

DMT153 Dew Point Transmitter

For low dew point measurements



Features

- Measures dew point down to -80 °C (-112 °F) $T_{d/f}$
- Measurement accuracy up to $\pm 2\text{ °C}$ ($\pm 3.6\text{ °F}$) $T_{d/f}$
- Operating pressure up to 50 bar (725 psi)
- RS-485 digital output with Modbus® RTU support
- Voltage (V) and current (mA) analog outputs
- Compatible with Vaisala Indigo products and Insight PC software
- Withstands condensation
- Sensor purge and autocalibration features improve long-term stability
- Traceable calibration certificate included

Vaisala DRYCAP® Dew Point Transmitter DMT153 is designed for measuring low dew point, even down to -80 °C (-112 °F) $T_{d/f}$. DMT153 is the ideal choice for low-humidity industrial applications such as semiconductor and battery manufacturing, pure gas production, demanding compressed air systems, and applications using pure gases.

Increase yield by minimizing disruptions

Humidity-related disruptions in industrial production environments can significantly impact yield and operational efficiency. Accurate dew point monitoring with the DMT153 transmitter enables early detection of unwanted humidity. Minimizing unplanned downtime and maintaining stable process conditions ensures higher product quality, reduces maintenance needs, and maximizes overall productivity.

Consistent performance despite changing conditions

The DMT153 transmitter's fast response time allows for immediate detection of humidity changes, supporting timely process adjustments.

The DRYCAP sensor used in DMT153 tolerates condensing environments and is highly resistant to contamination, thanks to the sensor's purge functionality. The unique autocalibration feature minimizes drift and ensures long-term measurement accuracy.

Applications

Typical areas of use for DMT153 are semiconductor and battery manufacturing, pure gas production, demanding compressed air systems ¹⁾ and applications using pure gases.

Suitable installation locations of the compact DMT153 include, for example, ducts, pipes, glove boxes, vacuum chambers, gas sampling lines, equipment or production lines, and test chambers.

Flexible connectivity

The DMT153 transmitter provides several output options, including analog voltage and current outputs and digital RS-485 output with Modbus RTU protocol. It can be used as a standalone digital transmitter over an RS-485 serial bus, or connected to Vaisala Indigo transmitters. For easy access to field calibration, device analytics, and configuration functionality, the transmitter can be connected to Vaisala Insight software for Windows® or the Indigo80 handheld indicator. For more information, see vaisala.com/insight and vaisala.com/indigo.

¹⁾ Class 1 compressed air, as specified in the ISO 8573-1:2010 standard.

Technical data

Measurement performance

Sensor	DRYCAP® 180U
Dew point / frost point temperature ¹⁾	
Measurement range	-80 ... -20 °C (-112 ... -4 °F) $T_{d/f}$ (non-calibrated range -100 ... +20 °C (-148 ... +68 °F) $T_{d/f}$)
Accuracy: ²⁾	
-80 ... -40 °C (-112 ... -40 °F)	±2 °C (3.6 °F) $T_{d/f}$
-40 ... -20 °C (-40 ... -4 °F)	±3 °C (5.4 °F) $T_{d/f}$
Typical response time 63 % [90 %] at gas temperature +20 °C (+68 °F) and pressure of 1 bar:	
-20 ... -80 °C $T_{d/f}$	30 s [7.5 min]
-80 ... -20 °C $T_{d/f}$	2 s [5 s]
Typical long-term stability	Better than ±2 °C (3.6 °F) $T_{d/f}$ / year

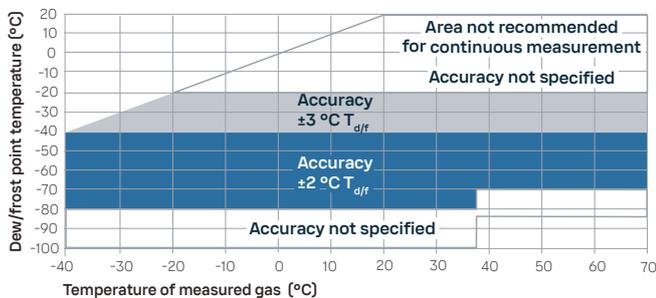
Available output parameters

Dew point / frost point temperature (°C or °F)
 Dew point temperature (°C or °F)
 Water concentration (ppm_v or ppb_v)³⁾
 Water mass fraction (ppm_w)³⁾

