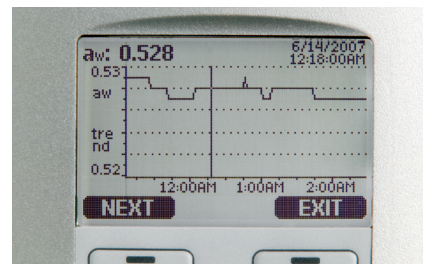


MMT330 Series Moisture and Temperature Transmitters for Oil



The display shows measurement trends, real-time data, and measurement history.

The MMT330 transmitter family offers reliable performance for the demanding measurement of moisture in oil.

Features/Benefits

- Continuous online measurement of moisture in oil
- Ball-valve installation – no need to shut down the process or drain the oil
- Proven Vaisala HUMICAP® sensor, used for over 15 years in oil applications
- Easy field calibration and maintenance – compatible with Vaisala HUMICAP® Hand-Held Moisture Meter for Oil MM70
- NIST traceable calibration (certificate included)
- Analog outputs, RS232/485, WLAN/LAN
- MODBUS protocol support (RTU/TCP)
- Approved for installation in MAN Diesel & Turbo Two-Stroke Diesel Engines lubrication systems

The Vaisala HUMICAP® Moisture and Temperature Transmitter Series for Oil MMT330 enables the fast and reliable detection of moisture in oil. MMT330 series transmitters can be used in online moisture monitoring and as control devices, allowing separators and oil driers to be started only when needed.

Proper monitoring saves both oil and the environment. With the MMT330 series it is easy and economical to monitor the changes of moisture in oil.

Reliable Vaisala HUMICAP® Technology

The MMT330 series incorporates the latest-generation Vaisala HUMICAP® sensor, which is the result of over 15 years of field experience. It was developed for demanding moisture measurement in liquid hydrocarbons.

The sensor's excellent chemical tolerance provides accurate and reliable measurement over a wide measurement range.

For Diverse Applications and Demanding Conditions

With a wide variety of probes, the transmitter can be used in lubrication systems, hydraulic systems, and transformers.

Indicates the Margin to Water Saturation

The MMT330 measures moisture in oil in terms of the water activity (aw) and temperature (T). Water activity indicates directly whether there is a risk of free-water formation. The measurement is independent of oil type and age.

Water Content as ppm Conversion

In addition to water activity, the MMT330 can output ppm, the average mass concentration of water in oil. Vaisala has this conversion readily available for mineral transformer oil.

For other oils, the oil-specific conversion coefficients can be programmed into the transmitter if the water solubility of the oil is known.

Graphical Display of Measurement Data and Trends for Convenient Operation

The MMT330 features a large numerical and graphical display with a multilingual menu and keypad. It allows users to easily monitor operational data, measurement trends, and access measurement history for the past 12 months.

The optional data logger, with real-time clock, makes it possible to generate over four years of measurement history and zoom in on any desired time or time frame.

The display alarm allows any measured parameter to be tracked, with freely configurable low and high limits.

Versatile Outputs and Data Collection

The MMT330 can support up to three analog outputs; an isolated galvanic power supply and relay outputs are also available.

For serial interface the USB connection, RS232, and RS485 can be used.

MMT330 is also capable of applying the MODBUS communication protocol and, together with an appropriate connection option, provides either MODBUS RTU (RS485) or MODBUS TCP/IP (Ethernet) communication.

The data logger, with real-time clock and battery backup, guarantees reliable logging of measurement data for over four years. The recorded data can be viewed on the local display or transferred to a PC with Microsoft Windows® software. The transmitter can also be connected to a network with an optional (W)LAN



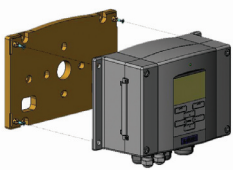
The Vaisala HUMICAP® Hand-Held Moisture for Oil Meter MM70 is designed for field-checking MMT330 transmitters.

interface, which enables a (wireless) Ethernet connection. A USB service cable makes it easy to connect the MMT330 to a PC via the service port.

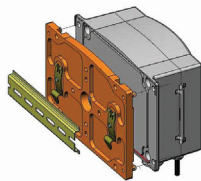
Easy Installation

MMT330 transmitters have several options for transmitter mounting. They are delivered installation-ready, pre-configured with all settings.

