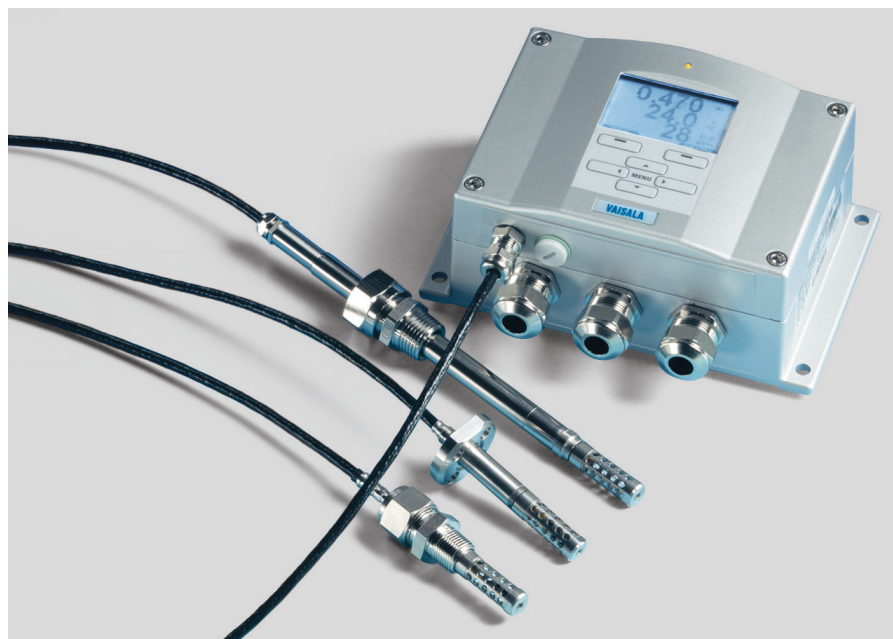




## MMT330 Series Moisture and Temperature Transmitters for Oil



### Features

- 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
- Analog outputs, RS-232/485, LAN
- Modbus protocol support (RTU/TCP)

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.

### Benefits

- Easy field calibration and maintenance – compatible with Vaisala HUMICAP® Hand-Held Moisture Meter for Oil MM70
- Approved for installation in MAN Diesel & Turbo Two-Stroke Diesel Engines lubrication systems

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

MMT330 measures moisture in oil in terms of the water activity (aw), relative saturation (%RS), and temperature (T). Water activity or relative saturation indicate 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, MMT330 can output ppm, the average mass concentration of water in oil. Vaisala has this conversion readily available for mineral transformer oil.

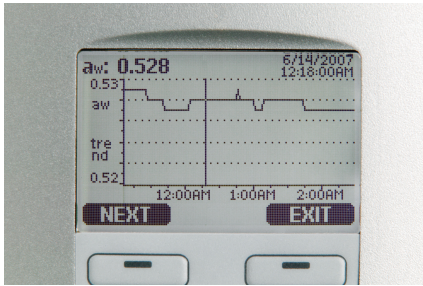
For other oils, the oil-specific conversion coefficients can be programmed into the transmitter if the water solubility of the oil is known.

### Graphical Display of Measurement Data and Trends for Convenient Operation

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.



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

## Versatile Outputs and Data Collection

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, RS-232, and RS-485 can be used.

In addition to the analog outputs, MMT330 provides Modbus RTU and TCP/IP communication protocol.

The data recorded by the data logger 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 LAN interface, which enables a Ethernet connection. A USB service cable makes it easy to connect the MMT330 to a PC via the service port.

## Easy Installation

With multiple options to choose from, the instrument can be tailored to meet the specific needs of each individual application and is delivered installation-ready and pre-configured for each delivery. Quick delivery time and global service network make MMT330 a perfect choice for any project.



