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**Filtration**

Suction filters



Clogging indicators



Ventilating filters



Return filters



Pressure filters



Return-suction filters



High pressure filters



Return-suction filters

**Description**

ARGO-HYTOS produces sophisticated filter solutions together with hydraulic and lubrication systems. The range of solutions we have implemented extends from fixed-position industrial plants to mobile applications.

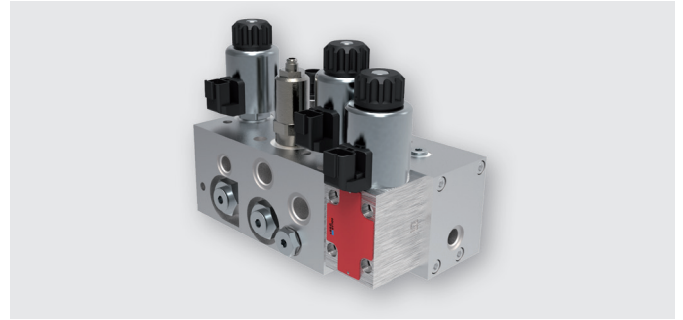
As well as customized developments, exactly adjusted to the individual requirements of the customer, ARGO-HYTOS offers a comprehensive range of innovative standard solutions for a wide variety of applications:

- › Suction filters
- › Return-suction filters and return filters
- › Pressure and high-pressure filters
- › Filling and ventilating filters
- › Filter accessories

## Fluid and Motion Control



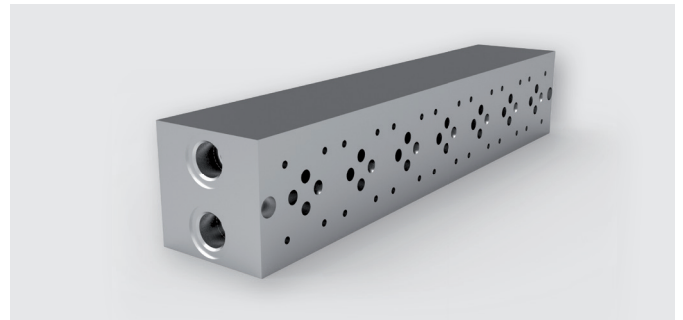
Customized solutions



Control solutions

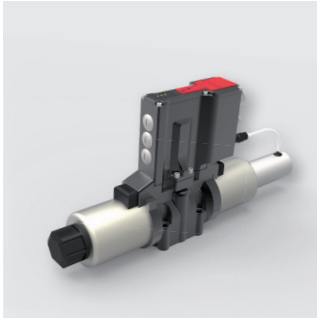


Gear pumps



Plates

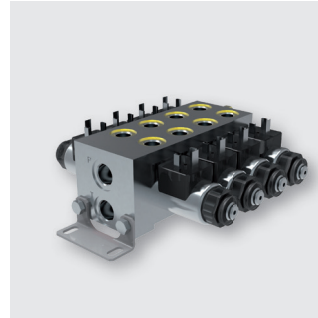
## Fluid and Motion Control



Directional and proportional valves



Modular valves



Sandwich valves



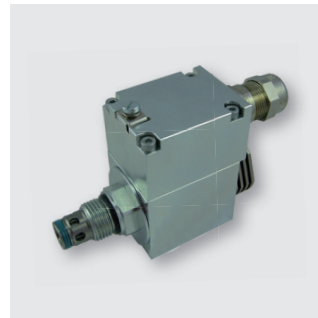
Screw-in cartridge valves



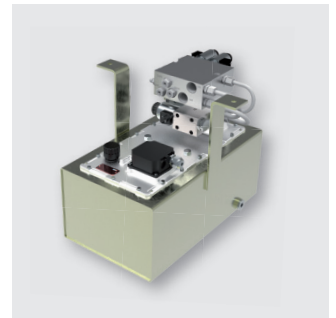
Slip-in cartridge valves



Load motion cartridges



Explosion proof valves



Hydraulic power packs

### Description

ARGO-HYTOS' expertise in control technology is the fruit of more than 65 years' experience. We focus here on a wide range of valves, power units and integrated manifolds featuring all commonly used design features and functions, together with proportional valves and the associated control electronics:

- › Directly operated directional valves in CETOP 02 to CETOP 05 and pilot operated directional valves in CETOP 07 and CETOP 08
- › Valves sub-plate and sandwich type – flow control, pressure and check valves in CETOP 02 to CETOP 05
- › Cartridge valves
- › Directly activated proportional valves with compensator sandwich valve, in CETOP 02 to CETOP 05
- › Analog and digital control electronics – on-board, or for installation in control cabinets
- › Power pack assembly kits
- › Customized control blocks

## Fluid Management



Off-line filter



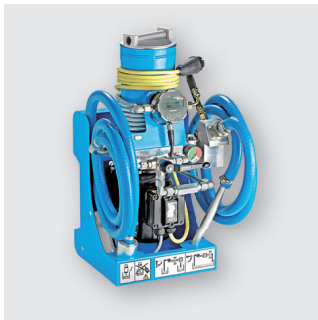
Off-line filter



Off-line filter unit



Off-line filter unit



Oil service unit



Oil service unit



Dewatering system



Dewatering system

### Description

As well as reducing maintenance and servicing costs, effective fluid management is also a key factor in boosting the reliability, productivity and cost-effectiveness of the operation. ARGO-HYTOS supplies application-oriented products for manual and automatic cleaning of hydraulic fluids:

- › Off-line filters
- › Off-line filter units
- › Filter cooling systems
- › Oil service units
- › Dewatering systems

## Sensors and Measurement



Portable particle counter



Portable oil lab



Particle monitor



Wear sensor



Condition sensors



Pressure sensor



Remote interfaces / display units



Valve electronics

### Description

Systems that provide reliable assessment of the condition of hydraulic fluids are the key feature of continuous fluid monitoring.

Sensors and measurement technology from ARGO-HYTOS precisely target this range of tasks. Our fluid monitoring products comprise equipment and system solutions to enable online monitoring during continuous operation as well as analysis of bottled samples under laboratory conditions.

- › Portable oil diagnosis equipment
- › Stationary and portable particle monitor
- › Oil condition sensors
- › Software to evaluate data and analyze trends





**Rental Units · Calibration · Oil Analysis · Services****Our Services for You**

The ARGO-HYTOS corporate philosophy focuses on integrated service for our costumers. Our process starts when we devise practical solutions, continue with product development and manufacturing, and extend through to our comprehensive after-sales service.

Today's global market environment calls for all-encompassing service concepts that are precisely tailored to the customer's requirements, so that unrestricted product benefit can be guaranteed.

For this reason, ARGO-HYTOS maintains its own distribution companies in key markets and cooperates with a network of professional service partners. The result: We are a globally active partner, present in all the world's decisive business regions and able to offer our customers the fullest possible service.

**Rental Units**

Should you need one of our instruments only for a certain time, we may supply you with a demo unit from our stock. This enables you to receive a replacement unit during maintenance work or to assure yourself of the quality of our products. We offer you e.g. oil service units, dewatering systems, oil particle counters and airborne particle counters. On the next page you will see our available units.

**Comprehensive Service**

Beginning with the planning, over the installation up to the maintenance of your individual Condition Monitoring Systems, we provide customized solutions from one source.

Do you have any questions? Please contact us:

**Consulting**

Are you interested in the topic Condition Monitoring and would like to equip your system with Sensors & Measurement technology respectively but you are short on experience? We will be pleased to support you with your measurement tasks and advise you regarding system integration and connection to your control system.

Benefit from our experience in various applications.

**Installation Service**

Do you need support with the installation of your Condition Monitoring System in your unit? We would like to support you. We will carry out mechanical installation, cabling, system integration, tests and initial operation.

If desired we will install a remote control system (e.g. GSM/Ethernet) and will take over the regular data recording and analysis.

**Calibration**

If you wish to certify your quality management according to ISO 9001ff, your measurement equipment has to be calibrated regularly. For this we offer a calibration service for our sensors including a corresponding certificate.

For testing of your particle counter, we also provide you with certified reference suspensions, in order to test the quality of your equipment at any time.

**Repair Service**

We will be pleased to check your equipment for errors and if needed we will make an estimate of the repairing costs. For fast and professional service we only use original spare parts.

**Laboratory Analysis**

The ARGO-HYTOS oil analysis includes the standard laboratory analysis as well as the extended condition analysis with the help of special electrical transducers. The condition of the oil may be analyzed more precisely. Please see the offered test methods on the following page.

Rental Units	Application
OPCount	Portable particle counter of the latest generation
PODS Pro	Portable particle counter with data storage and printer
OPCom portable	Portable particle monitor with data storage
OPCom <sup>1)</sup>	Stationary particle counter
LubCos H <sub>2</sub> O+ II <sup>1)</sup>	Oil condition sensor
LubCos Level <sup>1)</sup>	Combined oil condition and filling level sensor
LubCos Vis+ <sup>1)</sup>	Oil viscosity sensor
LubCos H <sub>2</sub> O <sup>1)</sup>	Combined water and temperature sensor
FA 016 / FAPC 016 <sup>2)</sup>	Compact oil service unit for easy filling or cleaning of hydraulic and lubricating systems
UM 045 / UMPC 045 / UMP 045 <sup>3)</sup>	Efficient oil service units for easy filling or cleaning of hydraulic and lubricating systems
COPS 010	Compact dewatering system for fast dewatering and filtering of oils
HHPC-6	Airborne particle counter: mobile solution for particle monitoring

<sup>1)</sup> Optionally with display and storage unit LubMon Visu

<sup>2)</sup> Optionally with integrated particle monitor

<sup>3)</sup> Optionally with integrated particle monitor or programmable oil diagnostic system

**Standard Laboratory Analysis consisting of:**

- › Kinematic viscosity at 40 °C and 100 °C (ISO 51562)
- › Slope m (DIN 51563)
- › Cleanliness level (ISO 4406:1999)
- › Neutralisation value (DIN 51558)
- › para. Determination of the water content (DIN EN ISO 12937) according to Karl Fischer

**Analysis with ARGO-HYTOS Condition Sensors consisting of:**

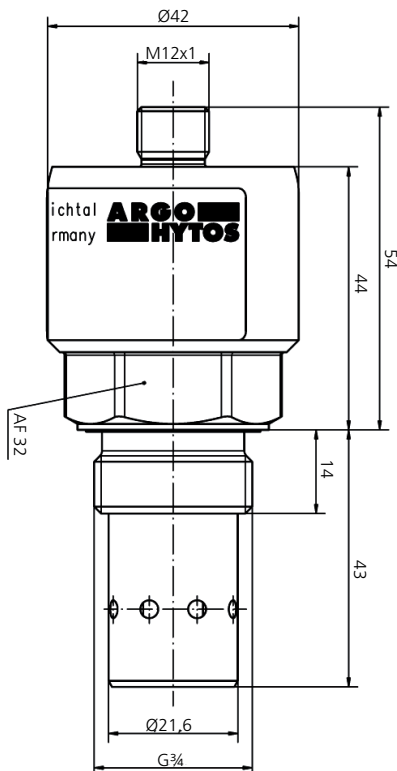
- › SAW dynamic viscosity
- › Slope m (DIN 51563)
- › Relative permittivity
- › Conductivity
- › Temperature range of the relative permittivity
- › Temperature range of the conductivity
- › Relative water content
- › Cleanliness level (ISO 4406:1999)

**Spectroscopy consisting of:**

- › UV/VIS/NIR-spectroscopy

**Humidity Sensor**
**LubCos H<sub>2</sub>O**

Continuous Oil Condition Monitoring


 LubCos H<sub>2</sub>O

**Description**
**Application area**

Water is not desired in hydraulic fluids and lubricants. High concentration of water can cause severe disturbance in operation and damage.

