



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 pressure-tight 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 %) ± 0.02

0.9 ... 1.0 ± 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 FO.1 IEC 60751

Mechanical Specifications

IP rating IP66

Weight example: MMT317 with 2 m cable 476 g

(Weight depends on selected probe and cable)

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-AISI 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 $R_L < 500 \Omega$

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

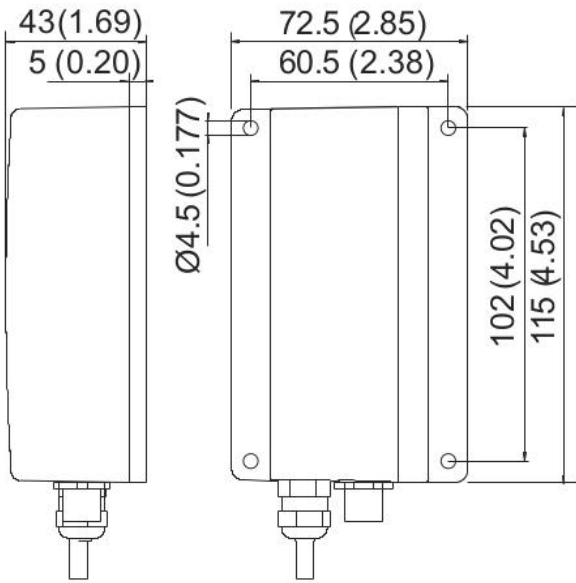
RS232C 12 mA

U_{out} 10 V (10 k Ω) 12 mA

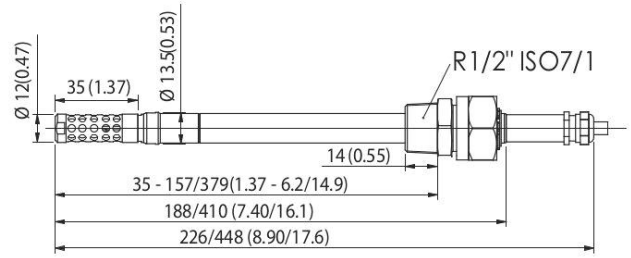
Channel 1 & channel 2

I_{out} 20 mA (load 511 Ω) 50 mA

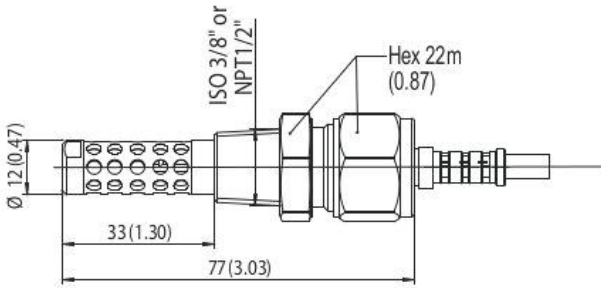
Channel 1 & channel 2



Transmitter body, dimensions in mm (inches)



MMT318 probe, dimensions in mm (inches)



MMT317 probe, dimensions in mm (inches)