

## LubMon Visu

SCSO 900-1000 · SCSO 900-1010



### Safety and operating instructions

#### Read safety and operating instructions before use

##### Note:

Representations do not always exactly correspond to the original.  
No legal claims arise from information provided by us in error.  
Subject to change.

#### In case of questions, please contact:

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**The sensor complies with the CE requirements.**

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## 1. About this documentation

### 1.1 Applicability of this documentation

This documentation is applicable for the following products:

- › LubMon Visu
- › LubMon Visu Ethernet version

This documentation is written for service engineers, technicians, operators and system operators.

This document contains important information for safe and appropriate assembly, transport, activation, operation, usage, servicing, dismantling and simple troubleshooting.

- › Read this document completely, before you work with the product.

### 1.2 Required and supplementary documentation



	Title	Number of document	Document type
	Data sheet	100.30	Data sheet
	Quick start	29379200	Quick start

Table 1: Required and supplementary documentation

## 2. Safety instructions

### 2.1 About this chapter

This product was manufactured according to the generally recognized standards of engineering. Nevertheless, there is a danger of injury or damage if you do not observe this chapter and the safety instructions in this documentation.

- › Read this document thoroughly and completely before working with the product.
- › Retain this document and ensure that it is available for all users at all times.
- › Always include the necessary documentation when passing the equipment along to a third party.

### 2.2 Intended use

This product is an electric component.

You may use the product for the following:

- › Display and storing of data of the ARGO-HYTOS LubCos sensors
- › Display and storing of data of the ARGO-HYTOS particle monitors
- › Display and storing of data of devices with a 4...20mA interface

The product is intended for professional use only, not for private use.

"Intended use" also includes that you have completely read and understood this documentation, in particular Chapter "Safety Instructions".

### 2.3 Improper use

Any other use than the intended use described, is improper and inadmissible.

If unsuitable products are installed or used in safety-related applications, unintended operating states can occur in the application, which can cause personal injury and / or material damage. Therefore only use this product in safety-related applications if this use is expressly specified and permitted in the product's documentation, e.g. in explosion protection areas or in safety-related parts of a control system (functional safety).

ARGO-HYTOS GmbH assumes no liability for damages resulting from improper use. The risks associated with improper use are solely with the user.

### 2.4 General safety instructions

- › Observe the valid regulations for accident prevention and environmental protection.
- › Observe the safety regulations and requirements of the country in which the product is used / applied.
- › Only use ARGO-HYTOS products that are in technically perfect condition.
- › Observe all instructions on the product.
- › People who assemble, operate, disassemble or maintain ARGO-HYTOS products may not do so under the influence of alcohol, other drugs or medications that affect the responsiveness.
- › Only use manufacturer-approved accessories and spare parts, in order to prevent personal danger due to unsuitable spare parts.
- › Observe the technical data and ambient specifications specified in the product documentation.
- › If unsuitable products are used or installed in safety-relevant applications, unintended operating states can occur in the application, which can cause personal injury and / or material damage. Therefore only use the product in safety-relevant applications if this use is expressly specified and permitted in the product's documentation.
- › You may only put the product into operation, when it has been established that the final product (e.g. a machine or system), into which the ARGO-HYTOS products are installed, complies with the country-specific regulations, safety regulations and standards of the application.

### 3. Scope of delivery

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The package includes:

- › 1 LubMon Visu
- › 3 screw Terminals
- › 2 Mounting clips
- › 1 Sealing cord
- › 1 Quick Start Guide

## 4. About this product

### 4.1 Functional description

The LubMon Visu is a universal display unit and simultaneously a data memory for the ARGO-HYTOS oil condition sensors. The LubMon Visu supports in particular the following sensors:

- › LubCos H<sub>2</sub>O
- › LubCos H<sub>2</sub>O+ II
- › LubCos Level
- › LubCos Vis+
- › OPCom Particle Monitor
- › OPCom FerroS
- › as well as all sensors, provided with an analog 4-20mA interface.

The LubMon Visu is provided with a 128x32 pixel display, a power and alarm display, an SD card slot and a USB port, and several control buttons.

The electrical connections on the back are described in detail in Chapter 8 "Electrical connection".

The LubMon Visu is a simple way to read and store the data from the existing sensors. Furthermore, in case the defined sensor parameters have been exceeded, alarms may be displayed via the LED display or externally connected sensors. It is also possible to read out the sensors, connected to the LubMon Visu, via the ARGO-HYTOS-Software LubMon PC<sub>light</sub> and to represent the measured data.