**Performance features**

The LubCos H<sub>2</sub>O measures the relative humidity of the oil and therefore displays the saturation degree in the water directly:

- › 0 %: Absolutely dry oil.
- › 100 %: The oil is completely saturated with water. Additional water will not be dissolved anymore and will present itself as free water.

In contrast to the humidity analysis from laboratories, where the absolute water content is defined in ppm (parts per million), the saturation limit of the oil can be determined by relative humidity measurement. The advantage of the relative humidity over the absolute water content is, that it is not necessary to know the oil or its saturation limit in order to determine if there is free or dissolved water.

**Example:**

- › Mineral oils (e.g. HLP) have a comparatively low water absorption capacity. 500 ppm may signify that the oil is over-saturated and that free water exists.
- › Ester oils (e.g. HEES) have a relatively high water capacity. 500 ppm may show that the oil is just saturated by 15 %.

Please also note the characteristics of the relative humidity with different temperatures: Warm oil can dissolve more water than cold oil. Therefore the relative humidity of the oil increases in case of no further water supply. Hot, relatively dry oil, may suddenly keep free water if the ambient temperature cools down.

The LubCos H<sub>2</sub>O points out the current saturation of the oil with water, independent from oil type and temperature and additionally assures operation of systems by directly warning.

**Measuring principle**

The sensor records the relative oil humidity and oil temperature. Through an oil specific calibration it is possible to calculate the absolute humidity up to the saturation limit.

The measuring values are given by RS232 and the analog outputs.

## Design characteristics

The sensor is provided with a G $\frac{3}{4}$  thread and can be integrated in the tank or via adapter in lines.

The communication with the sensor either takes place over a serial interface or over two analog outputs (4 ... 20 mA).

## Software

A free software for data recording and evaluation of the measured values can be downloaded from our website at [www.argo-hytos.com](http://www.argo-hytos.com) within the download area.

## Technical data

Sensor data	Size	Unit
Max. operating pressure	50	bar
<i>Operating conditions:</i>		
Temperature <sup>1)</sup>	-20 ... +85	°C
Rel. Humidity <sup>1)</sup>	0 ... 100	% r.H. (non-condensing)
Compatible fluids	mineral oils (H, HL, HLP, HLPD, HVLP), synthetic esters (HETG, HEPG, HEES, HEPR), polyalkylenglycols (PAG), zinc and ash-free oils (ZAF), polyalphaolefins (PAO)	
Wetted materials	aluminium, HNBR, polyurethane resin, epoxy resin, chemical nickel/gold (ENIG), soldering tin (Sn60Pb40, Sn96, 5Ag-3CuO, 5NiGe), aluminium oxide, glass (DuPont QQ550)	
Protection class <sup>2)</sup>	IP67	
Power supply <sup>3)</sup>	9 ... 33	V
Power input	max. 60	mA
<i>Output</i>		
Power output (2x) <sup>4)</sup>	4 ... 20	mA
Accuracy power output <sup>5)</sup>	± 2	%
Interface	RS232	-
<i>Connections</i>		
Threaded connection	G $\frac{3}{4}$	inch
Tightening torque threaded connection	45 ±4,5	Nm
Electrical connection	M12x1, 8-pole	-
Tightening torque M12-connector	0,1	Nm

## Measuring range

Rel. humidity	0 ... 100	%
Temperature	-20 ... +85	°C

## Measuring accuracy

Rel. humidity	1	% r.H.
Temperature	0,1	K

## Measuring accuracy<sup>6)</sup>

Rel. humidity (10 ... 90%) <sup>7)</sup>	±3	% r.H.
Rel. humidity (<10 %, >90 %) <sup>7)</sup>	±5	% r.H.
Temperature	±2	K

Response time humidity measurement (0 to 100 %)	<1	min
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Weight	115	g
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<sup>1)</sup> Outside the specified measuring range, there are possibly no plausible measuring values to be expected

<sup>2)</sup> With screwed on connector

<sup>3)</sup> Automatic switch off at U <8 V and U >36 V, with load-dump impulses over 50V an external protection must be provided

<sup>4)</sup> Outputs IOut1 and IOut2 are freely configurable (see interfaces and communication commands)

<sup>5)</sup> In relation to the analogue current signal (4 ... 20 mA)

<sup>6)</sup> Works calibration

<sup>7)</sup> Calibrated to air at room temperature

## Order code

LubCos H <sub>2</sub> O	SCSO 300-1000
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## Accessories

Screw-in block for mounting in a return line, connection G $\frac{3}{4}$	SCSO 100-5070
Complete data cable set, 5 m length	SCSO 100-5030
Data cable with open ends, 5 m length	SCSO 100-5020
Contact box for connection of a data cable	SCSO 100-5010
USB adapter - RS232 serial	PPCO 100-5420
Power supply	SCSO 100-5080
Ethernet - RS232 gateway	SCSO 100-5100
Display and storage device LubMon Visu	SCSO 900-1000

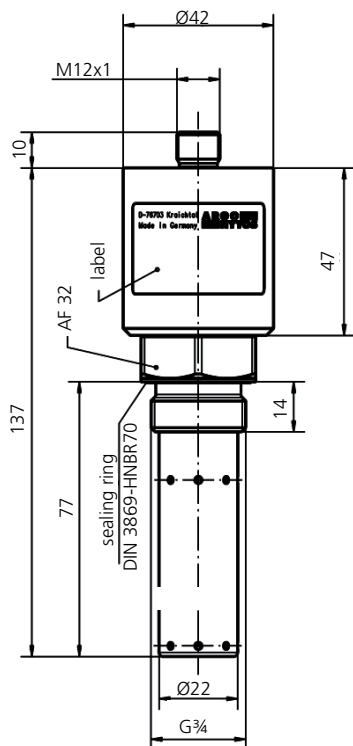
Lubrication Condition Sensor

# LubCos H<sub>2</sub>O+ II

Continuous Oil Condition Monitoring



LubCos H<sub>2</sub>O+ II



## Description

### Application area

Stationary screw-in sensor for the continuous determination of the oil condition, humidity and temperature in hydraulic and lubricating oils.

### Performance features

Measurement of changes in hydraulic fluids and lubricants. Data is continuously documented, evaluated and stored. In that way deterioration and changes in the oil (e.g. water leakage, oil change, ...) can be indicated. Through this, damage can be recognized or completely avoided at an early stage. This offers the opportunity to prevent machine failures as well as to prolong maintenance and oil change intervals by means of appropriate measures. Furthermore, by monitoring the lubricant, correctly performed maintenance work and the use of the required lubricant quality may be documented.

### Measuring principle

The sensor records the following physical oil characteristics as well as its periodic change: Temperature, relative oil humidity and water activity, relative dielectric number and conductivity of the fluid respectively.

As especially the conductivity and the relative dielectric number show a strong connection to the temperature, next to the characteristic values at current temperature the sensor also sends the data at reference temperature (40 °C). The sensor is able to evaluate condition changes automatically.

### Design characteristics

The sensor is provided with a G $\frac{3}{4}$  thread and can be e.g. integrated in a return line or the tank.

The communication with the sensor either takes place over a serial RS232 interface, two analog outputs (4 ... 20 mA) or CANopen.

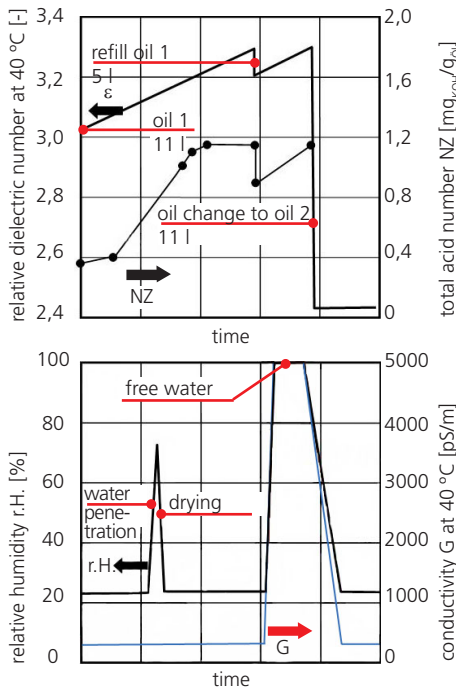
In order to also enable a long-term record of data up to half a year, the sensor is provided with an internal data storage unit.

### Software

A free software for data recording and evaluation of the measured values can be downloaded from our website at [www.argo-hytos.com](http://www.argo-hytos.com) within the download area.

## Application example

By using the sensor different changes of the oil condition can be detected. The following example shows a typical course of relative dielectric number, conductivity and relative humidity during various changes of the condition in the system. By means of the characteristics, different oil types may be differed, oil refreshing and oil change can be detected and the relative humidity, free water as well as the deterioration and deterioration rate can be defined respectively.