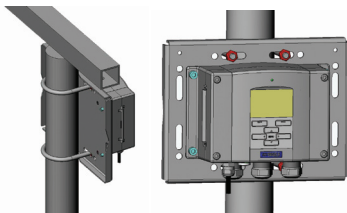
Mounting Options



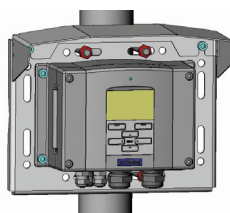
Mounting with Wall Mounting Kit



Mounting with DIN Rail Installation Kit



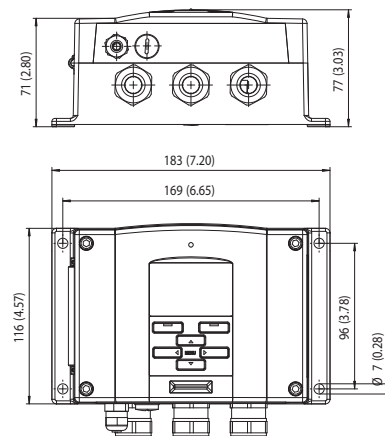
Pole Installation with Installation Kit for Pole or Pipeline



Mounting Rain Shield with Installation Kit

Dimensions

Dimensions in mm (inches)



TYPE APPROVED PRODUCT
CERTIFICATE NO.: A-13529

HUMICAP® is a registered trademark of Vaisala.



The MMT332 probe is installed using a flange. It is designed for high-pressure applications.

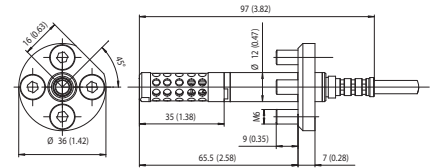
Installation Options

MMT332 for High Pressure Installations

| | |
|-------------------|-------------------------------------|
| Pressure range | 0 ... 250 bar / 0 ... 3625 psia |
| Probe diameter | 12 mm / 0.5" |
| Installation | |
| Flange | 36 mm / 1.4" |
| Temperature | |
| Measurement range | -40 ... +180 °C (-40 ... 356 °F) |

Dimensions

Dimensions in mm (inches)



The MMT337 probe, with optional Swagelok® connector, is ideal for tight spaces with a thread connection. The small probe is designed for integration into small diameter lines.

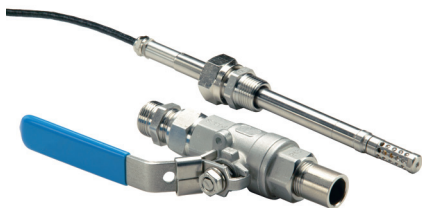
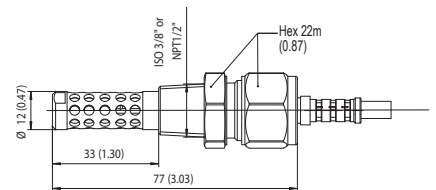
Installation Options

MMT337 with Small-Sized Probe

| | |
|-------------------|-------------------------------------|
| Pressure range | 0 ... 10 bar / 0 ... 145 psia |
| Probe diameter | 12 mm / 0.5" |
| Installation | |
| Fitting body | R 3/8" ISO |
| Fitting body | 1/2" ISO |
| Fitting body | NPT 1/2" |
| Temperature | |
| Measurement range | -40 ... +180 °C (-40 ... 356 °F) |

Dimensions

Dimensions in mm (inches)



The MMT338 is ideal for installation into pressurized processes where the probe needs to be able to be removed while the process is running. The probe depth is adjustable.

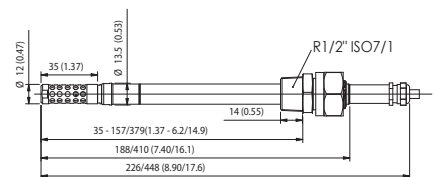
Installation Options

MMT338 with Probe for Pipeline Installations

| | |
|--------------------------------|---|
| Pressure range with ball-valve | 0 ... 40 bar / 0 ... 580 psia up to 120 °C (248 °F) and 40 bar |
| Adjustable length | 35 ... 157/379 mm / 1.37 ... 6.2 / 14.9" |
| Installation | |
| Fitting body | R1/2" ISO |
| Fitting body | NPT 1/2" |
| Ball-valve set | BALLVALVE-1 |
| Sampling cell | DMT242SC2 |
| Temperature | |
| Measurement range | -40 ... +180 °C (-40 ... 356 °F) |

Dimensions

Dimensions in mm (inches)



Technical Data

Measured Values

| | |
|---|----------------|
| WATER ACTIVITY | |
| Measurement range a_w | 0 ... 1 |
| Accuracy (including non-linearity, hysteresis and repeatability) | |
| 0 ... 0.9 | ±0.02 |
| 0.9 ... 1.0 | ±0.03 |
| Response time (90%) at +20 °C in still oil (with stainless steel filter) | 10 min. |
| Sensor | HUMICAP® 180,2 |