The parameters of the individual sensors and their meaning can be found in the respective manuals.

### 4.2 Component overview

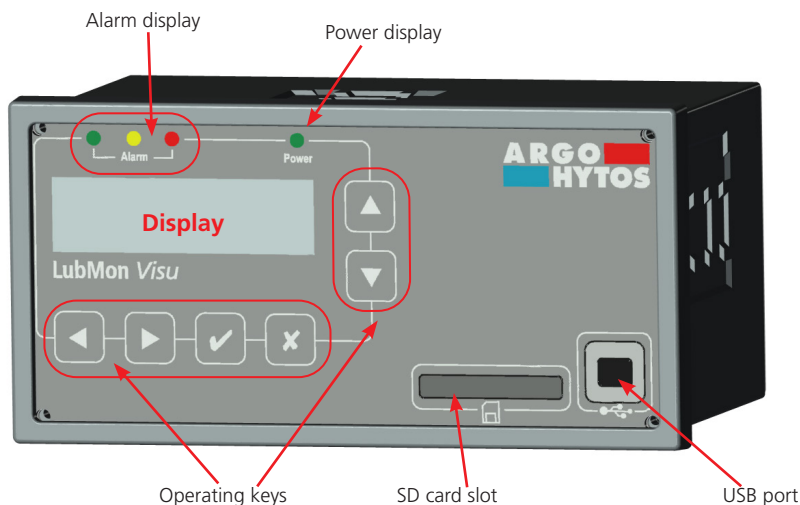


Fig. 1: Structure of the LubMon Visu

### 4.3 Identification of the product



Fig. 2: Nameplate

## 5. Transport and storage

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There are no special transport instructions for this product.

For storage and transport, however, observe the environmental conditions, stated in the technical data.

## 6. Assembly

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The LubMon Visu is designed for panel mounting and can be fixed by using the enclosed screw terminals. To ensure the sealing of the installation, the supplied seal must be used. The installation dimensions can be taken from the dimensional drawing.



## 7. Electrical connection

### 7.1 General information and safety note

The device may only be installed by a qualified electrician. The national and international regulations for installation of electrical equipment must be followed.

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



**Improper connection of the device may result in damage.**

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

The permissible operating voltage must be between 9V and 33V DC. The cables of the connected sensors must be shielded.

On the rear of the LubMon Visu, there are three 8pin connectors (see Fig. 3) as well as an RJ45-jack for connection to a network. The network socket, however, is only assigned and will only work with the Ethernet version of the LubMon Visu.

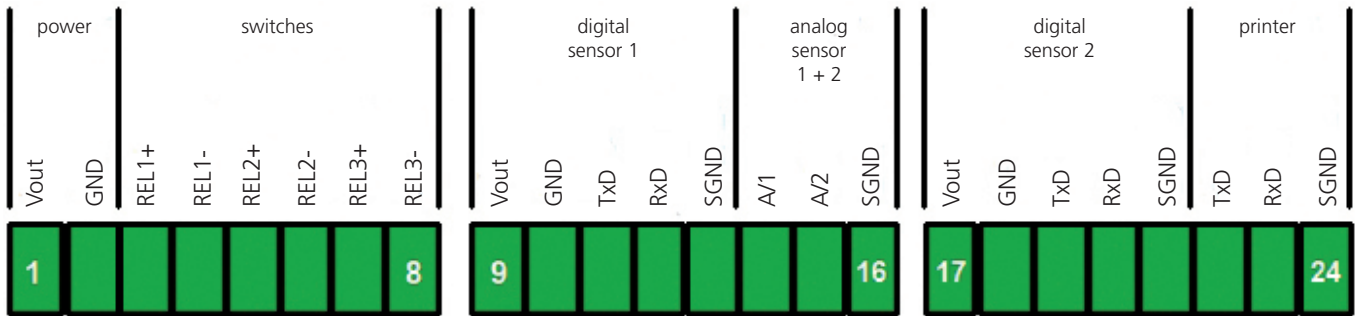


Fig. 3: Pin assignment in plan view of the rear module

The connectors 1-3 (from left to right) have the following pin assignment:

#### Connector 1 (Pin 1 – 8):

Pin 1 ("V<sub>IN</sub>") and Pin 2 („GND") are the terminals for the power supply of the module. Pin 3 ("REL1+") to Pin 8 ("REL1-") are three two-pole potential-free contacts (max. 36V, 700mA).