## Technical data

Sensor data	Size	Unit
Max. operating pressure	50	bar
<i>Operating conditions:</i>		
Temperature <sup>1)</sup>	-20 ... +85	°C
Rel. humidity <sup>1)</sup>	0 ... 100	% r.H. (non-condensing)
Compatible fluids	mineral oils (H, HL, HLP, HLPD, HVLP), synthetic esters (HETG, HEPG, HEES, HEPR), polyalkyleneglycols (PAG), zinc and ash-free oils (ZAF), polyalphaolefins (PAO)	
Wetted materials	aluminium, HNBR, polyurethane resin, epoxy resin, chemical nickel/gold (ENIG), soldering tin (Sn96, 5Ag3CuO, 5NiGe), aluminium oxide, glass (DuPont QQ550) gold, silver-palladium	
Protection class <sup>2)</sup>	IP67	
Power supply <sup>3)</sup>	9 ... 33	V
Power input	max. 0,2	A

<i>Output</i>		
Power output (2x) <sup>4)</sup>	4 ... 20	mA
Accuracy power output <sup>5)</sup>	± 2	%
Interfaces	RS232/CAN	-

<i>Connections</i>		
Threaded connection	G $\frac{3}{4}$	inch
Tightening torque threaded connection	45 ±4,5	Nm
Electrical connection	M12x1, 8-pol.	-
Tightening torque M12-connection	0,1	Nm

<i>Measuring range</i>		
Rel. dielectric number	1 ... 7	-
Rel. humidity	0 ... 100	% r.H.
Conductivity	100 ... 800000	pS/m
Temperature	-20 ... +85	°C

<i>Measuring resolution</i>		
Rel. dielectric number	1 * 10 <sup>-4</sup>	-
Rel. humidity	0,1	% r.H.
Conductivity	1	pS/m
Temperature	0,1	K

<i>Measuring accuracy<sup>6)</sup></i>		
Rel. dielectric number <sup>7)</sup>	rel. ±0,015	-
Rel. humidity (10 ... 90 %) <sup>8)</sup>	±3	% r.H.
Rel. humidity (<10 %, >90 %) <sup>8)</sup>	±5	% r.H.
Conductivity (100 ... 2000pS/m)	±200	pS/m
Conductivity (2000 ... 800000pS/m)	Typ. < ±10	%
Temperature	±2	K

Response time humidity (0 auf 100 %)	<10	min
Weight	140	g

- <sup>1)</sup> Outside the specified measuring range, there are possibly no plausible measuring values to be expected  
<sup>2)</sup> With screwed on connector  
<sup>3)</sup> Automatic switch off at U < 8 V and U > 36 V, with load-dump impulses over 50V an external protection must be provided  
<sup>4)</sup> Outputs IOut1 and IOut2 are freely configurable (see interfaces and communication commands)  
<sup>5)</sup> In relation to the analogue current signal (4 ... 20 mA)  
<sup>6)</sup> Works calibration <sup>7)</sup> Calibrated to n-Pentan at 25 °C  
<sup>8)</sup> Calibrated to air at room temperature

## Order code

LubCos H <sub>2</sub> O+ II	SCSO 100-1010
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## Accessories

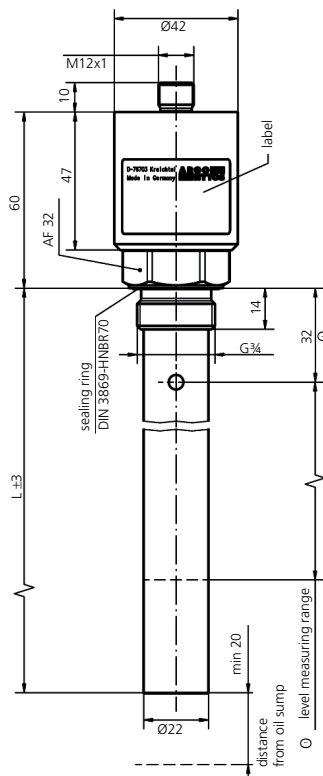
Screw-in block for mounting in a return line, connection G $\frac{3}{4}$	SCSO 100-5070
Complete data cable set, 5 m length	SCSO 100-5030
Data cable with open ends, 5 m length	SCSO 100-5020
Contact box for connection of a data cable	SCSO 100-5010
USB adapter - RS232 serial	PPCO 100-5420
Power supply	SCSO 100-5080
Ethernet - RS232 gateway	SCSO 100-5100
Display and storage device LubMon Visu	SCSO 900-1000

## LubCos Level

Continuous Oil Condition Monitoring



LubCos Level



LubCos Level 200: L = 200 mm, level measuring range = 115 mm  
 LubCos Level 375: L = 375 mm, level measuring range = 288 mm  
 LubCos Level 615: L = 615 mm, level measuring range = 515 mm

### Description

#### Application area

Stationary screw-in sensor for the continuous determination of the oil condition, humidity and temperature in hydraulic and lubricating oils as well as measuring the fluid level.

#### Performance features

Measurement of changes in hydraulic fluids and lubricants. Data is continuously documented, evaluated and stored. In that way deterioration and changes in the oil (e.g. water leakage, oil change, ...) can be indicated. Through this, damage can be recognized or completely avoided at an early stage. This offers the opportunity to prevent machine failures as well as to prolong maintenance and oil change intervals by means of appropriate measures. Furthermore, by monitoring the lubricant, correctly performed maintenance work and the use of the required lubricant quality may be documented.

#### Measuring principle

The sensor records the following different physical oil characteristics as well as its periodic change: Temperature, relative oil humidity and water activity, relative dielectric number, conductivity of the fluid and fluid level respectively. As especially the conductivity and the relative dielectric number show a strong connection to the temperature, next to the characteristic values at current temperature the sensor also sends the data at reference temperature (40 °C). The sensor is able to evaluate condition changes automatically.

#### Design characteristics

The sensor is provided with a G $\frac{3}{4}$  thread and can be integrated in the tank. The sensor that measures the oil parameters is on the end of the lance. This ensures that the sensor element is always fully immersed and the oil parameters and their changes may be correctly defined. Above the sensor element there is a special level transducer by which the filling level can be determined.

The communication with the sensor either takes place over a serial RS232 interface, two analog outputs (4 ... 20 mA) or CANopen.

In order to also enable a long-term record of data up to half a year, the sensor is provided with an internal data storage unit.

#### Software

A free software for data recording and evaluation of the measured values can be downloaded from our website at [www.argo-hytos.com](http://www.argo-hytos.com) within the download area.

## Technical data

Sensor data	Size	Unit
Max. operating pressure	50	bar
<i>Operating conditions:</i>		
Temperature <sup>1)</sup>	-20 ... +85	°C
Rel. humidity <sup>1)</sup>	0 ... 100	% r.H. (non-condensing)
Compatible fluids	mineral oils (H, HL, HLP, HLPD, HVLP), synthetic esters (HETG, HEPG, HEES, HEPR), polyalkylenglycols (PAG), zinc and ash-free oils (ZAF), polyalphaolefins (PAO)	
Wetted materials	aluminium, HNBR, polyurethane resin, epoxy resin, chemical nickel/gold (ENIG), soldering tin (Sn96, 5Ag3CuO, 5NiGe), aluminium oxide, glass (DuPont QQ550)) gold, silver-palladium	
Protection class <sup>2)</sup>	IP67	
Power supply <sup>3)</sup>	9 ... 33	V
Power input	max. 0,2	A
<i>Output</i>		
Power output (2x) <sup>4)</sup>	4 ... 20	mA
Accuracy power output <sup>5)</sup>	± 2	%
Interfaces	RS232/CAN	-
<i>Connections</i>		
Threaded connection	G $\frac{3}{4}$	inch
Tightening torque threaded connection	45 ±4,5	Nm
Electrical connection	M12x1, 8-polig	-
Tightening torque M12-connection	0,1	Nm
<i>Measuring range</i>		
Rel. dielectric number	1 ... 7	-
Rel. humidity	0 ... 100	% r.H.
Conductivity	100 ... 800000	pS/m
Temperature	-20 ... +85	°C
Fluid level	115/288/515	mm
<i>Measuring resolution</i>		
Rel. dielectric number	1 * 10 <sup>-4</sup>	-
Rel. humidity	0,1	% r.H.
Conductivity	1	pS/m
Temperature	0,1	K
Fluid level	0,1	%

## Measuring accuracy<sup>6)</sup>

Rel. dielectric number <sup>7)</sup>	±0,015	-
Rel. humidity (10 ... 90 %) <sup>8)</sup>	±3	% r.H.
Rel. humidity (<10 %, >90 %) <sup>8)</sup>	±5	% r.H.
Conductivity (100 ... 2000pS/m)	±200	pS/m %
Conductivity (2000 ... 800000pS/m)	Typ. <±10	K %
Temperature	±2	
Fluid level	Typ. <±5	

Response time humidity measurement (0 to 100 %) <10 min

Weight 170/210/250 g

<sup>1)</sup> Outside the specified measuring range, there are possibly no plausible measuring values to be expected

<sup>2)</sup> With screwed on connector

<sup>3)</sup> Automatic switch off at U <8 V and U >36 V, with load-dump impulses over 50V an external protection must be provided

<sup>4)</sup> Outputs IOut1 and IOut2 are freely configurable (see interfaces and communication commands)

<sup>5)</sup> In relation to the analogue current signal (4 ... 20 mA)

<sup>6)</sup> Works calibration

<sup>7)</sup> Calibrated to n-Pentan at 25 °C

<sup>8)</sup> Calibrated to air at room temperature

## Order code

LubCos Level 200, length 200 mm SCSO 150-1200

LubCos Level 375, length 375 mm SCSO 150-1375

LubCos Level 615, length 615 mm SCSO 150-1615

## Accessories

Complete data cable set,  
5 m length SCSO 100-5030

Data cable with open ends,  
5 m length SCSO 100-5020

Contact box for connection of  
a data cable SCSO 100-5010

USB adapter - RS232 serial PPCO 100-5420

Power supply SCSO 100-5080

Ethernet - RS232 gateway SCSO 100-5100

Display and storage device  
LubMon Visu SCSO 900-1000

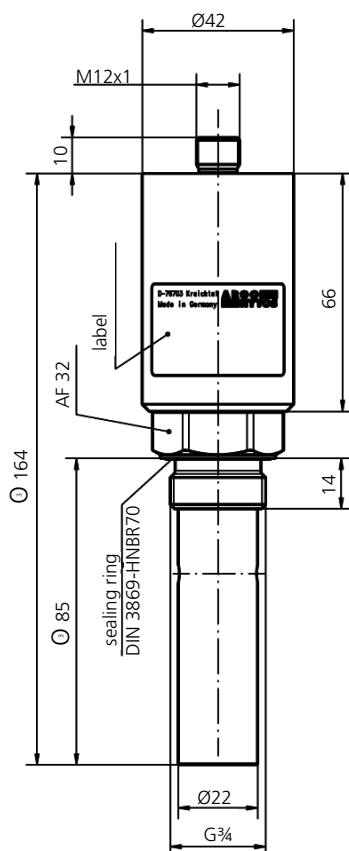


## LubCos Vis+

Continuous Oil Condition Monitoring



LubCos Vis+



### Description

#### Application area

Sensor for determination of the viscosity, relative dielectric number and temperature in hydraulic and lubricating oils. The sensor is a screw-in sensor and immersion sensor respectively and is designed for continuous monitoring of the oil condition.

#### Performance features

Measurement and documentation of changes in hydraulic fluids and lubricants. The measured values are continuously documented, evaluated and stored. In that way deterioration and changes in the oil (e.g. viscosity and polarity) can be indicated. Through this, damage can be recognized or completely avoided at an early stage. By monitoring of the lubricant, it is also possible to record service measures and the use of the prescribed lubricant quality.

#### Measuring principle

The sensor records the following physical oil characteristics as well as periodic changes: Temperature, SAW-shear viscosity, and the relative dielectric number of the fluid. As the viscosity and the relative dielectric number show a strong connection to the temperature, the sensor additionally sends -after a learning phase - compensated values at a reference temperature (40 °C). The sensor is able to evaluate constitutional changes as well as its own functional condition automatically. Alarm messages, warnings and errors are displayed as error codes.

#### Design characteristics

The sensor is provided with a G $\frac{3}{4}$  thread and can be integrated in the return line or the tank. Optionally the sensor can be used as immersion sensor for analyzing of oil samples. The communication with the sensor takes place optionally over a serial RS232 interface, CANopen or over two analogue outputs (4 ... 20 mA). In order to enable a long-term recording of data, the sensor is also provided with an internal storage unit.

