



AOM CORIOLIS MASS FLOW METER

With highly accurate measurement performance and extreme capabilities, the compact flow meter AOM-CM are a natural choice for many applications. The sensor can be equipped with different flange connections. The AOM-CM can provide online flow and density measurement. AOM-CM is applicable for extremely low flow applications starting at a flow range of few kg/h up to 540 000 kg/h.

Benefits

- » Torsion oscillator design assures a stable and drift free measurement with excellent signal to noise ratio
- » Resilient to external noise and vibration
- » Insensitive to pipe pressure changes
- » Robust tube wall thickness provides increased operational safety in abrasive applications
- » Long life guaranteed due to low mechanical stresses in the sensor mechanism
- » No moving parts to wear or fail

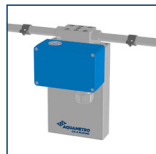
Physical principle

Inside the AOM-CM sensor, there are precision tubes that are energized by an electromagnetic drive system controlled by the attached AOM-CM transmitter.

When a liquid or gas fluid flows through these vibrating tubes, it is they are subjected to non-symmetrical additional deflection. The degree of which is determined by the mass of the fluid passing through, due to the degree of inertia that is generated. This deflection is detected electronically by two velocity sensors within the flow meter body. High-precision electronics in the transmitter process the sensor signals and calculate a time delta between them. This measured quantity time delta is proportional to the mass flow rate.

Installation conditions

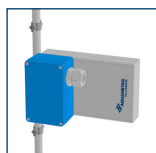
Installation position



Liquid applications: For liquid measurements, the AOM-CM sensor should be installed at a low point in the pipe system with its measurement tubes pointing downwards as this will prevent gas bubbles collecting in the sensor. The presence of gas bubbles can reduce the performance of the sensor for both mass flow and density.



Liquid applications with solid particles in the fluid: If there is a risk that the liquid contains (heavy) solid particles, the AOM-CM sensor should be installed at a high point in the pipe system with its measuring loops pointing upwards to avoid the collection of the particles in the sensor.



Liquid applications: Installation of an AOM-CM sensor in a vertical pipe ("flag" installation) is only recommended in exceptional cases e.g. for pure liquids without gas and solid particles.

For liquid applications with possible gas content, flow should be upwards through the meter to assist in purging and removing accumulated gas from the meter. Liquid applications with possible content of solid particles should be avoided.

Upstream / downstream installation

AOM-CM015 to AOM-CM30 are parallel block construction type sensors, for which there are no upstream/downstream straight run restrictions.

For our seal-less, parallel construction type sensors AOM-CM40 to AOM-CM100, straight pipe sections of 5-10 pipe diameters upstream and 3-4 pipe diameters downstream should be provided where flow is connected to the meter out of plane with the sensor meter tubes. This is required to avoid different flow velocities being established within the two measuring tubes.

Flow direction

AOM-CM flow sensors are bi-directional.

If, once the flow meter has been mounted, the flow reading is opposite or negative to the flow reading expected, the flow sense can be corrected by parameter adjustment in the transmitter.

Filter & strainer

For liquid measurement applications that have solid particles with a diameter of 0.25 times the inside diameter for the measuring tubes, a filter/strainer must be installed upstream from the flow meter to reduce the risk of blockage.

Temperature

The flow meter should be installed such that it is kept at the same temperature while in operation.

Rapid temperature changes should be avoided whenever possible. Rapid temperature changes may impact the performance and lifetime of the sensor.

Temperature change to a sensor should be at a rate of no more than 1°C per second. Temperature changes while in operation should be minimized by the use of insulation and/or heat tracing where applicable.

Vibrations

Vibrations can impair the functionality and measurement accuracy of the AOM-CM sensor. Please take into account following:

- » Suitable measures must be taken to avoid external mechanical vibrations on the sensor in order to minimise their possible impact on the measurement.
- » The pipe system must be as free as possible from all vibrations. In principle, standard building or system vibrations have no significant impact on the accuracy of the measurement. Nevertheless, heavy vibrations should be avoided at all costs.
- » It is recommended that you install the flow meter at a point that vibrates as little as possible. Use solid pipe clamps onto a rigid, non-vibrating surface to decouple the meter from pipe and other vibrations.
- » Any unsecured pipe sections situated near the flow meter that might have a tendency to vibrate should definitely be avoided.
- » Both the mechanical design of the flow meter and the implementation of digital filtering in the transmitter signal processing electronics will minimize the effects of vibration on the measurement. However, please note that excessive external vibration can impact measurement performance and, under certain circumstances, cause damage to the flow meter.

Electrical installation

The AOM-CM sensors are designed with fixed mechanical connection to the AOM-CMT45 transmitter.

For the electrical connection to the AOM-CMT45 transmitter the AOM-CM has one 12-pin M12 connector, "A" coded, for power supply and standard interfaces and one 8-pin M12 connector, "A" for optional interface configuration.