#### Connector 2 (Pin 9 – 16):

Pin 9 ("V<sub>OUT</sub>") to Pin 13 ("SGND") is the first digital sensor interface (RS232). In addition, up two analog sensors (4 – 20mA) can be connected to Pin 14 ("AI1") and Pin 15 ("AI2").

#### Connector 3 (Pin 17 – 24):

Pin 17 ("V<sub>OUT</sub>") to Pin 21 ("SGND") is the second digital sensor interface (RS232). A thermal printer (accessory) can be connected to Pin 22 ("TXD") up to Pin 24 ("SGND") via RS232.

## 7.2 Module power supply

The module is supplied with voltage via the connector 1 ("V<sub>IN</sub>" - Pin 1 and 2). Also see Chapter 13, Technical data.

Pin 9 + 10 and Pin 17 + 18 are internally connected to the power supply.

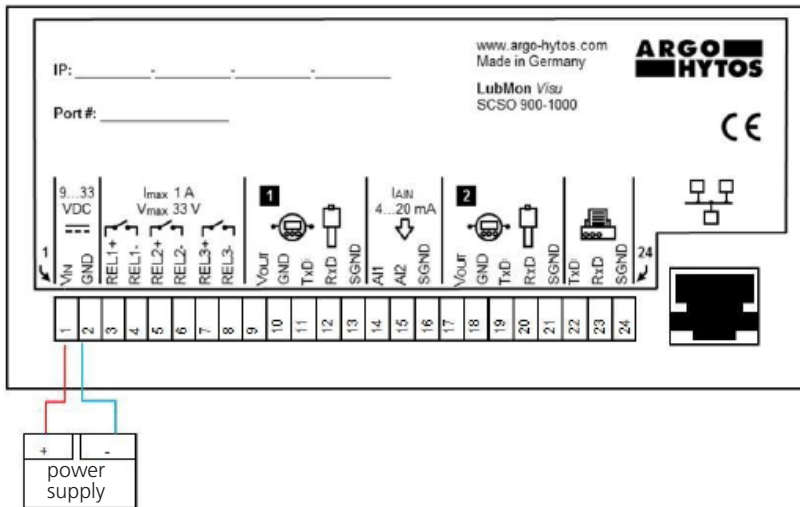


Fig. 4: Rear view of the Visu with connected power supply



If power is supplied, the LubMon Visu starts automatically, displays the ARGO-HYTOS logo for a few seconds and then switches automatically to the basic view.

**Please do not press any button during startup.**

## 7.3 Connecting a digital sensor

The following shows the connection of a digital sensor (e.g. LubCos H<sub>2</sub>O+ II) with a standard cable with open strands to sensor interface 1 (Pin 9 – 13). The LubMon Visu is provided with two sensor interfaces. The connection of a sensor to the sensor interface 2 (Pin 17 – 21) is carried out as described for sensor interface 1.

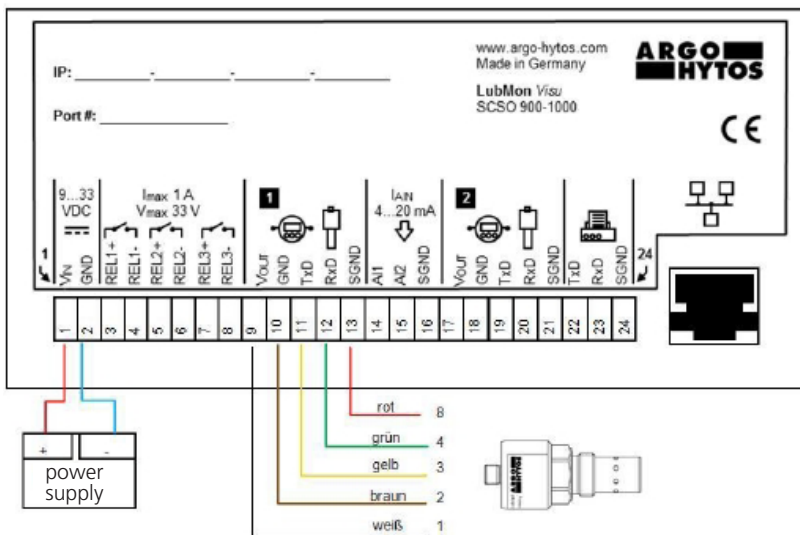


Fig. 5: Example of a digital connection with a LubCos sensor, the connection of a particle monitor is carried out analogously.