#### Software

A free software for data recording and evaluation of the measured values can be downloaded from our website at [www.argo-hytos.com](http://www.argo-hytos.com) within the download area.

## Technical data

Sensor data	Size	Unit
Max. operating pressure	50	bar
<i>Operating conditions:</i>		
Temperature <sup>1)</sup>	-20 ... +85	°C
Rel. humidity <sup>1)</sup>	0 ... 100	% r.H. (non-con- densing)
Compatible fluids	mineral oils (H, HL, HLP, HLPD, HVLP), synthetic esters (HETG, HEPG, HEES, HEPR), polyalkylenglycols (PAG), zinc and ash-free oils (ZAF), polyalphaolefins (PAO)	
Wetted materials	aluminium, HNBR, polyurethane resin, epoxy resin, chemical nickel/gold (ENIG), soldering tin (Sn96, 5Ag3CuO, 5NiGe), aluminium oxide, glass (DuPont QQ550) silicon carbide, silicon oxide	
Protection class <sup>2)</sup>	IP67	
Power supply <sup>3)</sup>	9 ... 33	V
Power input	max. 0,2	A
<i>Output</i>		
Power output (2x) <sup>4)</sup>	4 ... 20	mA
Accuracy power output <sup>5)</sup>	± 2	%
Interfaces	RS232/CAN	-
<i>Connections</i>		
Threaded connection	G $\frac{3}{4}$	inch
Tightening torque threaded connection	45 ±4,5	Nm
Electrical connection	M12x1, 8-polig	-
Tightening torque M12-connection	0,1	Nm
<i>Measuring range</i>		
SAW-shear viscosity	8 ... 400	mm <sup>2</sup> /s
Rel. dielectric number	1 ... 7	-
Temperature	-20 ... +85	°C
<i>Measuring resolution</i>		
SAW-shear viscosity	0,1	mm <sup>2</sup> /s
Rel. dielectric number	1 * 10 <sup>-3</sup>	-
Temperature	0,1	K
<i>Measuring accuracy<sup>6)</sup></i>		
SAW-shear viscosity (8 ... 100 mm <sup>2</sup> /s) <sup>7)</sup>	Typ <±5	mm <sup>2</sup> /s
SAW-shear viscosity (100 ... 400 mm <sup>2</sup> /s) <sup>7)</sup>	Typ <±5	%
Rel. dielectric number <sup>8)</sup>	±0,02	-
Temperature	±0,5	K
Weight	155	g

<sup>1)</sup> Outside the specified measuring range, there are possibly no plausible measuring values to be expected

<sup>2)</sup> With screwed on connector

<sup>3)</sup> Automatic switch off at U < 8 V and U > 36 V,

with load-dump impulses over 50V an external protection must be provided

<sup>4)</sup> Outputs IOut1 and IOut2 are freely configurable

(see interfaces and communication commands)

<sup>5)</sup> In relation to the analogue current signal (4 ... 20 mA)

<sup>6)</sup> Works calibration

<sup>7)</sup> Depending on the oil type

<sup>8)</sup> Calibrated to n-Pentan at 25 °C

## Order code

LubCos Vis+ SCSO 200-1000

## Accessories

Screw-in block for mounting in  
a return line, connection G $\frac{3}{4}$  SCSO 100-5070

Complete data cable set,  
5 m length SCSO 100-5030

Data cable with open ends,  
5 m length SCSO 100-5020

Contact box for connection of  
a data cable SCSO 100-5010

USB adapter - RS232 serial PPCO 100-5420

Power supply SCSO 100-5080

Ethernet - RS232 gateway SCSO 100-5100

Display and storage device  
LubMon Visu SCSO 900-1000

Pressure Sensor

**PSC**

Continuous Oil Condition Monitoring



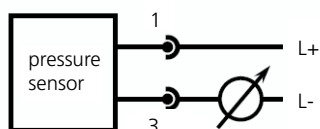
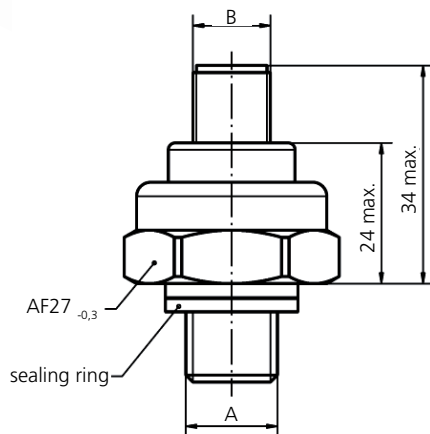
PSC

Description

**Application area**

The new pressure sensors of series PSC of ARGO-HYTOS have been developed for mobile and industrial applications. The used thin film technology provides a hermetically sealed design which does not need an inner seal. Together with the stainless steel housing, the sensor is extremely sturdy and suitable for measurements in all fluids or gases. The sensor is resistant to pressure peaks, high temperatures as well as excessive vibrations and can therefore also be used under extreme conditions.

A wide range of pressure and plug variants allows use in various applications. Thanks to the low weight and the compact design the sensor is especially suited for OEMs, requiring direct integration into the machine e.g. in pressure measurement at control blocks.



## Technical data

Pressure range (relative pressure)		PSC 010-1713	PSC 100-1843	PSC 250-1843	PSC 400-1843
Measuring range	bar	10	100	250	400
Overload pressure	bar	20	200	375	600
Burst pressure	bar	30	300	500	800
Service life		10 mio. pressure cycles			
Output signal - options		4 ... 20 mA			
Auxiliary power UB	VDC	8-30			
Current consumption	mA	signal current (max. 20) for current output			
Insulation voltage	VDC	500			
Total error in the nominal temperature range	%	≤ 1,0 % of margin			
Response time	ms	≤ 2 ms, max. up to 63 % of full scale pressure with step change on input			
Accuracy	%	≤ 0,5 % of margin			
Nonlinearity	%	≤ 0,1 % of margin			
1-year stability	%	≤ 0,2 % of margin			
Pressure connection		G1/4" A DIN 3852-E			
Electrical connection (plug) / IP		M12-4POLE	M12-4POLE	M12-4POLE	IP 67
Protection classes					
Weight	g	ca. 80			

### Materials in contact with measured medium

Pressure connection / housing	1.4301
Sensor measuring cell	1.4542 or comparable

### Permitted temperature range

Media temperature	°C	-30 °C ... +110 °C
Ambient temperature range	°C	-30 °C ... +100 °C*
Storage temperature range	°C	-30 °C ... +100 °C*
*Limited temperature range with M12 connection plug	°C	-15 °C ... +85 °C
Nominal temperature range	°C	0 ... +80 °C
Vibration resistance	g	20 according IEC 60068-2-6 (vibration under resonance)
	PSD	20 according IEC 60068-2-64 (noises)

EMV tests	EN 61000-4-1 to -6 EN 61000-6-4
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### CE conformity

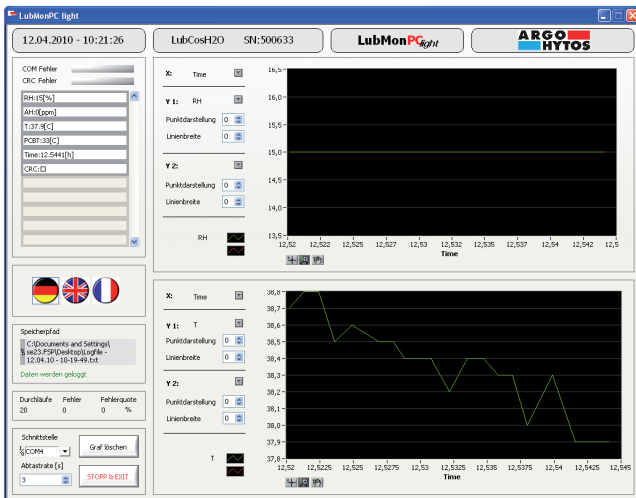
EMV Directive	2004/108/EG noise emission and interference resistance
Pressure Equipment Directive	Classification according to Pressure Equipment Directive 97/23/EG as pressure maintaining components with safety function (artikel 3. sect. 3).
RoHs conformity	yes

## Order code

Order code	Pressure range	Output	Seal	Connection „A“ Material 1.4301	Electrical connection „B“
PSC 400-1843	0 - 400 bar	4-20 mA	Aluminium washer	G1/4 A DIN 3852-A	M12 - 4pole
PSC 250-1843	0 - 250 bar	4-20 mA	Aluminium washer	G1/4 A DIN 3852-A	M12 - 4pole
PSC 100-1843	0 - 100 bar	4-20 mA	Aluminium washer	G1/4 A DIN 3852-A	M12 - 4pole
PSC 010-1713	0 - 10 bar	4-20 mA	FKM (Viton) O-ring	G1/4 A DIN 3852-E	M12 - 4pole

# LubMon PClight

Continuous Oil Condition Monitoring



LubMon PClight

## Description

### Application area

The software LubMon PClight allows recording, storing and visualizing the incoming data from the condition sensors LubCos H<sub>2</sub>O, LubCos H<sub>2</sub>Oplus II, LubCos Level, LubCos Visplus and OPCOM II.

### Performance features

The scope of operation of the LubMon PClight is specified below:

#### Communication

- › communication optionally over RS232 journal or TCP/IP
- › free selection of IP-address, port number and COM-Port
- › free adjustability of the sampling rate

#### Graphical visualisation of the measured data

- › two diagrams with respectively two y-axis and one x-axis
- › flexible axis assignment
- › logarithmic and linear axis display
- › diverse zoom and formatting options
- › list display of the currently measured data and units

#### Storing

- › start/stop-function for automatic storing
- › storing in .txt-format with header for series of measurement and labelling of the units
- › recording of the current timestamp

#### Others

- › intuitive operation

### System requirements

The software is written in NI-LabVIEW. For operation the current runtime environment LabVIEWRun-Time Engine and the NI.Visa Runtime Engine are necessary. This can optionally be downloaded together with the programme in packet.

The system requirements apply to the requirements of the runtime environment. The following operating systems are supported: Windows 2000/XP/Vista x86/Vista x64/Windows 7.

### Software

The software can be downloaded from our website at [www.argo-hytos.com](http://www.argo-hytos.com).