Other

Start-up time	1 min
Warm-up time	10 min (15 min to full specification)
Measurement cycle	1 s
Resolution	0.01 °C $T_{d/f}$ at digital output
SI-traceable calibration certificate	Yes, for range -80 ... -20 °C (-112 ... -4 °F) $T_{d/f}$

- 1) When the dew point temperature is below 0 °C, the transmitter outputs frost point temperature for $T_{d/f}$.
- 2) Including calibration uncertainty, hysteresis, non-linearity, and repeatability.
- 3) Calculated on a wet basis.



DMT153 accuracy over temperature range

Powering

Operating voltage	With RS-485 output: 11–28 V DC With analog output: 15–28 V DC At low temperature or high pressure: 21–28 V DC
Nominal voltage	24 V
Current consumption	Normal operation: 20 mA + load current During self diagnostics: max. 220 mA pulsed
Supply voltage fluctuation	Max 0.3 V 50/60 Hz AC rms

Operating environment

Operating environment	Indoor use
Use in wet location	No
Operating temperature	-40 ... +70 °C (-40 ... +158 °F)
Operating humidity	0–100 %RH (up to +20 °C (+68 °F)) ¹⁾
Operating process pressure	0–50 bar (0–725 psi), absolute
Measurement environment	For air, nitrogen, argon, helium, oxygen, and vacuum ^{2) 3)}
Sample flow rate	No effect on measurement accuracy
Storage temperature	-40 ... +60 °C (-40 ... +140 °F)
Storage humidity	0–90 %RH
IP rating	IP66 ¹⁾

- 1) Applicable to the transmitter body (excluding the sensor), with the probe connection cable properly connected.
- 2) Consult Vaisala if other chemicals are present. Consider safety regulations with flammable gases.
- 3) Not suitable for measurements in hydrogen or pure carbon dioxide.

Analog outputs

Number of analog outputs	2 (1 voltage, 1 current)
Selectable output types	0–5 V, 0–10 V, scalable 4–20 mA, 0–20 mA, scalable
Accuracy of analog outputs at +20 °C (+68 °F)	±0.01 V / ±0.01 mA
Temperature dependence	±0.005 %/°C
External loads	Current output: $R_L < 500 \Omega$ Voltage output: $R_L > 10 \text{ k}\Omega$

Digital communication

Serial communication	RS-485
Communication protocol	Modbus RTU

Mechanical specifications

Connector type	M12 5-pin A-coded male
Weight ¹⁾	190 g (6.7 oz)
Mechanical connection options	ISO G1/2" 1/2" NPT 3/4"-16 UNF (for dimensions of the models, see the following page)

Materials

Transmitter body	Stainless steel (AISI 316L)
Stainless steel mesh filter	AISI 303 (filter body), AISI 316L grade 18 μm (mesh)

- 1) Model with ISO G1/2" thread.

Compliance

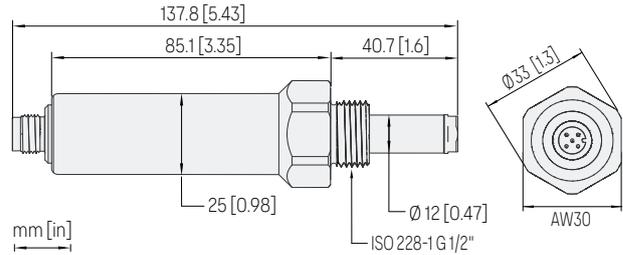
EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) as amended by 2015/863
Electromagnetic compatibility (EMC) ¹⁾	IEC/EN 61326-1, industrial environment CISPR 11 / EN 55011, Class B, Group 1 FCC part 15 B, Class B ICES-3 / NMB-3 (Class B) KC (Korea Certification) ²⁾
Compliance marks	CE, China RoHS, FCC, KC