The pin assignment of the sensor can be taken from the following figure.

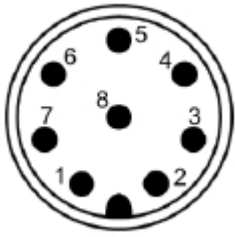


Fig. 6: Pin assignment of the sensor connector



Fig. 7: Pin assignment cable connector

Pin	Function	Color
1	Power supply L+	White
2	Power supply L-	Brown
3	TxD, CAN low [OUT]	Green
4	RxD, CAN high [IN]	Yellow
5	Not assigned	Grey
6	Analog output 1: 4...20mA	Pink
7	Analog output 2: 4...20mA	Blue
8	Signal ground SGND	Red
Shield	-	-

Table 2: Pin assignment sensor

It should be noted, that the communication lines have to be crossed according to the following figure.

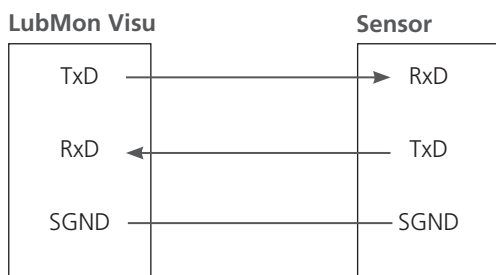


Fig. 8: Crossed communication line

#### 7.4 Connecting an analog sensor (4...20mA)

At Pin 14 and 15, there are analog inputs (4 – 20mA) for connection of additional sensors. In the following example, a pressure sensor with a supply voltage input and a 4-20mA output are used.

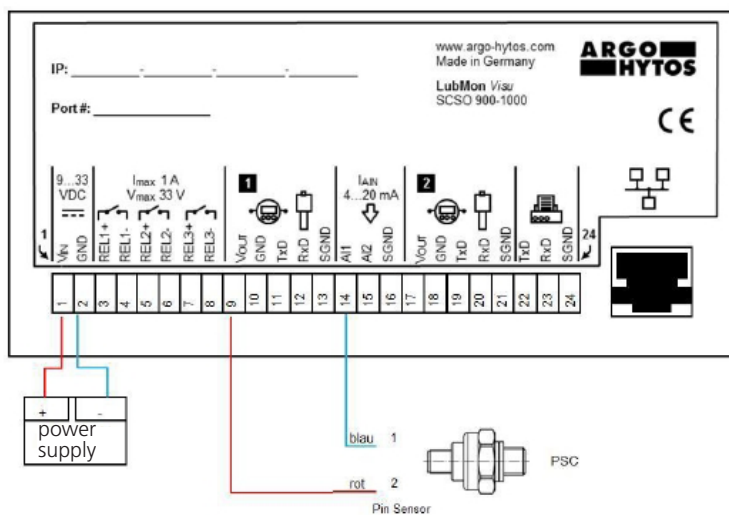


Fig. 9: Connection of an analog pressure sensor to the analog input 1

For power supply, the voltage input (red cable in Figure 9: connecting an analog pressure sensor) of the sensor can be connected to Pin 9 ("VOUT") of the module. The 4-20 mA output of the sensor (blue cable) can be connected directly to Pin 14 ("AI1") or Pin 15 ("AI2") of the LubMon Visu.

8.1 Menu structure

The LubMon Visu can completely be configured and operated, using the touch screen on the display menu structure. Also the measurement data of the connected sensors can be displayed on the screen. The complete menu structure is shown in the following figure, the meaning is explained below.

With the ▲ or ▼ button, you can navigate the menu and scroll through the entries. By pressing the selection button ✓ you can jump to the next level. You may return by pressing the ✕ button. If you have to adjust values, you may jump to the next position by pressing the ◀ or ▶ button. The number to be changed will be highlighted and changed by using ▲ and ▼. The position is selected with the buttons "left" and "right" and changed by the keys "upwards" and "downwards". The values are taken over with the check button and discarded with the cross key.