Performance

| | |
|-----------------------------|-----------------------------------|
| TEMPERATURE | |
| Measurement range | |
| MMT332 | -40 ... +180 °C (-40 ... +356 °F) |
| MMT337 | -40 ... +180 °C (-40 ... +356 °F) |
| MMT338 | -40 ... +180 °C (-40 ... +356 °F) |
| Accuracy at +20 °C (+68 °F) | ± 0.2 °C (0.36 °F) |

Operating Environment

| | |
|---|---|
| Operating temperature | |
| for probes | same as measurement ranges |
| for transmitter body | -40 ... +60 °C (-40 ... +140 °F) |
| with display | 0 ... +60 °C (+32 ... +140 °F) |
| Pressure range for probes | see probe specifications |
| Electromagnetic compatibility | Complies with EMC standard EN61326-1, Industrial environment |
| Note: Transmitter with display test impedance of 40 ohm is used in IEC61000-4-5 (Surge immunity) | |

Inputs and Outputs

| | |
|---|---|
| Operating voltage | 10 ... 35 VDC, 24 VAC ± 20% |
| with optional power supply module | 100 ... 240 VAC 50/60 Hz |
| Power consumption @ 20 °C (U_{in} 24VDC) | |
| RS232 | max. 25 mA |
| U_{out} 2 x 0...1V / 0...5V / 0...10V | max. 25 mA |
| I_{out} 2 x 0...20 mA | max. 60 mA |
| display and backlight | + 20 mA |
| Analog outputs (2 standard, 3rd optional) | |
| current output | 0 ... 20 mA, 4 ... 20 mA |
| voltage output | 0 ... 1 V, 0 ... 5 V, 0 ... 10 V |
| Accuracy of analog outputs at 20 °C | ± 0.05% full scale |
| Temperature dependence of the analog outputs | ± 0.005%/°C full scale |
| External loads | |
| current outputs | $R_L < 500$ ohm |
| 0 ... 1V output | $R_L > 2$ kohm |
| 0 ... 5V and 0 ... 10V outputs | $R_L > 10$ kohm |
| Max. wire size | 0.5 mm ² (AWG 20) stranded wires recommended |
| Digital outputs | RS232, RS485 (optional) |

| | |
|---|---|
| Protocols | ASCII commands, MODBUS RTU |
| Service connection | RS232, USB |
| Relay outputs | 0.5 A, 250 VAC, SPDT, potential-free (optional) |
| Ethernet interface (optional) | |
| Supported standards | 10BASE-T, 100BASE-TX |
| Connector | 8P8C (RJ45) |
| IPv4 address assignment | DHCP (automatic), static |
| Protocols | Telnet, MODBUS TCP/IP |
| WLAN interface (optional) | |
| Supported standards | 802.11b |
| Antenna connector type | RP-SMA |
| IPv4 address assignment | DHCP (automatic), static |
| Protocols | Telnet, MODBUS TCP/IP |
| Security | WEP 64/128, WPA |
| Authentication / Encryption | |
| Open / no encryption | |
| Open / WEP | |
| WPA Pre-shared key / TKIP | |
| WPA Pre-shared key / CCMP (a.k.a. WPA2) | |
| Optional data logger with real-time clock | |
| Logged parameters | max. four with trend/min/max values |
| Logging interval | 10 sec. (fixed) |
| Max. logging period | 4 years, 5 months |
| Logged points | 13.7 million points per parameter |
| Battery lifetime | min. 5 years |
| Display | LCD with backlight, graphical trend display of any parameter |
| Menu languages | English, Chinese, Finnish, French, German, Japanese, Russian, Spanish, Swedish |

Mechanics

| | |
|--------------------------------------|---|
| Cable bushing | M20x1.5 for cable diameter 8 ... 11mm/0.31 ... 0.43" |
| Conduit fitting | 1/2" NPT |
| Interface cable connector (optional) | M12 series 8-pin (male) |
| option 1 | female plug with 5 m (16.4 ft.) black cable |
| option 2 | female plug with screw terminals |
| USB-RJ45 Serial Connection Cable | 219685 |
| (incl. Mi70 Link software) | |
| Probe cable diameter | 5.5 mm |
| Standard probe cable lengths | 2 m, 5 m or 10 m |
| | (Additional cable lengths available, please see order forms for details) |
| Housing material | G-AlSi 10 Mg (DIN 1725) |
| Housing classification | IP 66 |
| | IP65 (NEMA4X) with local display |
| Weight | depending on selected probe, cable and modules 1.0 - 3.0 kgs |
| Sensor protection | Stainless steel grid standard filter/ Stainless steel grid filter for high flow rates (>1 m/s) |

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