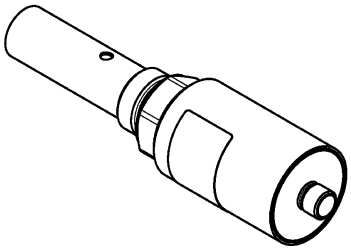

Quickstart LubCos MMS Vis+

V1.00.13

Read the safety instructions and operating instructions in the manual prior to commissioning!

For any questions please contact:

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The device complies with CE requirements

Read the safety instructions and operating instructions prior to commissioning!

Note: Illustrations do not always precisely correspond to the original. No legal claim can be derived due to incorrect information. Product design is subject to change without notice.

1. Technical data

Sensor data	Range	Unit
Max. operating pressure	10	bar
Operating temperature, fluid[1)]	-20…100[2)]	°C
Ambient conditions, operation: Temperature Humidity	 -20…80 0…95	 °C % r.H.
Ambient conditions, storage: Temperature Humidity	 -20…80 0…95	 °C % r.H.
Hydraulic fluid	HLP, HLPD, HVLP (according to. DIN 51524) HETG, HEES, HEPR (according to. DIN ISO 15380)	
Moistened materials	Aluminum, HNBR, Epoxy	
Power supply[3)]	9…33	V
Current consumption	<0,2 typ.; <0,3 max.	A
Output Current outputs (2x) [4)] Interfaces Optical signal [9)]	 4…20 RS232/CAN RGB-LED	 mA
Connecting dimensions Threaded connection Electrical connection 8-pole connector	 G ¾ M12 x 1	
Measurement range Rel. permittivity Viscosity Temperature	 1…7 8…400 -20…120	 - mm²/s °C
Measurement resolution Rel. permittivity Viscosity Temperature	 $1*10^{-4}$ 0,1 0,1	 - mm²/s K
Measurement accuracy [7)] Rel. permittivity [9)] Viscosity [8)] Temperature	 ± 0,05 ± 5 typ. ± 0,2	 - mm²/s K

Tabelle 1.1: Technische Daten

[1)] Permanently
[2)] Short term 120 °C
[3)] Automatic shutdown at U < 8 V and U > 36 V, for Load-Dump impulse over 50V is an extern protection needed
[4)] Outputs IOut1 and IOut2 are configurable (cmp. interface configuration chapter in the manual)
[5)] Option, not used at the moment
[6)] Shear-Viscosity, measured with SAW sensor, calibrated in Panolin HLP Synth 46 between 20°C und 100°C Reference: Ubbelohde Viscometer
[7)] Factory calibration
[8)] Depending on used type of oil
[9)] Calibrated in n-Pentan at 25°C

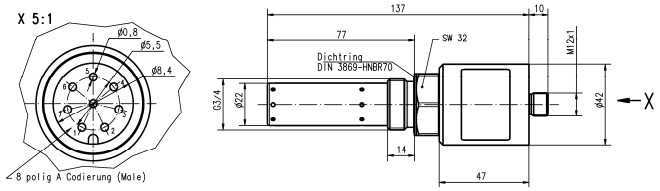

Fig. 1.1: Dimensional drawing

2. Installation

The sensor is designed as a screw-in sensor with 3/4" thread. Ideally the sensor is installed in hydraulic circuits in the tank or in the return line. For gear units with forced flush the sensor can also be arranged in the flush line. Always comply with maximum permissible pressures and temperatures when placing the sensor (see section 1).

Screw the sensor into a prepared receptacle in the tank, or in the return line. For installation in the return line, the return adapter (order number SCSO 100-5070) can also be used (see: fig. 3.1). The seal on the oil side is a profile sealing ring. To ensure correct seal the sealing surface of the sensor receptacle must be especially prepared and have a maximum roughness value of Rmax= 16. Sensor tightening torque is 45 Nm ±4.5 Nm.

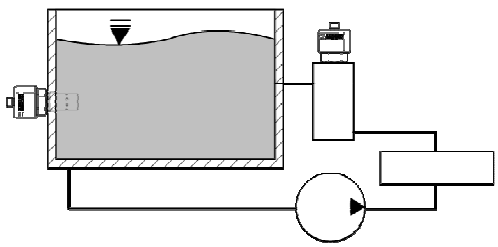

Fig. 2.1: Installation of a sensor in an oil tank or a line adapter

To ensure correct function comply with the following guidelines relative to install position and location of the sensor:

- The measurement should always be taken at a point that is characteristic for the system being monitored.