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

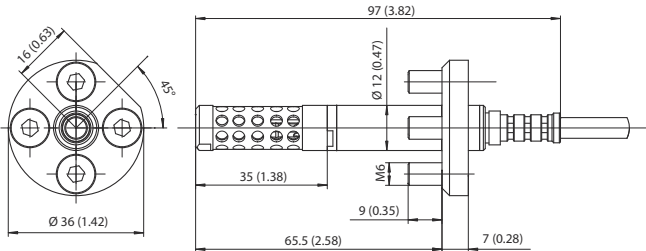
# Installation Options



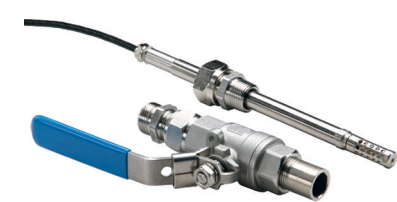
The MMT332 probe is installed using a flange. It is designed for high-pressure applications.

## MMT332 for High Pressure Installations

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



MMT332 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.

## MMT338 with Probe for Pipeline Installations

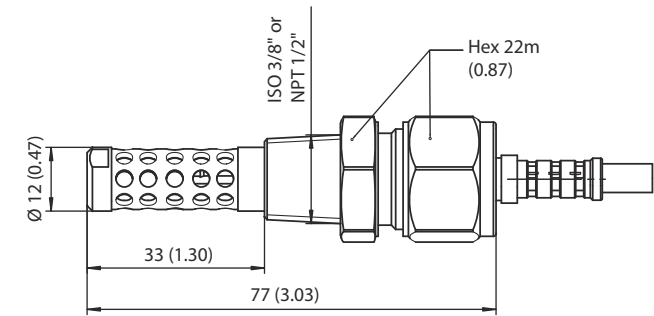
Pressure range with ball-valve	0 ... 40 bar / 0 ... 580 psia Up to 120 °C (248 °F) and 40 bar
Adjustable length	35 ... 157/379 mm (1.37 ... 6.2 /14.9 in)
Temperature measurement range	-40 ... +180 °C (-40 ... 356 °F)
<b>Installation</b>	
Fitting body	R1/2" ISO
Fitting body	NPT 1/2"
Ball-valve set	BALLVALVE-1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



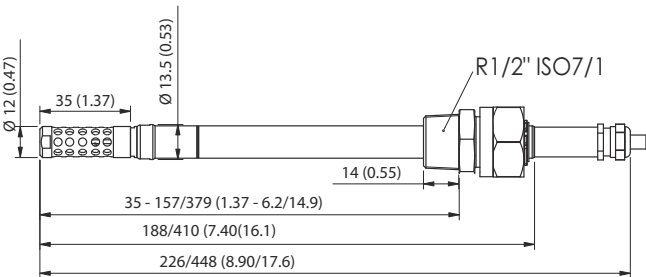
The MMT337 probe, with optional Swagelok connector, is ideal for tight spaces with a thread connection. The small probe is designed for integration into small diameter lines.

## MMT337 with Small-sized Probe

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



MMT337 Dimensions in mm (inches)



MMT338 Dimensions in mm (inches)

# Technical Data

## Measurement Performance

### Water Activity

Measurement range $a_w$	0 ... 1
Response time (90 %) at +20 °C in still oil (with stainless steel filter)	10 min
Sensor	HUMICAP® 180L2
Accuracy (Including Non-linearity, Hysteresis, and Repeatability):	
0 ... 0.9	±0.02
0.9 ... 1.0	±0.03

### Temperature

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

## Operating Environment

EMC compliance	EN61326-1, Industrial environment <sup>1)</sup>
Pressure range for probes	See probe specifications

### 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)

<sup>1)</sup> Note: Transmitter with display test impedance of 40  $\Omega$  is used in IEC61000-4-5 (Surge immunity)

## Inputs and Outputs

Operating voltage	10 ... 35 VDC, 24 VAC ±20 %
Operating voltage with optional power supply module	100 ... 240 VAC 50/60 Hz

### Power Consumption at 20 °C ( $U_{in}$ 24 VDC)

RS-232	Max. 25 mA
$U_{out}$ 2 x 0 ... 1 V / 0 ... 5 V / 0 ... 10 V	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	$R_L < 500 \Omega$
0 ... 1 V output	$R_L > 2 \text{ k}\Omega$
0 ... 5 V and 0 ... 10 V outputs	$R_L > 10 \text{ k}\Omega$
Max. wire size	0.5 mm <sup>2</sup> (AWG 20) stranded wires recommended