## Order code

LubMonPC <i>light</i>	SCSO 800-1000
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## Supported sensors

LubCos H <sub>2</sub> O	SCSO 300-1000
LubCos H <sub>2</sub> O <i>plus</i> II	SCSO 100-1010
LubCos Level 200	SCSO 150-1200
LubCos Level 375	SCSO 150-1375
LubCos Level 615	SCSO 150-1615
LubCos <i>Visplus</i>	SCSO 200-1000
OPCom II	SPCO 300-1000
OPCom Ferros	SPCO 500-1000

## Zubehör

Contact box for connection of a data cable, M12 x 1,8-pin	SCSO 100-5010
Data cable with open ends (5m)	SCSO 100-5020
Complete data cable set, M12 x 1,8-pin, (5m)	SCSO 100-5030
USB adapter - RS232 serial	PPCO 100-5420
Power supply	SCSO 100-5080
Ethernet - RS232 gateway for sensor connection	SCSO 100-5100

# LubMon Visu

Continuous Oil Condition Monitoring



LubMon Visu

## Description

### Application area

LubMon Visu is a display unit, suitable for panel-mounting, with integrated data memory for connection of various sensors. ARGO-HYTOS offers a wide range of compatible sensors for monitoring of hydraulic and lubricating fluids. These are amongst others particle monitors, temperature, humidity and oil aging sensors as well as sensors for monitoring of the filter lifetime. Furthermore any sensor with analog current output may be connected e. g. for pressure or filter monitoring.

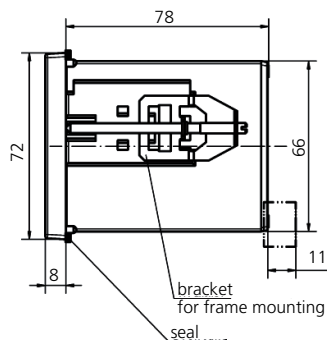
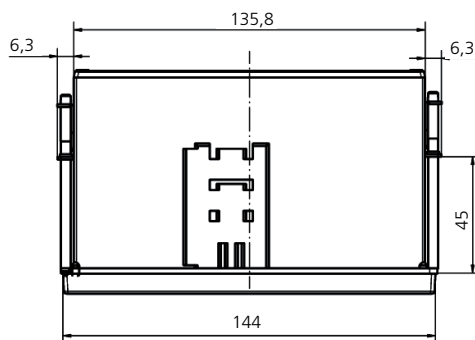
### Performance features

Two sensors with serial interface as well as two sensors with analog interface may additionally be attached to the LubMon Visu. The recorded measured values are collected in the data memory and may be copied onto a SD-memory card if desired. By means of the integrated display the current measured values as well as the stored data may be indicated with timestamp. Navigation through the data and the operating menu is carried out over six keys at the front side of the module. Besides of the graphical display, alarms and status information are shown by four LEDs.

Communication with a processor or a SPS is effected by USB 2.0 or optionally by Ethernet. In order to activate the switch signals, there are also three potential-free switch contacts available. Optionally the printer, listed under accessories, may be connected to the module.

### Design characteristics

LubMon Visu is designed for panel-mounting. Cabling is effected by the plug at the back side of the device. The sensors are supplied with power by the connecting plugs also.



## Technical data

Module data	Size	Unit
<i>Power supply</i>		
Voltage	9 ... 33	VDC
Power input	typ. 100 max. 300	mA
<i>Ambient conditions</i>		
Temperature, operation	0 ... +60	°C
Temperature, storing	+5 ... +50	°C
Humidity, operation	0 ... 95	%
Humidity, storing	0 ... 95	%
<i>Connections</i>		
RJ45 <sup>1)</sup>	1x	
8-pole switch contact, provided with thread	3x	
USB-B	1x	
SD-card slot	1x	
<i>Operation</i>		
Membrane keyboard	6	keys
<i>Display</i>		
Graphical display	128 x 32	pixel
Brightness	adjustable	

<sup>1)</sup> Only available with Ethernet version

## Order code

LubMon Visu, standard	SCSO 900-1000
LubMon Visu, Ethernet	SCSO 900-1010

### Compatible sensors

LubCos H <sub>2</sub> O	SCSO 300-1000
LubCos H <sub>2</sub> Oplus II	SCSO 100-1010
LubCos Level 200	SCSO 150-1200
LubCos Level 375	SCSO 150-1375
LubCos Level 615	SCSO 150-1615
LubCos Visplus	SCSO 200-1000
OPCom II	SPCO 300-1000

### Accessories

Connecting plug	SCSO 900-5010
Data cable with open ends, 5 m length	SCSO 100-5020
USB-SD card reader	SCSO 900-5040
SD-card	SCSO 900-5050
Compatible thermal printer	SCSO 900-5070
USB-cable	SCSO 900-5060
Retaining clips	SCSO 900-5030



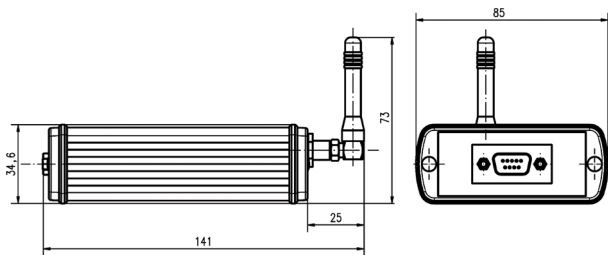
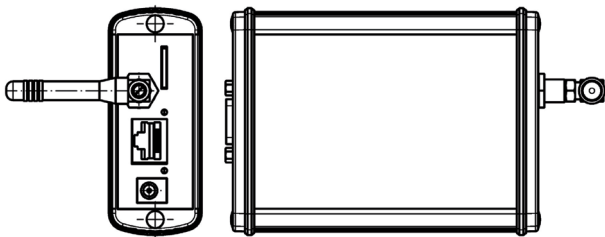
Remote Interface

# LubMon Connect

Continuous Oil Condition Monitoring



LubMon Connect



## Description

### Application area

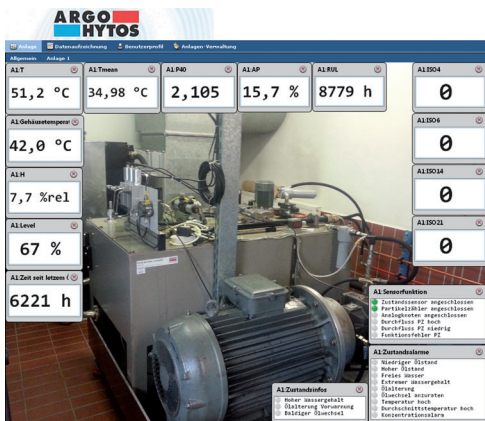
The LubMon Connect is a remote gateway for connection of ARGO-HYTOS sensors via a CANopen interface. The data of the connected sensors are automatically transferred to a web database and can be displayed or exported via an internet page.

By the use of the CAN Bus and the CANopen protocol a simple and robust possibility is provided to integrate the sensors into existing systems in order to guarantee secure communication.

At the gateway an ethernet interface and a GSM module are provided for data transfer to the internet. The communication can be carried out either via the at the location existing network or - e.g. with mobile or remote systems - also via the worldwide available GSM network.

The LubMon Connect communicates with an internet server which can store all incoming data in variable time intervals. The data can directly online be visualized in form of diagrams or exported for processing. For this purpose a ring memory of 100.000 data sets is available.

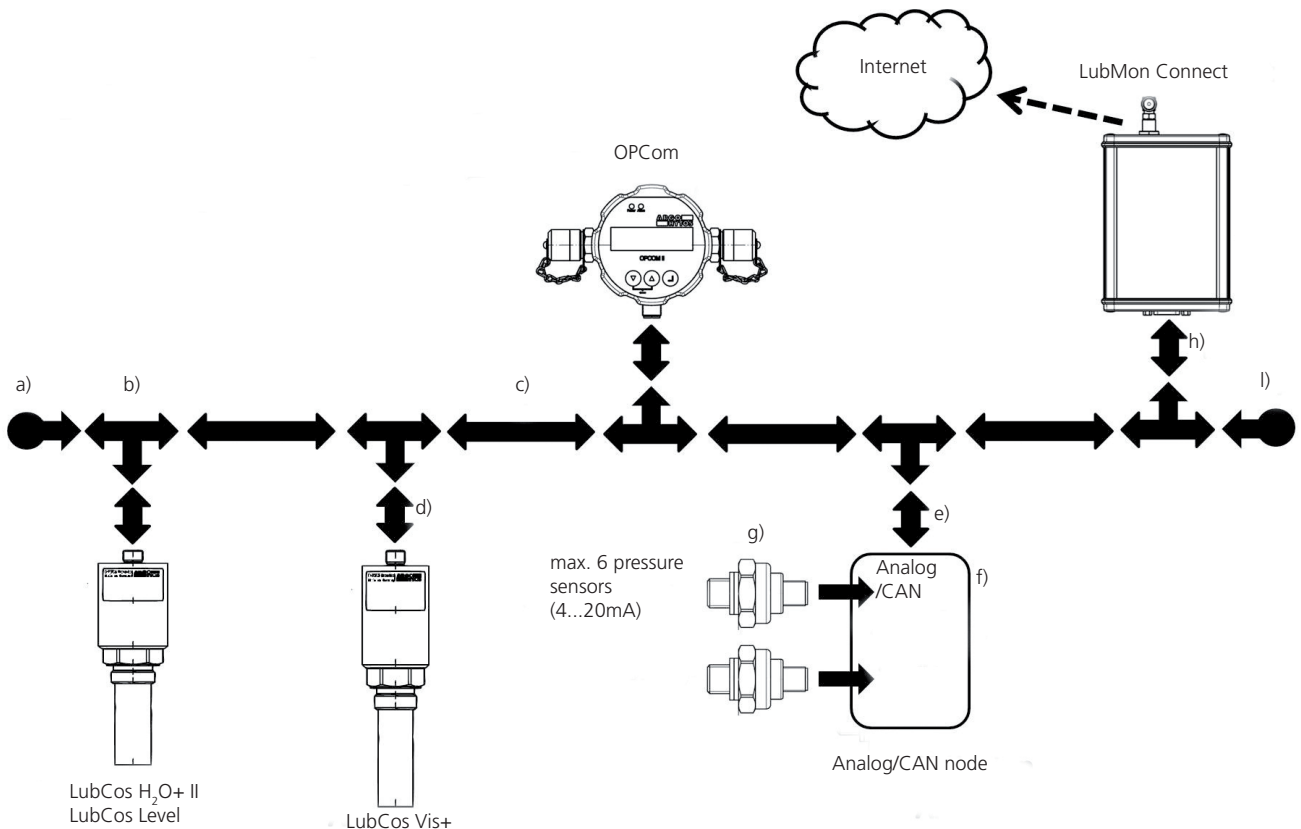
Note: If desired, Condition Monitoring Systems with LubMon Connect and sensors may be supplied ready for connection (plug & play). For the internet portal of the LubMon Connect an annual fee shall be due.