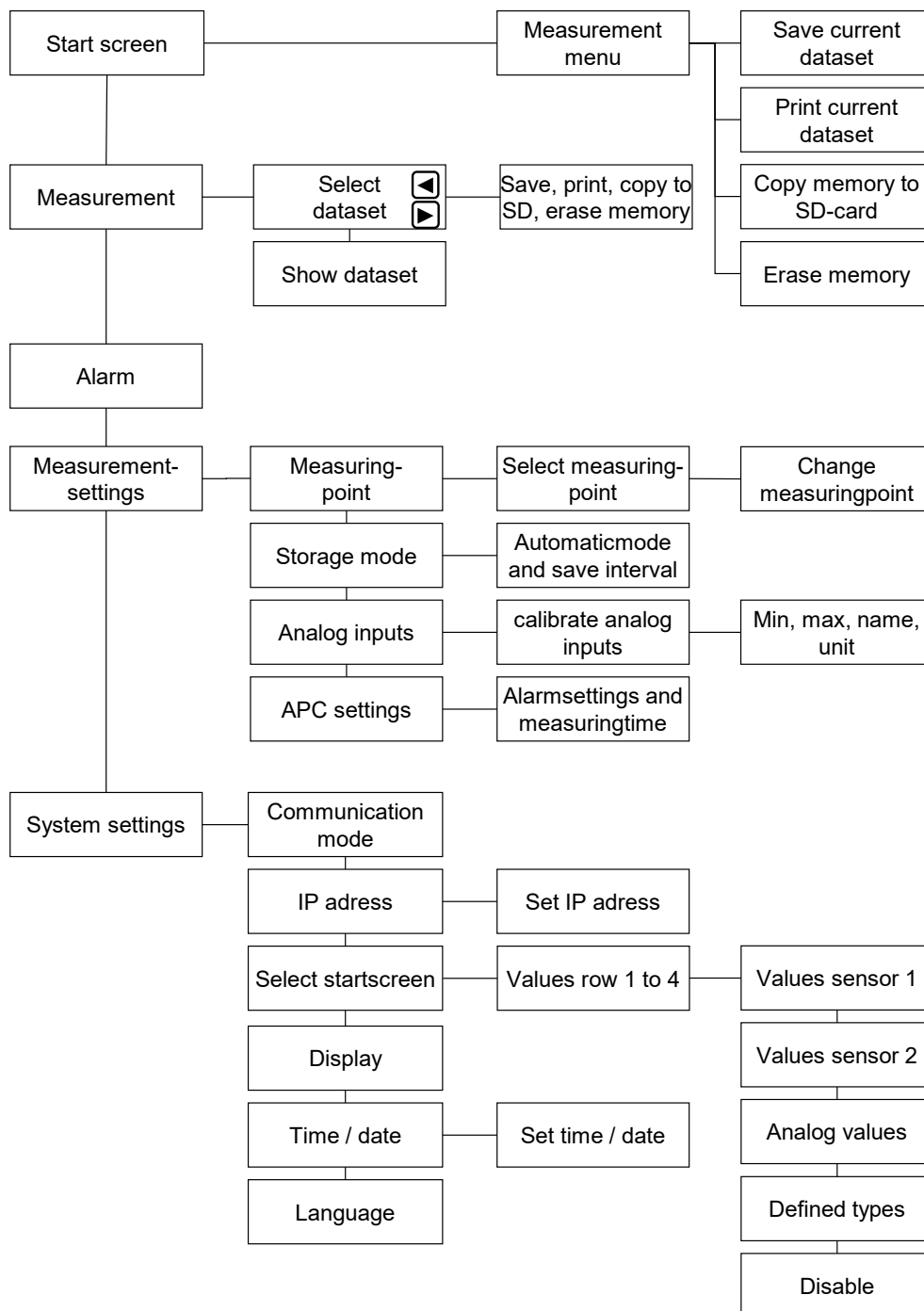


Fig. 10: Menu structure

## 8.2 Start screen

On the start screen, the temperature, the relative humidity and the ISO-classes are displayed if the corresponding sensors are connected. The disk on the bottom right shows the current storage mode. If an "M" is shown in the disk, storing of the current measured values must be performed manually (in the form of a data set). If an "A" is shown in the disk, the automatic storage mode is activated, what means that storing is carried out automatically according to the set interval.

## 8.3 Measuring menu

The measuring menu is accessed through the ✓ key. In the measuring menu, the current data can be saved and printed and all data can be copied onto an SD card. Moreover, the memory can be cleared.