<b>Digital outputs</b>	RS-232, RS-485 (optional)
Protocols	ASCII commands, Modbus RTU
Service connection	RS-232, 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

## General

Display	LCD with backlight, graphical trend display of any parameter
Menu languages	English, Chinese, Finnish, French, German, Japanese, Russian, Spanish, Swedish

### 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

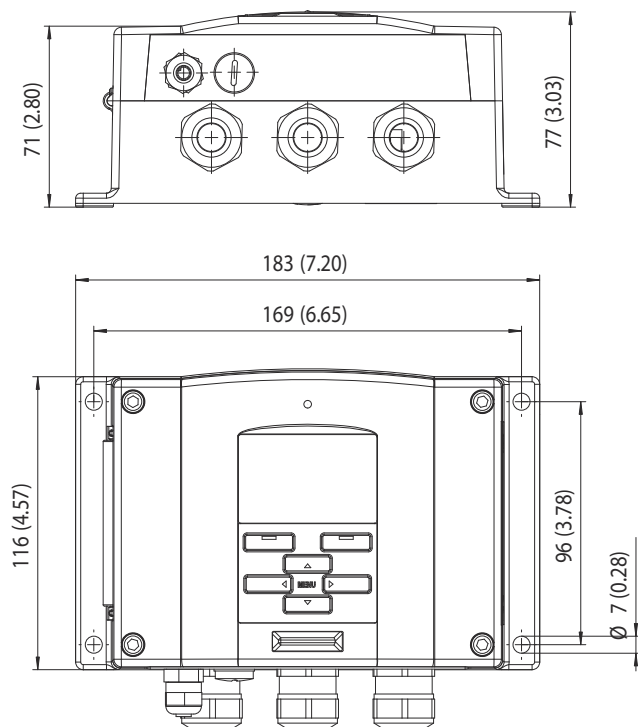
## Mechanical Specifications

Weight	1.0 - 3.0 kg (depends on selected probe, cable, and modules)
Sensor protection	Stainless steel grid standard filter/ Stainless steel grid filter for high flow rates (> 1 m/s)
Cable bushing	M20x1.5 for cable diameter 8 ... 11 mm (0.31 ... 0.43 in)
Conduit fitting	1/2" NPT
USB-RJ45 Serial Connection Cable (incl. MI70 Link software)	219685
Probe cable diameter	5.5 mm (0.2 in)
Standard probe cable lengths	2 m, 5 m or 10 m (6.6 ft, 16.4 ft, 32.8 ft) (Additional cable lengths available, please see order forms for details)
Housing material	G-AlSi10 Mg (DIN 1725)
<b>Interface cable connector (optional)</b>	M12 series 8-pin (male)
Option 1	Female plug with 5 m (16.4 ft) black cable
Option 2	Female plug with screw terminals

## Compliance

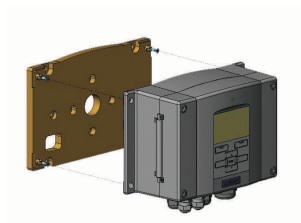
IP rating	IP66
IP rating with local display	IP65
NEMA rating with local display	4X

## Dimensions

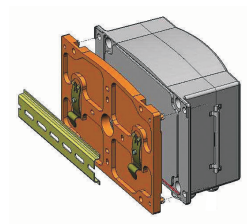


Dimensions in mm (inches)

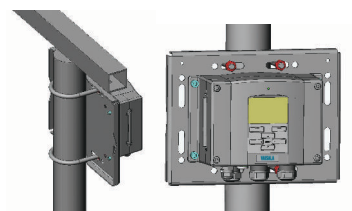
## Mounting Options



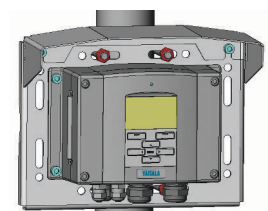
Mounting with Wall Mounting Kit



Mounting with DIN Rail Installation Kit



Pole Installation with Installation Kit for Pole or Pipeline



Mounting Rain Shield with Installation Kit