## Technical data

Data	Size	Unit	Data	Size	Unit
<i>Ambient conditions operation</i>			<i>GSM</i>		
Temperature	+5 ... +50	°C	Aerial	Stub Antenna FME	-
Humidity	0 ... 95	% r.H.	Transmission power @ 850/900 MHz	2	W
<i>Ambient conditions storing</i>			Transmission power @ 1800/1900 MHz	1	W
Temperature	0 ... +60	°C	SIM card type	standard SIM card 1,8V / 3V	-
Humidity	0 ... 95	% r.H.	Frequencies	850 / 900 / 1800 / 1900 (Quad-Band EGSM)	MHz
Power supply	12 ... 28	VDC	<b>Optical indications</b>		
Power input	max. 0,3	A	Power-LED	green	
<i>CAN interface</i>			Ethernet-LED	yellow	
Plug	SUB-D9	-			
Bus speeds	100 / 125 / 250 / 500	kBaud			
Protocol	CANopen				
<i>Ethernet interface</i>					
Connection type	RJ45	-			
Speed	10/100	MBit			
Protocol	UDP				

## Connection diagram (example)



## Order code

Fixing clamp LM Connect short side	SCSO 700-5010
Fixing clamp LM Connect long side	SCSO 700-5020
Subscription for one-year-use LM Connect	SCSO 700-5030
SMS-Card 50 pcs. LM Connect	SCSO 700-5040
a) CAN terminator female	SCSO-700-5160
b) CAN T-connector	SCSO 700-5140
c) CAN cable standard 2 m	SCSO 700-5120
d) CAN sensor cable	SCSO 700-5110
e) CAN cable open leads 0,3 m	SCSO 700-5130
f) Analog CAN adapter LM Connect	SCSO 700-5060
g) PSC pressure sensor	PSC 400-1843 PSC 250-1843 PSC 100-1843 PSC 010-1713
h) Sub-D CAN adapter LM Connect	SCSO 700-5050
i) CAN terminator male	SCSO 700-5150

## Supported sensors

LubCos H <sub>2</sub> O+ II	SCSO 100-1010
LubCos Level 200	SCSO 150-1200
LubCos Level 375	SCSO 150-1375
LubCos Level 615	SCSO 150-1615
LubCos Vis+	SCSO 200-1000
OPCom	SPCO 300-1000



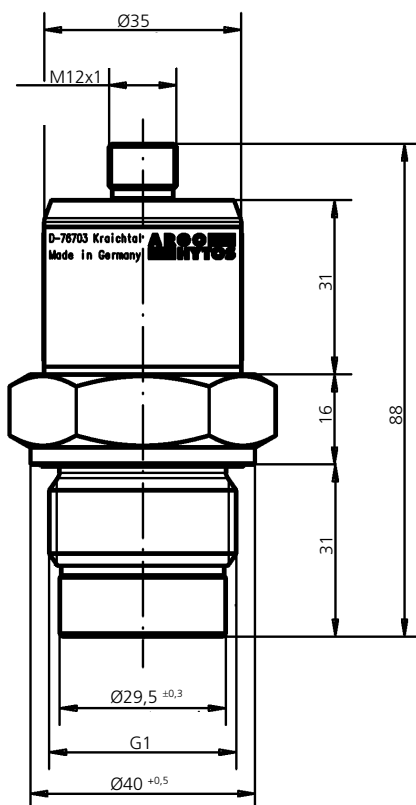
Wear Sensor

## OPCom FerroS

Continuous Oil Condition Monitoring



OPCom FerroS



### Description

#### Application area

The OPCom FerroS is an intelligent sensor for determination of the condition of hydraulic and lubricating systems based on ferromagnetic wear particles. The sensor is a screw-in / immersion sensor and is designed for continuous monitoring of ferromagnetic contamination in oil.

#### Performance features

The sensor measures the wear of mechanical components by detecting ferromagnetic particles. The number of particles is continuously recorded and evaluated by an inductive measuring principle. Transfer is effected via digital and analog interface. Recognition of wear and damage at an early stage allows planning of servicing measures and machine failures can be minimized.

#### Measuring principle

The sensor records the number of ferromagnetic particles accumulating at the permanent magnet at the sensor head. In this regard, the sensor can distinguish between fine particles in the micrometer range and coarse ferromagnetic fragments in the millimeter range. According to the output signal of 0 ... 100% the distribution of ferromagnetic particles at the sensor surface can be read off. Furthermore the sensor may compensate the magnetic field of the permanent magnet, whereupon the particles will dissolve from the sensor head (automatic cleaning process). With the time intervals between two cleaning processes, a change in wear can be assumed.

#### Design characteristics

The sensor is provided with a G1" thread and can directly be integrated in a gearbox or in the lubricating circuit. The communication with the sensor either takes place over a serial RS232 interface, CAN (CANopen or SAE J1939) or via an analog output (4 ... 20mA).

## Technical data

Sensor data	Size	Unit
Max. Operating pressure	20	bar
<i>Operating condition</i>		
Temperature	-40 ... 85	°C
Humidity <sup>1)</sup>	0 ... 100	% r.H.
<i>Min. distance for attraction of fine particles (1g) in oil with</i>		
Kin. visosity <100mm <sup>2</sup> /s	~9,0	mm
Kin. viscosity 300mm <sup>2</sup> /s	~7,5	mm
Kin. viscosity 500mm <sup>2</sup> /s	~7,0	mm
<i>Min. necessary flow velocity for automatic cleaning process</i>		
	0,05	m/s
Max. flow velocity	1,0	m/s
Compatible fluids	Mineral oils (H, HL, HLP, HLPD, HVLP) synthetic esters (HETG, HEPG, HEES, HEPR), polyalkylen glycols (PAG), zinc and ash-free oils (ZAF), polyalphaolefines (PAO)	
Wetted materials	aluminium, polyamide (PA6 GF30), HNBR, epoxy resin	
Protection class <sup>2)</sup>	IP 67	
Power supply <sup>3)</sup>	9... 33	VDC%
Power input	max. 0,5	A
<i>Output</i>		
Output analog <sup>4)</sup>	4 ... 20	mA
Accuracy of power output <sup>5)</sup>	±2	%
Interface digital	RS232/CAN	-
<i>Connection</i>		
Threaded connection	G1	inch
Tightening torque thread	50 ±5	Nm
Electrical connection	M12x1, 8-pole	-
Tightening torque M12-plug	0,1	Nm
<i>Measuring range</i>		
Fine particles	0 ... 100	%
Coarse particles	1 ... 10	-
<i>Measuring resolution</i>		
Fine particles	0,1	%
Coarse particles	1	-
<i>Repeat accuracy</i>		
Fine particles	±5	%
Weight	~190	g

1) Non-condensing

2) With screwed-on connector

3) Automatic switch-off at U < 8 V and U > 36 V

4) Output is freely configurable (see interface and communication commands)

5) In relation to digital output value

## Order code

OPCom FerroS	SPCO 500-1000
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## Accessories

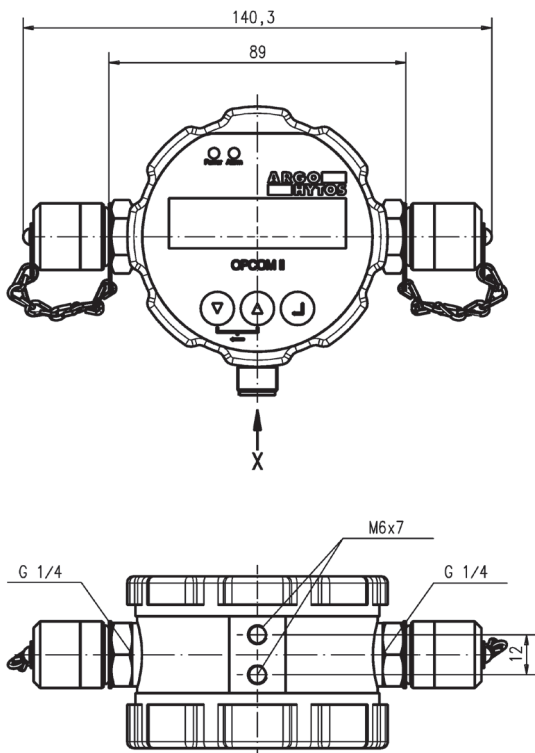
Complete data cable set, 5 m length	SCSO 100-5030
Data cable with open ends, 5 m length	SCSO 100-5020
Contact box for connection of a data cable	SCSO 100-5010
USB adapter - RS232 serial	PPCO 100-5420
Power supply	SCSO 100-5080
Ethernet - RS232 gateway	SCSO 100-5100
Display and storage device LubMon Visu	SCSO 900-1000

# OPCom Particle Monitor

Continuous Oil Condition Monitoring



OPCom Particle Monitor



Dimension drawing

## Description

### Application area

The OPCom Particle Monitor is a compact particle measurement device for continuous monitoring of the contamination in hydraulic fluids and lubricants.

### Performance features

#### *Recognizing changes in your hydraulic fluid*

Particle monitors precisely display any change of contamination in your system. In that way you can react quickly when an increase in particle concentration occurs and the appropriate countermeasures can be taken. Subsequent damages are minimized and costs are reduced.

#### *High pressure range*

The OPCom Particle Monitor is designed for operating with pressures of up to 420 bar. In that way it can be mounted directly to a pressure line.

#### *Intuitive operating*

The OPCom Particle Monitor is equipped with an intensely illuminated graphic display and a keypad by which you may set up all required adjustments. The menu navigation is made up intuitively and logically.

#### *Wide communication possibilities*

The OPCom Particle Monitor exports data to a serial interface or optionally to a CAN-Bus (CANopen + SAE J1939). Parallel, the configurable 4 - 20 mA interface can be connected. Over a digital alarm output you will be warned when limits are exceeded or fallen below. Readings can run time-controlled, manually or started and stopped over a digital input. The data can also be stored on the integrated memory unit.

#### *Design characteristics*

On the fluid side the OPCom Particle Monitor is equipped with two Minimes connections to connect the sensor generally in the off-line circuit to the system. The electrical connection is installed via an 8-pole M12 x 1 circular plug. The integrated data memory allows data recording over a longer period. Besides all its technical functions the OPCom Particle Monitor scores by its compact and optical design.

## Measuring principle

The OPCom Particle Monitor is an optical particle monitor which works to a so-called light extinction principle. This means that the particles are classified within a measuring cell with the help of a laser regarding their size and quantity.

## Software

A free PC-software for data recording and evaluation of the measured values can be downloaded from our website at [www.argo-hytos.com](http://www.argo-hytos.com) within our download area.

