MMT310 Series Moisture and Temperature Transmitters for Oil

Features

- Continuous measurement of moisture in oil
- Proven Vaisala HUMICAP® sensor, over 15 years in oil applications
- Measurements in lubrication, hydraulic and transformer oils
- Excellent pressure and temperature tolerance
- Measuring water activity - ppm calculation for transformer oil
- Small size, easy to integrate
- Traceable calibration for measurement and analog outputs (certificates included)
- Applications: e.g. monitoring of transformer oil and of lubrication systems in marine and paper industry

Vaisala HUMICAP® Moisture and Temperature Transmitter Series for Oil MMT310 is a fast and reliable online detector for moisture in oil.

Reliable Vaisala HUMICAP® Technology

The MMT310 series incorporates the latest generation of the Vaisala HUMICAP sensor, developed for demanding moisture measurement in liquid hydrocarbons. The sensor's excellent chemical tolerance provides accurate and reliable measurement over the wide measurement range.

Measuring Water Activity

MMT310 measures moisture in oil in terms of the water activity (a_w) and temperature (T). Water activity indicates directly whether there is a risk of free-water formation. The measurement is independent of oil type, age, and temperature.

Water Content as PPM Calculation for Transformer Oils

PPM units are traditionally used in transformer applications. They indicate the average mass concentration of water in oil. The ppm calculation for mineral oil based transformer oil is optional in the MMT310 series.

Diverse Applications and Demanding Conditions

MMT310 can be used in lubrication and hydraulic systems as well as in transformers. It can be used for on-line moisture monitoring and as a control function, allowing separators and oil purifiers to be started only when necessary.

Installation Options

MMT310 has two adjustable probe lengths. The transmitter can be ordered with a ball-valve set that enables the insertion and removal of the moisture probe for calibration, without the need to empty the oil system.

MMT317 has a small pressuretight probe with optional Swagelok fittings.

An optional rain shield is available for outdoor installations.

Several Outputs, One Connector

The MMT310 series has two analog outputs and an RS-232 serial output. The output signals and the supply power travel in the same cable, the only cable connected to the unit.

Technical Data

Measurement Performance

Water Activity	
Measurement range a_w (%RS)	0 ... 1 (0 ... 100 %)
Accuracy (Including Non-Linearity, Hysteresis, and Repeatability):	
0 ... 0.9 (0 ... 90 %) 0.9 ... 1.0	±0.02 ±0.03
Response time (90 %) at +20 °C in still oil (with stainless steel filter)	10 min
Sensor	Vaisala HUMICAP® 180L2
Temperature	
Measurement range	-40 ... +180 °C (-40 ... +356 °F)
Typical accuracy at +20 °C (68 °F)	±0.2 °C (±0.36 °F)
Sensor	Pt100 RTD Class F0.1 IEC 60751

Mechanical Specifications

IP rating	IP66
Weight example: MMT317 with 2 m cable (Weight depends on selected probe and cable)	476 g
Cable feed through alternatives	8-pole connector with 5 m cable Female 8-pin connector screw joint for cable diameter 4 ... 8 mm
Sensor protection	Stainless steel grid standard filter Stainless steel grid filter for high flow rates (> 1 m/s)
Materials	
Transmitter housing	G-AlSi 10 Mg
Transmitter base	PPS
Probe Cable Length	
MMT317	2 m, 5 m, or 10 m
MMT318	2 m, 5 m, or 10 m
Probe installation MMT317	
Swagelok®	NPT 1/2", ISO 3/8" or ISO 1/2"
Probe installation MMT318	
Fitting bodies	ISO 1/2", NPT 1/2"

Spare Parts and Accessories

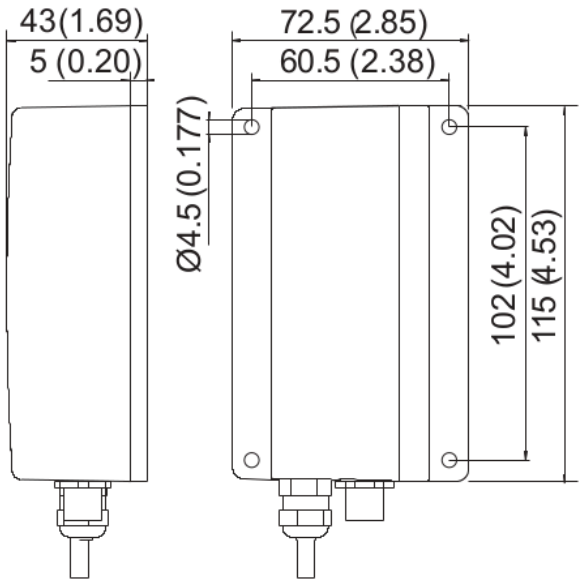
Rain shield	ASM211103
USB cable	238607
Stainless steel filter	HM47453SP
Stainless steel filter (high flow rate)	220752SP
Ball-Valve Set	BALLVALVE-1

Operating Environment

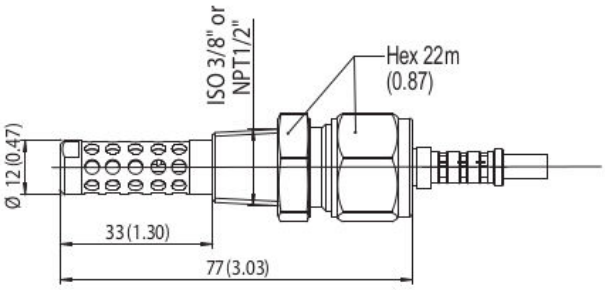
Operating temperature for electronics	-40 ... +60 °C (-40 ... +140 °F)
Storage temperature	-55 ... +80 °C (-67 ... +176 °F)
Pressure range for MMT318 with ball-valve up to 120 °C	0 ... 40 bar
Pressure range for MMT317	0 ... 10 bar
EMC compliance	EN61326-1, Industrial environment

Inputs and Outputs

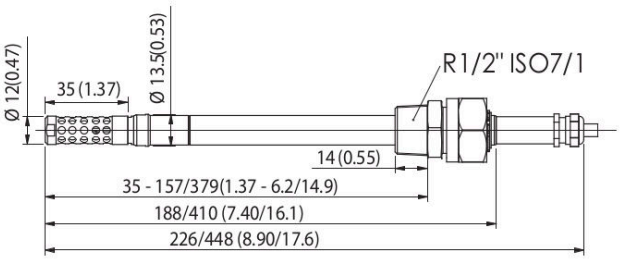
Two analog outputs, selectable and scalable	0 ... 20 mA or 4 ... 20 mA 0 ... 5 V or 0 ... 10 V 1 ... 5 V available through scaling
Typical accuracy of analog output at +20 °C	±0.05 % full scale
Typical temperature dependence of analog output	0.005 %/°C (0.003 %/°F) full scale
Serial output	RS-232C
Connections	8-pole connector with RS232C, current/ voltage outputs (two channels) and U_{in}
Operating voltage	10 ... 35 VDC
External load	R_L < 500 Ω
Startup time after power-up	3 s
Minimum Operating Voltage	
RS232C output	10 VDC
Analog output	15 VDC
Pressures above 10 bara (145 psia)	24 VDC
Power Consumption	
RS232C	12 mA
U_{out} 10 V (10 kΩ) Channel 1 & channel 2	12 mA
I_{out} 20 mA (load 511 Ω) Channel 1 & channel 2	50 mA



Transmitter body, dimensions in mm (inches)



MMT317 probe, dimensions in mm (inches)



MMT318 probe, dimensions in mm (inches)

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