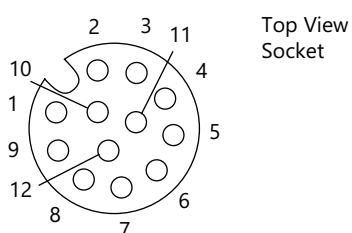
The 12-pin M12 connector provides power supply, RS485 interface, digital outputs, digital input, and optional the analog 4-20 mA interfaces.

AOM-CM configuration

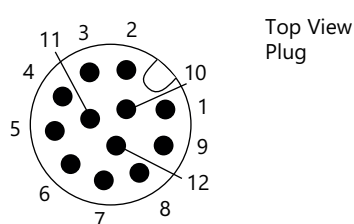
SENSOR	
Temperature range:	-50 to +120°C up to +210°C
Max. nominal pressure:	PN 40 (PN 16 for AOM-CM80 and AOM-CM100 sensor)
Construction type:	Parallel construction type
Face to face length:	220 mm up to 900 mm
Housing material:	Stainless steel SS 304
Wetted parts material:	1.4571, Stainless steel SS 316Ti
Process connection:	Flange DIN DN15 up to DN200 / PN40
Nominal flow:	300 kg/h up to 540 000 kg/h (Related to: HFO (14 cSt, 998 kg/m ³) / MGO (5 cSt, 830 kg/m ³) @ 0.5 bar pressure loss with an accuracy of 0.20 %)
Electrical connection:	Aluminum box, M12 plug
Protection class:	IP66: AOM-CM015 to AOM-CM40 IP65: AOM-CM60 to AOM-CM100

TRANSMITTER AOM-CMT45	
Housing / protection class:	IP66 enclosure on sensor
Ambient temperature:	-40 up to +60°C
Measurement:	Mass flow / volume flow / temperature / density
Digital outputs 2 x:	Frequency or impulse (for volume flow, mass flow and density) or status outputs (acc. to DIN IEC 60 946 / potential-free)
Digital inputs 1 x:	acc. DIN IEC 60 946 (potential-free)
Interfaces:	Modbus RS485 RTU
Power supply:	12-24 VDC +/-10%
Power consumption:	6 W
Connection:	M12 connector 12 pin A-coded (24 VDC, RS485, OI/DI) Cable 3 m (M12 to free ends) Other lengths on request
DISPLAY (available as option)	
Backlit color LCD	Integrated in transmitter

Electrical connection of AOM-CMT45 transmitter



Pin numbering of the AOM-CMT45 12-pin M12 socket



Pin numbering of a 12-pin M12 plug

Pin configuration of 12-pin M12 socket

Pin #	Signal	I/O Option	Remark
1	+24V	all	Positive supply terminal
2	AO1-	optional	Negative terminal for analog output 1
3	0V/GND	all	Ground for power supply
4	RS485-	all	Negative signal of the two-wire RS485 interface
5	DO1	all	Digital output 1 (called channel 0/A in Modbus documentation)
6	RS485+	all	Positive signal of the two-wire RS485 interface
7	DI1	all	Digital input 1
8	DO2	all	Digital output 2 (called channel 1/B in Modbus documentation)
9	AO1+	optional	Positive terminal for analog output 1
10	I/O GND	all	Ground for digital in- and outputs
11	AO2+	optional	Positive terminal for analog output 2
12	AO2-	optional	Negative terminal for analog output 2
Shield	Ground / PE	all	