Technical data		
Sensor data	Size	Unit
<i>Max. operating pressure:</i>		
dynamic	420	bar
static	600	bar
Permissible flow rate	50 ... 400	ml/min
<i>Operating conditions:</i>		
Temperature	-20 ... +85	°C
Rel. humidity	0 ... 100	% r.H. (non-condensing)
Display readable up to	60	°C
Compatible fluids	mineral oils (H, HL, HLP, HLPD, HVLP), synthetic esters (HETG, HEPG, HEES, HEPR), polyalkylenglycols (PAG), zinc and ash-free oils (ZAF), polyalphaolefins (PAO)	
Wetted materials	Stainless steel, sapphire, chrome, NBR, minimesse coupling: Zinc/nickel	
Protection class <sup>1)</sup>	IP67	
Power supply	9 ... 33	V
Power input	max. 0,3	A
Max. power consumption	2	W
<i>Output</i>		
Power output <sup>2)</sup>	4 ... 20	mA
Accuracy power output <sup>2)</sup>	± 2	%
Interfaces	RS232/CAN	-
Alarm contact	Open	-
	Collector	-
<i>Digital input for start and stop</i>		
Power supply	9 ... 33	V
Data memory	3000	data records

Connecting dimensions		
Fluid connections	G¼ minimesse M16x2	inch -
Electrical connection	M12x1, 8-pole	-
Tightening torque M12-connection	0,1	Nm

## Measuring range according to ISO 4406:99

Cleanliness level (measuring range)	0 ... 24	Ordinal number (OZ)
Cleanliness level (calibrated range)	10 ... 22	Ordinal number (OZ)
Measuring accuracy (calibrated range)	±1	Ordinal number (OZ)
Weight	~720	g

<sup>1)</sup> With screwed-on connector

<sup>2)</sup> Output IOut is freely configurable (see interfaces and communication commands)

<sup>3)</sup> In relation to the analogue current signal (4 ... 20 mA)

Order code	
OPCom Particle Monitor	SPCO 300-1000
OPCom Particle Monitor for phosphate ester	SPCO 300-2000
OPCom Particle Monitor without display	SPCO 300-1200

## Accessories

Complete data cable set, 5 m length	SCSO 100-5030
Data cable with open ends, 5 m length	SCSO 100-5020
Contact box for connection of a data cable	SCSO 100-5010
USB adapter - RS232 serial	PPCO 100-5420
Power supply	SCSO 100-5080
Ethernet - RS232 gateway	SCSO 100-5100
Display and storage device LubMon Visu	SCSO 900-1000
Minimesse connection with volume flow limiting	
Pressure range 1: 2 ... 50 bar	SPCO 300-5105
Pressure range 2: 50 ... 400 bar	SPCO 300-5140
Minimesse connection with control loop	SPCO 300-5100

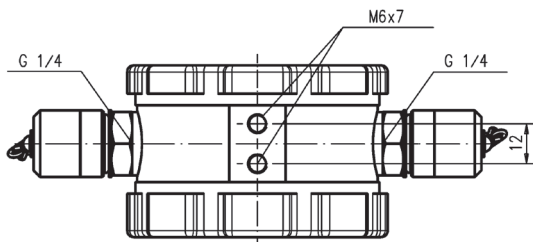
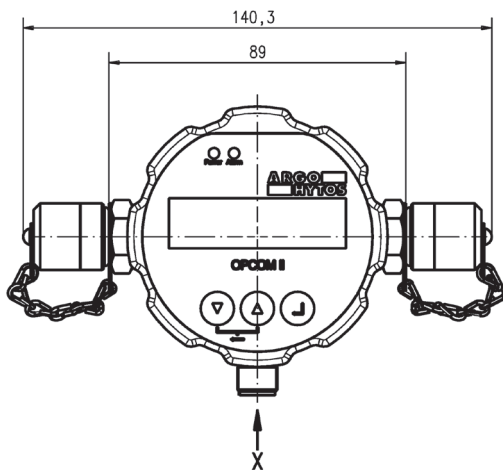


# OPCom Particle Monitor Phosphate Ester

Continuous Oil Condition Monitoring



OPCom II Phosphate Ester



Dimension drawing

## Description

### Application area

The OPCom Particle Monitor Phosphate Ester is a compact particle measurement device for continuous monitoring of the contamination in phosphate ester.

### Performance features

#### *Recognizing changes in your hydraulic fluid*

Particle monitors precisely display any change of contamination in your system. In that way you can react quickly when an increase in particle concentration occurs and the appropriate countermeasures can be taken. Subsequent damages are minimized and costs are reduced.

#### *High pressure range*

The OPCom Particle Monitor Phosphate Ester is designed for operating with pressures of up to 420 bar. In that way it can be mounted directly to a pressure line.

#### *Intuitive operating*

The OPCom Particle Monitor Phosphate Ester is equipped with an intensely illuminated graphic display and a keypad by which you may set up all required adjustments. The menu navigation is made up intuitively and logically.

#### *Wide communication possibilities*

The OPCom Particle Monitor Phosphate Ester exports data to a serial interface or optionally to a CAN-Bus (CANopen + SAE J1939). Parallel, the configurable 4 - 20 mA interface can be connected. Over a digital alarm output you will be warned when limits are exceeded or fallen below. Readings can run time-controlled, manually or started and stopped over a digital input. The data can also be stored on the integrated memory unit.

#### *Design characteristics*

On the fluid side the OPCom Particle Monitor Phosphate Ester is equipped with two Minimes connections to connect the sensor generally in the off-line circuit to the system. The electrical connection is installed via an 8-pole M12 x 1 circular plug. The integrated data memory allows data recording over a longer period. Besides all its technical functions the OPCom Particle Monitor scores by its compact and optical design.

## Measuring principle

The OPCom Particle Monitor is an optical particle monitor which works to a so-called light extinction principle. This means that the particles are classified within a measuring cell with the help of a laser regarding their size and quantity.

## Software

A free PC-software for data recording and evaluation of the measured values can be downloaded from our website at [www.argo-hytos.com](http://www.argo-hytos.com) within our download area.

## Warnings:

- › Avoid contact of phosphate ester fluids with the housing of the device!
- › Device can contain remains of the calibration fluid!

## Technical data

Sensor data	Size	Unit
<i>Max. operating pressure:</i>		
dynamic	420	bar
static	600	bar
Permissible flow rate	50 ... 400	ml/min
<i>Operating conditions:</i>		
Temperature	-20 ... +85	°C
Rel. humidity	0 ... 100	% r.H. (non-condensing)
Display readable up to	60	°C
Compatible fluids	Phosphate ester, mineral oil	
Wetted materials	Stainless steel, sapphire, chrome, NBR, minimess coupling: Zinc/nickel	
Protection class <sup>1)</sup>	IP67	
Power supply	9 ... 33	V
Power input	max. 0,3	A
Max. power consumption	2	W
<i>Output</i>		
Power output <sup>2)</sup>	4 ... 20	mA
Accuracy power output <sup>2)</sup>	± 2	%
Interfaces	RS232/CAN	-
Alarm contact	Open	-
	Collector	-
<i>Digital input for start and stop</i>		
Power supply	9 ... 33	V
Data memory	3000	data records

<i>Connecting dimensions</i>		
Fluid connections	G¼ minimess	inch
	M16x2	-
Electrical connection	M12x1, 8-pole	-
Tightening torque M12-connection	0,1	Nm

## *Measuring range according to ISO 4406:99*

Cleanliness level (measuring range)	0 ... 24	Ordinal number (OZ)
Cleanliness level (calibrated range)	10 ... 22	Ordinal number (OZ)
Measuring accuracy (calibrated range)	±1	Ordinal number (OZ)
Weight	~720	g

<sup>1)</sup> With screwed-on connector

<sup>2)</sup> Output IOut is freely configurable (see interfaces and communication commands)

<sup>3)</sup> In relation to the analogue current signal (4 ... 20 mA)

## Order code

OPCom Particle Monitor for phosphate ester	SPCO 300-2000
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## Accessories

Complete data cable set, 5 m length	SCSO 100-5030
Data cable with open ends, 5 m length	SCSO 100-5020
Contact box for connection of a data cable	SCSO 100-5010
USB adapter - RS232 serial	PPCO 100-5420
Power supply	SCSO 100-5080
Ethernet - RS232 gateway	SCSO 100-5100
Display and storage device LubMon Visu	SCSO 900-1000
Minimess connection with volume flow limiting	
Pressure range 1: 2 ... 50 bar	SPCO 300-5105
Pressure range 2: 50 ... 400 bar	SPCO 300-5140
Minimess connection with control loop	SPCO 300-5100

Portable Particle Monitor

**OPCom Portable Oil Lab**

Particle Counting - The Easy Way



OPCom Portable Oil Lab

Description

**Mobile oil laboratory for oil cleanliness and condition monitoring - easy, compact and cost-efficient**

The OPCom Portable Oil Lab is a mobile oil laboratory for service, with which the oil cleanliness and the oil condition in hydraulic and lubrication systems can be measured quickly and easily.

Sampling can be carried out directly via a pressure line or via the integrated pump. In this connection, measurement can be effected either manually or automatically in an adjustable time interval.

The OPCom Portable Oil Lab enables particle measuring according to the latest standard and displays the cleanliness classes according to ISO 4406:1999 and SAE AS4059. In addition, the relative humidity and oil temperature are displayed. Optionally, further information on the oil condition, taken from the conductivity and polarity of the oil, can be shown via the integrated display.

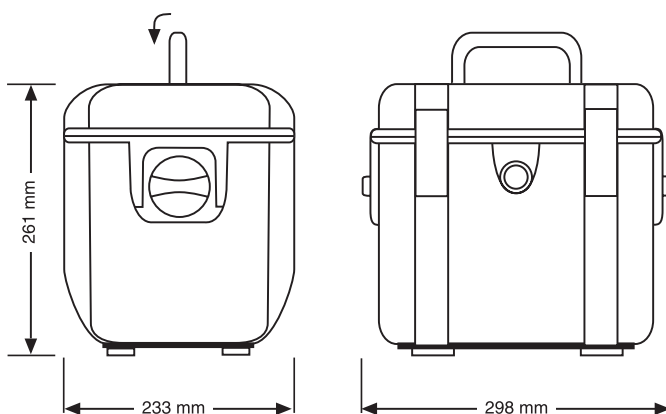
All functions of the OPCom portable Oil Lab can intuitively be operated via the integrated keypad. The internal data memory allows saving of more than 1.250 data records, which may comfortably be transferred to a processor via USB adapter or SD card. Furthermore the OPCom portable Oil Lab includes an integrated printer to print any data record on the spot.

The real-time clock, integrated in the OPCom portable Oil Lab, adds a time-stamp to all measured data in order to facilitate a later allocation. The measured data can additionally be marked with a freely definable indication of the measuring point.

The integrated powerful battery pack is available in two capacity classes and allows operation of several hours. The used batteries are characterized by a low self-discharge, long operating state as well as a recharging of less than one hour. The compact particle counter is supplied with a power supply, hoses and couplings. Amongst others, the OPCom portable Oil Lab can additionally be delivered together with a convenient carrying bag with separated pockets for hoses and samples on one side as well as for the recharger and other accessories on the other side.

The portable oil service device OPCom portable Oil Lab offers an intelligent and cost-efficient possibility for monitoring of your system and oil parameters.

