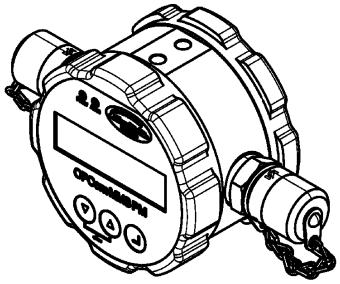

Quickstart OPCom MMS PM

V1.04.13

Read the safety instructions and operating instructions prior to commissioning!

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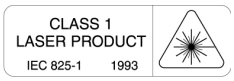
The device complies with CE requirements

Never remove the coverings. The device uses a laser with the potential to harm users.

OPCom contains a laser sensor classified as a Class 1 product during normal use (pursuant to 21 CFR, subchapter J of the Health and Safety Act of 1968). This manual does not contain any service information regarding installed parts. Service should only be performed by trained service personnel.

OPCom has been evaluated and tested in accordance with EN61010-1:1993, "Safety Requirements For Electrical Equipment For Measurement, Control, and Laboratory Use," IEC 825-1:1993, "Safety of Laser Products," and other relevant industry norms (e.g. ISO 4406, ISO 6149-2).

A sticker indicating the laser class pursuant to 21CFR has been applied to the device. A copy of this sticker can be seen in Image 1 below.



1. Technical data

Sensor data	Range	Unit
Max. operating pressure	420 dynamic	bar
Fluid temperature range	-20..80	°C
Ambient conditions, *operation:*		
temperature	-20..60	°C
humidity	0…95	%
Ambient conditions, *storage:*		
temperature	-20..85	°C
humidity	0..95	%
Hydraulic fluid	Mineral liquids and ester liquids, polyalphaolefins	
Moistened materials, sealing material	Stainless steel, sapphire, NBR, copper	
Power supply	9…33	V
Max. power consumption	2	W
Outputs, interfaces		mA
Current output (1x)	4..20	
Interface	RS232, CANopen,	
Alarm contact	Open-collector output	
Connectiong dimensions		
Threaded connection	¼“, Minimess 16x1,5	
Electrical connection	M12 x 1, 8-pin	
Permissible flow	50 … 400	ml/min
Cleanliness according to ISO 4406:99 (measurement range)	0 … 24	Ordinal number
Cleanliness according to ISO 4406:99 (calibrated range)	10 … 22	Ordinal number
Measurement accuracy	± 1	Ordinal number

Table 1.1: Technical data

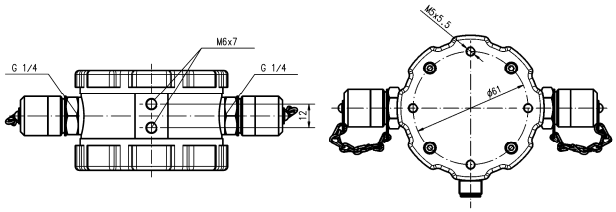


Fig 1.1: Dimensional drawing

2. Installation

- Hydraulically the OPCom has to be connected to the pressure line respectively in bypass flow (50…400 ml/min).
- Adjust the flow rate by orifices and flow control valve (accessories).
- Within the menu (sensor parameter/flow) the current flow can be checked.
- Abrupt changes of the cross section, orifices, valves, and pumps at the inlet of the OPCOM have to be avoided in order to reduce de-aeration and accumulation of contaminants
- The length of the pressure line has to be selected carefully. Long lines and low flow rates might lead to particle sedimentation. Moreover the pressure loss is highly dependent on the viscosity. At low temperatures this might result in low flow rates and an insufficient flow through the OPCom. In contrast, long pressure lines might be reasonable in case of free air within the oil. Thus needed time for the solution of the air is provided.
- Steep and fast pressure gradients should be avoided in order to gain an exact measurement result.
- Sampling should be performed at a characteristic location
- The factory setting of the sampling time is 1 minute by default. In case of very clean oil this time can be changed.

3. Electrical connection

Only a qualified electrician should install the device. Comply with national and international guidelines for setting up electrical equipment.

Power supply in accordance with EN50178, SELV, PELV, VDE0100-410/A1.

Incorrect connection of the device can lead to damages!

De-energize the system for the installation and connect the device as follows:

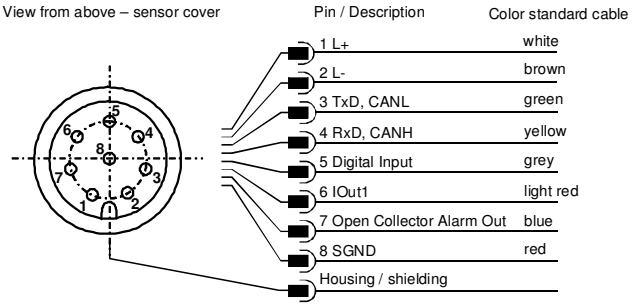


Fig 3.1: Pin assignment of the connector

The permissible operating voltage is between 9 VDC and 33 VDC. The sensor cable must be shielded. To achieve IP67 degree of protection, only use suitable connectors and cable.

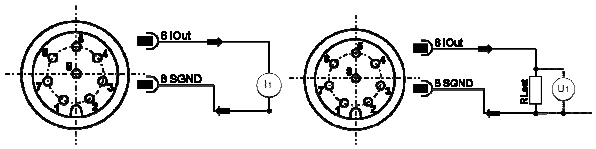


Fig 3.2: Measuring the analog 4..20 mA outputs with an without load resistor

Current should be measured with a suitable current measurement device, in accordance with Fig. 4.2. The maximum load is 250 Ω. More details can be read within the manual.

The calculation of the ordinal numbers *ON* by means of the analog current *I* can be performed according to the following equation:

Output	Equation	Number
Ordinal number / cleanliness	$OZ = \frac{26}{16mA} \cdot I / mA - \frac{26}{4}$	*(3-1)*

Fig 3.3: Calculating the scale number or purity class based on the current

Pursuant to ISO 4406:99, the current range covers scale numbers from 0 to 26. A current value of 4 mA would correspond to a scale number of 0, whereas 20 mA would correspond to a scale number of 26.

I_{out} in mA	4	12	20
Ordnial number	0	13	26

Fig 3.4: Table for calibrating the PLC's current inputs

4. Communication

- Baud rate: 9600
- Data bits: 8
- Parity: none
- Stop bits: 1
- Flow controll: none

#	Command format	Meaning	Reply format
1	RVal[CR]	Reading all measured values with subsequent check sum (CRC)	$ Time:x.xxx[h];T:xx.x[°C]; ....;CRC:x[CR][LF]
2	RID[CR]	Reading of identification with subsequent check sum (CRC)	Martechnic;STyp;SN:xxxxxx-xxx; SW:xx.xx.xx;CRC:x 1)
3	RCon[CR]	Reading of configuration parameters with subsequent CRC	$AO1:x;AO2:x;…; CRC:x[CR][LF]
4	RMemO[CR]	Reading of memory organisation (header), names and units	Time [h]; T [°C]; P [-];P40 [-];PTG [1/K]; … [CR][LF]
5	RMem[CR]	Reading of complete memory, including header	$Time [h]; T [°C]; P [-]; … …[CR][LF]…;... [CR][LF]…
6	RMemH-n[CR]	Read memory of the recent *n* hours	$Time [h]; T [°C]; P [-];P40[1/K];…; CRC:x[CR][LF]…

Table 4.1: Reading commands

For additional information on CAN-communication and the digital channels please refer to the manual.