- The sensor should be installed at a point where the medium is sufficiently mixed
- For a tank installation ideally the sensor is mounted in the vicinity of the return line or flush line.
- Ensure that the sensor is completely covered with oil in all operating situations of the system. Pay particular attention to the floating volume of the tank or a possible diagonal position. Foam formation in the tank should be avoided.
- When installing in the return line or flush line do not allow the flush line to run empty in any operating situation.
- To avoid thermal influences to the extent possible the sensor should not be installed in the immediate vicinity of hot components and parts (e.g. motors).
- If the oil in the tank is not sufficiently mixed, it is possible that free water can settle on the floor of the tank. Consequently the sensor at position 1 would not detect the water. In thisspecial case installation position 2 would be recommended (see: fig. 3.2).

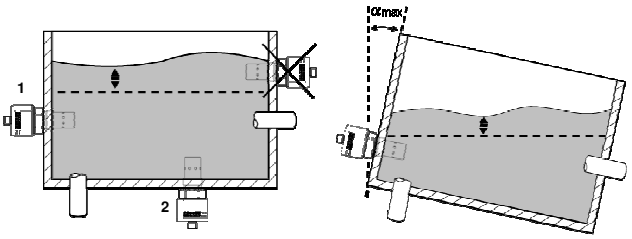

Fig. 2.2: Installation example of correct and incorrect mounting of the sensor in an oil tank

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.

Improper electrical connection of the sensor can damage the device!

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

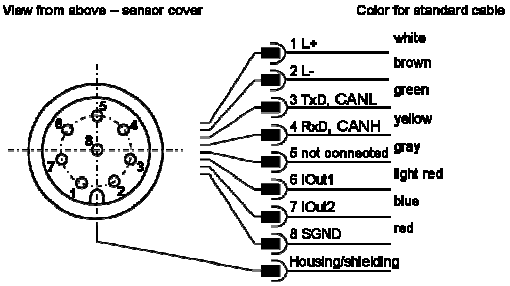

Fig. 3.1: Pin assignment, view from above the sensor

The permissible operating voltage is between 9 V and 33 V. The sensor cable must be shielded. To achieve IP67 degree of protection, only use suitable connectors and cable. The tightening torque for the connector is 0.1 Nm.

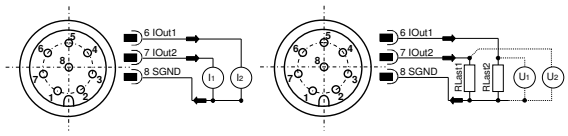

Fig. 3.2: Measuring the analog 4...20 mA outputs with and without load resistors

In order to measure the currents of the analog current output, a load resistor must be connected to each output as shown in fig. 4.2. The load resistor should be less than 100 ohm for 12 V power supply and less than 400 ohm for 24 V the power supply.

In order to derive the measurement value *X* (temperature, humidity, etc.) from the voltage *U* over the resistor *R* now applied, the voltages have to be converted with the formulas (4-1) – (4-4).

Ausgabegröße X	Ausgabebereich	Größengleichung	Formel
T in °C	-20°C...120°C	$X/°C = \frac{U/V}{R/\Omega} \cdot 8750\left(\frac{°C}{A}\right) - 55\,°C$	*(3-1)*
P; P40	1...5 4mA: Learning	$X = \frac{U/V}{R/\Omega} \cdot 266{,}667\left(\frac{1}{A}\right) - 0{,}333$	*(3-2)*
V; V40 in mm²/s	8 mm²/s... 400 mm²/s 4mA: Learning	$X/\frac{mm^2}{s} = \frac{U/V}{R/\Omega} \cdot 26{,}133\left(\frac{mm^2/s}{A}\right) - 122{,}666\frac{mm^2}{s}$	*(3-3)*

AP in %	0%...100%	$X = \frac{U/V}{R/\Omega} \cdot 6250\left(\frac{\%}{A}\right) - 25\%$	*(3-4)*

Table 3.1: Calculation of the measurement values

I_{out} in mA	4	5	12	20
T in °C	-20	-11,25	50	120
P; P40	Learning in progress	1	2,867	5
V; V40 in mm²/s	Learning in progress	8	190,9	398
AP in %	0	6,25	50	100

Table 3.2: Scaling of the current outputs for PLC calibration

4. Communication parameters RS232

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

#	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;LubCosMMSVis+; SN:xxxxx;...;CRC:x[CR][LF]
3	RCon[CR]	Reading of configuration parameters with subsequent CRC	$AO1:x;AO2:x;…; CRC:x[CR][LF]
4	RGrad[CR]	Reading of value gradients (over time and over temperature)	$Time:x.xxx[h]; PTG:x.xxx[1/K]; …CRC:x[CR][LF]
5	RMemO[CR]	Reading of memory organisation (header), names and units	Time [h]; T [°C]; P [-];P40 [-];PTG [1/K]; … [CR][LF]
6	RMem[CR]	Reading of complete memory, including header	$Time [h]; T [°C]; P [-]; … …[CR][LF]…;... [CR][LF]…
7	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