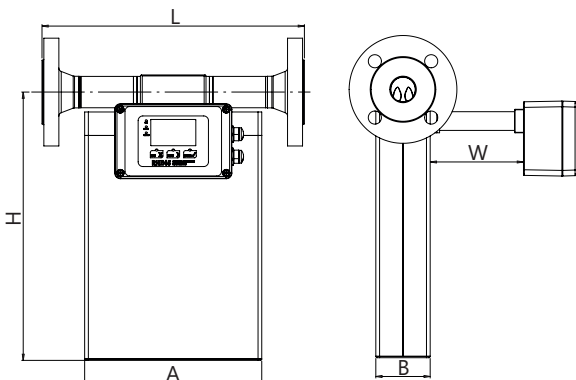
Dimensions

AOM-CM sensor type	Nominal flow rate* kg/h	Flange connection** DIN EN 1092-1	Weight kg	Temperature range °C	L face to face length mm	A mm	B mm	H mm	W mm	E mm
AOM-CM015T45	2	DN15 PN40	4	-50 / +210	220	120	40	208	100	
AOM-CM02T45	13	DN15 PN40	4	-50 / +210	220	120	40	208	100	
AOM-CM03T45	65	DN15 PN40	4	-50 / +210	220	120	40	208	100	
AOM-CM04T45	300	DN15 PN40	4	-50 / +210	220	120	40	208	100	
AOM-CM06T45	600	DN15 PN40	8.5	-50 / +210	280	164	58	246	100	
AOM-CM10T45	1 500	DN25 PN40	16.5	-50 / +210	280	189	58	286	100	
AOM-CM15T45	5 000	DN25 PN40	16.5	-50 / +210	400	300	70	481	150	
AOM-CM20T45	10 000	DN40 PN40	23.5	-50 / +210	460	300	70	486	150	
AOM-CM30T45	30 000	DN50 PN40	58.5	-50 / +210	725	600	140	875	150	150
AOM-CM40T45	40 000	DN80 PN40	140.5	-50 / +210	725	720	180	1 153	150	250
AOM-CM60T45	110 000	DN100 PN40	235.5	-20 / +120	725	950	230	1 443	150	300
AOM-CM80T45	280 000	DN150 PN16	380.5	-20 / +120	900	1 320	403	1 775	150	
AOM-CM100T45	540 000	DN200 PN16	520	-20 / +120	900	1 320	403	1 758	150	

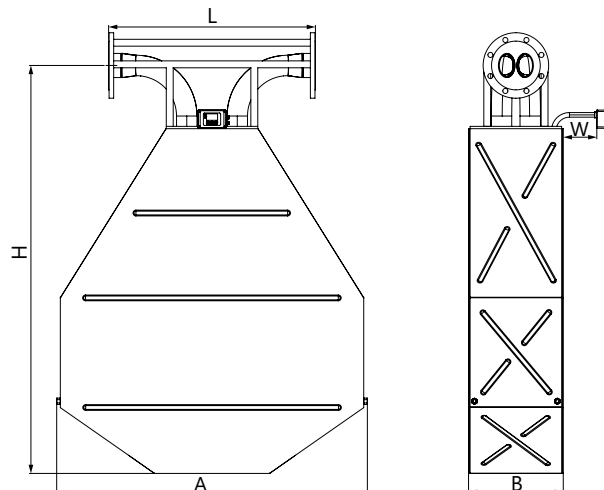
* Nominal flow rate related to HFO (14 cSt, 998 kg/m³) / MGO (5 cSt, 830 kg/m³) @ 0.5 bar pressure loss with an accuracy of 0.20 %.

** Other flange connections (e.g. JIS) on request.

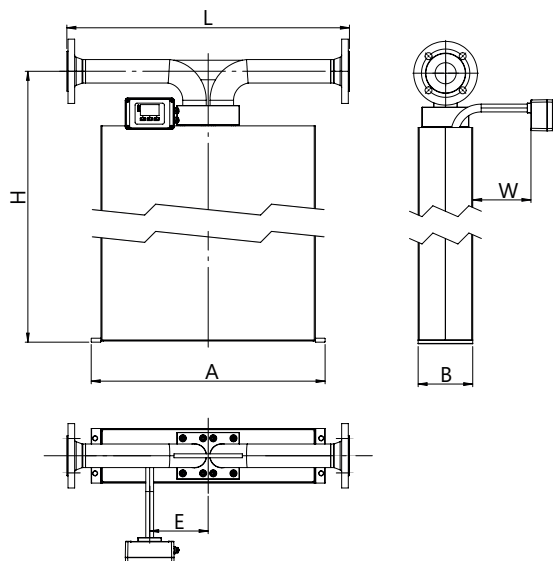
AOM-CM015T45 to AOM-CM20T45



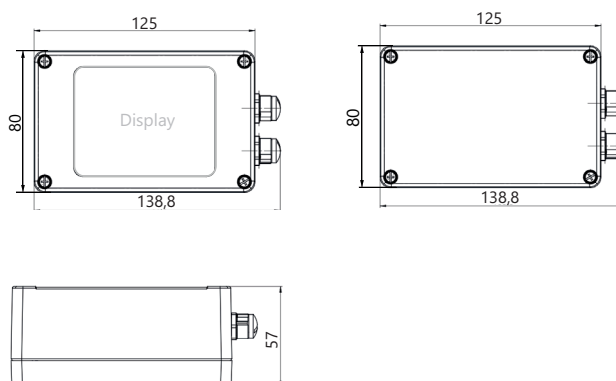
AOM-CM80T45 to AOM-CM100T45



AOM-CM30T45 to AOM-CM60T45



AOM-CMT45 with or without display



You will find detailed technical data on the product range and project planning notes in our technical documentation.

Made in Germany 

info@aquametro-oil-marine.com
www.aquametro-oil-marine.com

Aquametro Oil & Marine AG
CH-4106 Therwil, Switzerland
Phone +41 61 725 44 00

Aquametro Oil & Marine GmbH
DE-18119 Rostock, Germany
Phone +49 381 382 530 00