Dimensions



## Technical data

Parameter	Size	Unit
<i>Operating pressure</i>		
High-pressure connection <sup>1)</sup>	5 ... 320	bar
With pump operation	0	bar
Viscosity range fluid	5 ... 1000	mm <sup>2</sup> /s
Operating temperature range fluid <sup>2)</sup>	0 ... +60	°C
<i>Operating conditions</i>		
Temperature	-10 ... +60	°C
Rel. humidity	0 ... 95	% r.H. (non-condensing)
Compatible fluids	mineral oils (H, HL, HLP, HLPD, HVLP), synthetic esters (HETG, HEPG, HEES, HEPR), polyalkylenglycols (PAG), zinc and ash-free oils (ZAF), polyalphaolefins (PAO)	
Wetted materials	chrome, aluminium, stainless steel, viton, steel, brass, HNBR, NBR, polyurethane resin, epoxy resin, chemical nickel/gold (ENIG), soldering tin (Sn96, 5Ag3CuO, 5NiGe), aluminium oxide, glass (DuPont QQ550), gold, silver-palladium, sapphire, PVC (hoses)	
<i>Power supply device</i>		
Power supply	24	VDC
Power consumption	max. 8	A
<i>Power supply for the according power adaptor</i>		
Power supply	100 ... 240	VAC (50/60 Hz)
Power consumption	max. 4	A
Power at 24VDC-output	max. 221	W
<i>Characteristics battery</i>		
Nominal capacity	6900	mAh
Loading time	< 1	h
Running time when measuring without pump (When measuring with pump the running time decreases depending on the oil viscosity)	> 24	h
<i>Measuring range particle measurement according to ISO 4406:1999</i>		
Cleanliness degree	0 ... 24	ordinal number (OZ)
Cleanliness degree (calibrated range)	10 ... 22	ordinal number (OZ)
Size channels	4, 6, 14, 21	µm(c)
<i>Measuring range oil parameter</i>		
Rel. permittivity	1 ... 7	-
Rel. humidity	0 ... 100	%
Conductivity	100 ... 800000	pS/m
Temperature	-20 ... +120	°C
<i>Measuring accuracy</i>		
Particle measurement (within the calibr. range) - ISO4 / ISO 6	± 1	ordinal number (OZ)
Particle measurement (within the calibr. range) - ISO14 / ISO 21	± 2	ordinal number (OZ)
Rel. dielectric number <sup>3)</sup>	± 0,015	-
Rel. humidity (10 ... 90 %) <sup>4)</sup>	± 3	% r.H.
Rel. humidity (<10 %, >90 %) <sup>4)</sup>	± 5	% r.H.
Conductivity (100 ... 2000pS/m)	± 200	pS/m
Conductivity (2000 ... 800000pS/m)	Typ. < 10	%
Temperature	± 2	K
Interfaces	USB-B, SD-card (SD or SD-HC in FAT/FAT16/FAT32-data format))	
Size internal data memory	1250 readings (with time stamp)	
Weight	< 10	kg
Scope of delivery	Manual, power supply 100-240V, power cable, low-pressure hose set incl. connection couplings, high-pressure hose	

<sup>1)</sup> Depending on the oil viscosity

<sup>2)</sup> Viscosity of the fluid must be within the permissible range

<sup>3)</sup> Calibrated to n-Pentan at 25 °C

<sup>4)</sup> Calibrated to air at room temperatur

## Order code

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OPCom Portable Oil Lab	PPCO 300-1000
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### Spare parts

Set, cover for SD and USB	PPCO 300-5090
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Hose set with couplings	PPCO 300-5050
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Minimess cable 2 m M16 x 2	PPCO 100-5280
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Paper rolls for themal printer	SCSO 900-5075
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Power supply	PPCO 300-5120
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Power cable	PPCO 300-5130
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Protection caps (2x)	PPCO 300-5080
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Suction connection	PPCO 300-5060
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Protective strainer	PPCO 300-5070
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### Optional accessories (not included in the scope of delivery)

Carrier bag for accessories	PPCO 200-5020
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Carrying strap	PPCO 200-5010
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SD-card	SCSO 900-5050
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SD-card reader	SCSO 900-5040
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Power cable with non-European plug on demand	
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## OPCount

Online and bottle measurement · Mobile and stationary operation · Lab quality accuracy



OPCount



OPCount

### Description

#### OPCount - Accurate mobile and stationary measurements

The OPCount is a particle counter, designed for stationary or mobile operation. With its touch display and keypad it can be easily operated anywhere.

The measurement results are shown according to the standards ISO 4406; NAS 1638; SAE AS 4059; GJB 420; GOST 17216. Thanks to the 32-bit high performance control unit, flexible measurements and simultaneous storage of data from different measuring points are possible. By operating the sensor with pressure, bubble formation is prevented. The measurement results can be printed on site on the integrated printer. With the included software, the measurement data can be downloaded to a PC for further processing. The additional software CMDM allows the control of measurement tasks and the visualization of the data.

Via the conversational setting menu of the OPCount, multiple languages are available. German, English, French, Spanish, Portuguese, Russian, Dutch, Chinese and Finnish may be selected.

The volumetric sensor cell and the modern and technically advanced components guarantee high resolution in combination with measurement accuracy. Each particle passing through the sensor is detected, counted and measured. Up to 32 freely selectable size channels indicate the number of particles and the particle size distribution.

The touch display indicates the particle sizes, the numbers and the cleanliness classes. During the measurement, the remaining time is also displayed on the screen. By preset measurement profiles, online and bottle samples can quickly be measured. Additional profiles can be easily created and customized by the user via the touch display. To prevent incorrect or unauthorized operation, the user area of the OPCount can be protected by a password.

## Technical data

### Parameter

#### Operating pressure

Low pressure	0 - 7 bar
High pressure	4 - 420 bar

#### Fluid specifications

Fluid temperature	10 °C - 60 °C
Viscosity range of fluid	with bottle measurement up to 200 cSt; at high pressure up to 350 cSt; at lubrication systems up to 1000 cSt
Flow rate	25 ml / min.

#### Technical data

Ambient temperature	5 °C - 40 °C
Relative humidity	max. 70 %
Number of channels	8 channels
Size channels	2, 5, 10, 15, 20, 25, 50, 100 µm 4, 6, 10, 14, 21, 25, 38, 70 µm
Calibration	according to ISO 4402 / ISO 11171
Cleanliness classes	ISO 4406; NAS 1638; SAE AS 4059; GJB 420 A and GOST 17216
Light source	laser diode
Weight	9 kg
Dimensions	475 x 356 x 225 mm
Internal data storage	4000 data records
Interface	USB

#### Electrical connections

Power supply	100 - 240 Volt, 50/60 Hz 10 - 36 Volt (XLR-connection, charging of battery not possible)
Running time of battery	4 hours

#### Software

Download software CMDM software	for PC safeguarding of the measurements stored in the device for planning of the measurements to be performed and trend displaying of measurement results
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Compatibility with sample fluids	Materials getting into contact with the samples: Steel 1.0161 (St37-) and 1.4571 (V4A), aluminium, borosilicate glass, polyamide, FKM. They are compatible with almost all mineral oil products. The standard version of the OPCount is not stainless and not compatible with esters or ketones as for example acetone. Special equipments for other materials as skydrol or aqueous solutions are available on request.
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## Order code

OPCount	OC 1000
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### Scope of delivery

OPCount portable particle counter
Power cable
USB cable
Calibration tables and certificates
2 plastic hoses with appropriate connector
Adapter for hydraulic connections
Minimesse hose
Manual incl. CD rom with download software
5 rolls for thermal printer
Transport case

### Applications

Online measurement at hydraulic systems up to 420 bar
Online measurement at switched off units without additional pressure performance
Offline measurement from sample bottles for application in laboratories
Lubrication applications
Long term analysis
Off-line and filtration monitoring
Filter performance tests

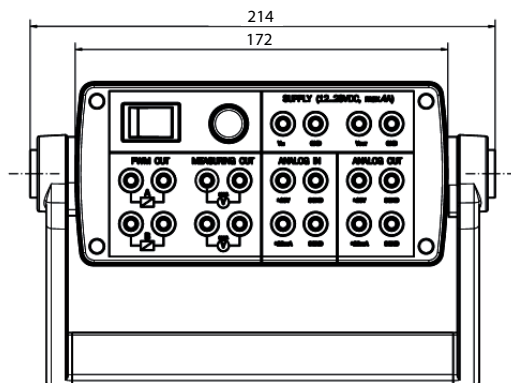
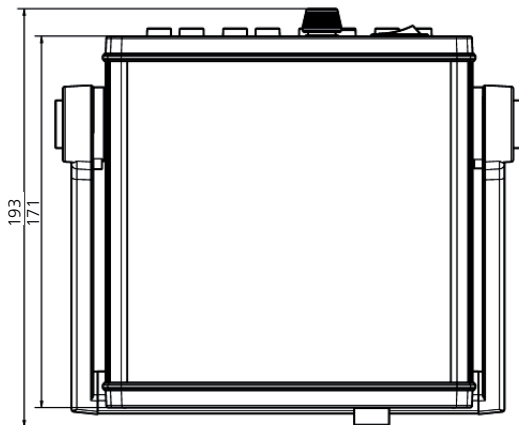
Signal Generator for Valve Control

# ValvE SiCon

Accessories for Valve Electronics



ValvE SiCon



## Description

### Application area

ValvE SiCon is a standalone signal generator, designed for controlling valves via programmable parameters. By the use of standard connectors, the device is suitable for all valves, regardless of the manufacturer.

### Leistungsmerkmale

ValvE SiCon can operate a valve of up to two magnetic coils. The control of the coil can be operated via a PWM signal by either setting the duty cycle ratio or the coil current value. The present coil current is additionally given out on a measuring channel as an analog voltage value. Furthermore, two analog outputs ( $\pm 10V$  and  $\pm 20mA$ ) are available for controlling valves with integrated electronics.

ValvE SiCon offers several configurable functions such as sine, ramp, triangle or sweep. Moreover, even set-points can be preset, from either an external device via two analog inputs ( $\pm 10V$  and  $\pm 20mA$ ), or with the integrated potentiometer.

The graphical display in combination with the keypad on the front panel enables an easy operation of the unit. In addition to the graphical display, the current conditions are shown via four status LEDs.

### Design characteristics

ValvE SiCon is designed for desktop use. The angle of the device can be modified by a fixable handle in steps of  $30^\circ$ . For all inputs and outputs banana jack plugs at the back of the device are used.



## Technical data

Device data	Size	Unit
<i>Power supply</i>		
Voltage	9 ... 28	VDC
Current consumption	Max. 4	A
<i>Ambient conditions</i>		
Temperature, storing	0 ... +60	°C
Temperature, operation	+5 ... +50	°C
Humidity, storing	0 ... 95	%
Humidity, operation (non-condensing)	0 ... 95	%
<i>Connections</i>		
Banana jacks	20	
<i>Operationg</i>		
Membrane keyboard	6	keys
<i>Display</i>		
Graphical display	128x32	pixel
Brightness	adjustable	
<i>Analog inputs</i>		
Voltage (1x)	±10	V
Current (1x)	±20	mA
Resolution	12	Bit
<i>Analog outputs</i>		
Voltage (1x)	±10	V
Current (1x)	±20	mA
Resolution	12	Bit
<i>PWM- outputs (2x)</i>		
Resolution	12	Bit
Measuring output	1	V / A
<i>Frequency range</i>		
PWM	20 ... 9.999	Hz
Dither	0 ... 500	Hz
Signal (sine, triangle,...)	0 ... 500	Hz

## Order code

ValvE SiCon	VE 100-1000
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