- 1) Compliance is specified for installations using shielded cables.
- 2) www.rra.go.kr/selform/rws-DMT153

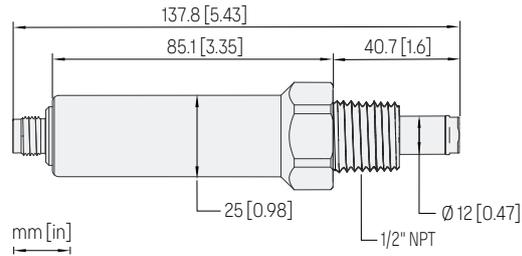
Spare parts and accessories

Filter	
Mesh filter 18um + washer, stainless steel	220957SP
Sealing rings	
Sealing ring set, 3 pcs D21/28×1.5 Cu for ISO G1/2" thread	221524SP
Sealing ring set, 3 pcs D19/25×1.5 Cu for 3/4"-16 UNF thread	221563SP
Cables and cable accessories	
Connector, M12-5F for 4-8 mm shielded cable ¹⁾	285482
Probe connection cable, M12-5F - open wires, 0.3 m (12 in)	CBL210896-03MSP
Probe connection cable, M12-5F - open wires, 1.5 m (4 ft 11 in)	223263SP
Probe connection cable, M12-5F - open wires, 3 m (9 ft 10 in)	26719SP
Instrumentation cable, M12-5F - open wires, 5 m (16 ft 5 in)	26720
Probe connection cable, M12-5F - open wires, 10 m (32 ft 10 in)	216546SP
Probe connection cable, M12-5F - open wires, 90° connector, 0.6 m (1 ft 12 in)	244669SP
Probe connection cable, M12-5F - open wires, 90° connector, 1.5 m (4 ft 11 in)	255102
Probe connection cable, M12-5F - M12-5M, 1 m (3 ft 3 in) ²⁾	INDIGOCABLE1M
Probe connection cable, M12-5F - M12-5M, 3 m (9 ft 10 in)	INDIGOCABLE3M
Probe connection cable, M12-5F - M12-5M, 5 m (16 ft 5 in)	INDIGOCABLE5M
Probe connection cable, M12-5F - M12-5M, 10 m (32 ft 10 in)	INDIGOCABLE10M
Indigo USB adapter	USB2
Sampling cells	
Sampling cell with female connectors, inlet G3/8", outlet G1/4" ISO	DMT242SC
Sampling cell with Swagelok male connectors for 1/4" tubing	DMT242SC2
Sampling cell with 1/4" Swagelok VCR connectors	DSCVCR14
Sampling cell with quick connector and leak screw	DSC74SP
Two pressure sampling cell	DSC74BSP
Two pressure sampling cell with coil	DSC74CSP
Service kit for DSC74 sampling cells	DSC74SERVICEKIT
Cooling/venting coil for sampling cell	DMCOILSP
Mounting accessories and plugs	
Probe holder assembly	ASM213582
NW40 mounting flange	225220SP
ISO G1/2" plug with sealing ring	218773
1/2" NPT plug	222507

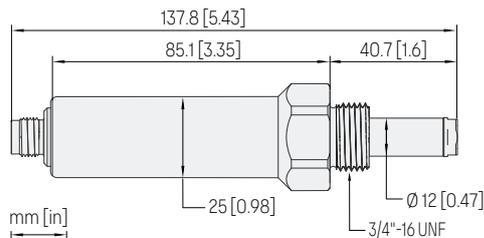
1) Connector for retrofitting an existing installed Vaisala DMT152 transmitter cable.
 2) Recommended for connection to Indigo80.



DMT153 dimensions, model with ISO G1/2" thread



DMT153 dimensions, model with 1/2" NPT thread



DMT153 dimensions, model with 3/4"-16 UNF thread