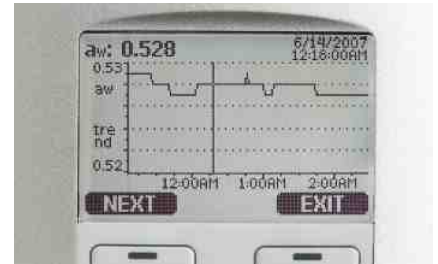# MMT330 Series Moisture and Temperature Transmitters for Oil

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
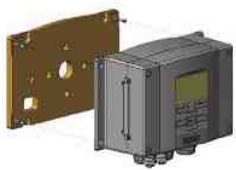
Mounting with Wall Mounting Kit
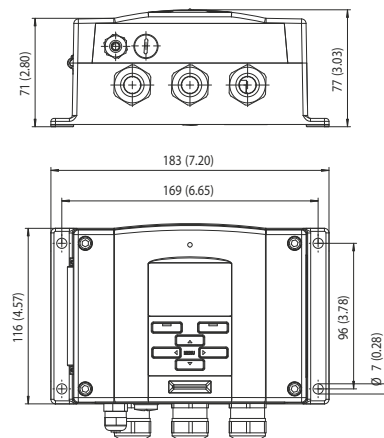
Mounting with DIN Rail Installation Kit

Pole Installation with Installation Kit for Pole or Pipeline

Mounting Rain Shield with Installation Kit

HUMICAP® is a registered trademark of Vaisala.

Dimensions

Dimensions in mm (inches)

71 (2.80)   77 (3.03)

183 (7.20)

169 (6.65)

116 (4.57)   96 (3.78)

Ø 7 (0.28)

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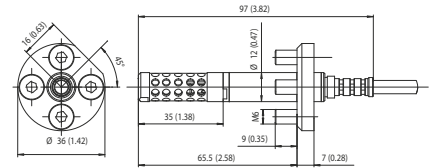
The MMT337 probe, with optional Swagelok® connector, is ideal for tight spaces with a thread connection. The small probe is designed for integration into small diameter lines.
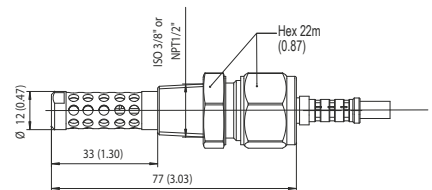
Installation Options

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)
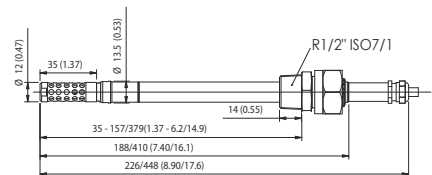
Technical Data

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_L2

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)

CE