

Due to the typically very low level of humidity, dewpoint measurements are sensitive to ambient moisture leaks. It is therefore important to have a leak tight sampling system construction. The system is likewise sensitive to diffusion of water molecules through the materials, as well as the absorption of moisture into the materials. The piping should preferably be made of metal, e.g. stainless steel with a good surface finish. Hygroscopic materials such as plastics are undesirable and should be avoided. Sample tubing should be as short in length as possible. "Dead ends" should be avoided. Also minimizing the number of connections helps in avoiding leaks.

Flow Rate

The sensor is not flow-dependent. The flow of the system is not critical to the measurement, although a higher flow makes the response time faster. Typically a flow of approximately 7 l/min (15 SCFH) is enough.