Selection	Description
> Storing current record	> The current measured values are stored as a data set.
> Printing	> The current measured values are printed, provided that a printer is connected.
> Copying on SD card	> The current measured values are copied onto the SD card if an SD card is inserted.
> Clearing memory	> The memory and all recorded data is erased.

Table 3: Measuring menu

## 8.4 Main menu

The main menu is accessed by pressing the keys ▲ and ▼.

In the main menu, the measured values can be read out, the alarms and the measurement and system settings can be configured.

### 8.4.1 Measured values

Selection	Description
> Choose record with ◀ and ▶	> The records can be searched chronologically.
> View record with ▲ and ▼	> The recorded data of each record may be looked at.

Table 4: Main menu measured values

### 8.4.2 Alarm

The menu item "Alarm" is selected with the button ✓. The individual alarms, output from the connected sensors, are shown here. By using ◀ and ▶, you can switch between the different alarm types. Of each alarm type, however, only the last occurred alarm is shown.

In the alarm menu, only the alarms from the sensors are displayed, which have been connected via RS232. In addition to these, more alarm conditions are detected, that are not displayed as text in the alarm menu. Such an alarm is shown by the flashing of the red alarm LED.

An alarm state is triggered by the following situations:

- > An analog input has exceeded the switching point „SPKT“, set with calibration.
- > With "APC settings", "Filter mode" is not selected and an ISO class exceeds the set limit.
- > With "APC settings", "Filter mode" is selected and all ISO classes are below the set limit.

Note:

The state of the alarm LEDs is identical at all times with the circuit of potential-free switching contacts on the rear panel. If the green LED lights, the REL1 is turned on, if the yellow LED lights, the REL2 is switched on and if the red LED lights, the REL3 is switched on.

### 8.4.3 Measurement settings

Selection	Description
› Measuring point	› Here, up to 10 different descriptions for the individual measuring points can be entered (e.g. "pump 1", "pump 2" etc.) and the current measuring point can be selected.
› Memory mode	› The automatic storage mode can be enabled or disabled, as well as the recording interval can be entered. If the automatic storage mode is turned off, each measurement must be saved manually.
› Analog inputs	› Here, the calibration of the analog inputs can be carried out. For this, the corresponding values for 4mA and 20mA must be entered (e.g. 4mA = 5 and 20mA = 20), in addition, the unit (e.g. "bar") and the switching point must be indicated in per cent.
› APC settings	› This menu item allows to select the measurement time, the alarm mode and the alarm threshold for a connected particle monitor.

Table 5: Main menu measured values

### 8.4.4 System settings

Selection	Description
› Communication mode	› "USB" or "Network" may be selected as communication mode.
› IP address	› Here, the IP address for the Ethernet network communication mode can be set.
› Display	› Here, the display can be configured so that the lights automatically switch off after a certain time. In addition, the brightness of the lighting can be regulated.
› Time / date	› Here, time and date can be set.
› Language	› Here, the language of the display presentations can be selected. Supported are currently English, German and French.

Table 6: Main menu system settings

The LubMon Visu is provided with an USB port for communication with a PC, as well as an RJ45 Ethernet port, which, however, is only functional in the Ethernet version of the LubMon Visu.

### 9.1 Connection to a PC

The LubMon Visu can be connected via a USB cable to a PC. Here, a virtual COM port is created on the PC. If necessary, you can check the assignment of the virtual COM port in the Windows Device Manager. Via this virtual COM port you can communicate with the LubMon Visu.

The COM port must be configured as follows:

- › Baudrate: 9600
- › Data-Bits: 8
- › Parity: None
- › Stop-Bits: 1
- › Flow control: None

The LubMon Visu is fully compatible with the PC software LubMon PClight from version 1.3.12 onwards. In order to display the measured values with LubMon PClight, connect the LubMon Visu via USB to a PC and select in LubMon PClight the virtual COM interface of the LubMon Visu. Within seconds, all measured values of the LubMon Visu are displayed.

For further information on LubMon PClight please see the corresponding manual.

### 9.2 Command list

In the following, the interface commands are shown for communication with the sensor. These can be passed to the sensor with a terminal program such as Microsoft Windows HyperTerminal.

#	Command format	Meaning	Return format
1	RVal[CR]	Reading of all measurement values with subsequent checksum (CRC)	\$Date:xx.xx.xx(dd.mm.yy); time:xx:xx:xx[h-h:mm:ss];T:xx.x[°C]; ...;CRC:x[CR][LF]
2	RID[CR]	Reading of the identification with subsequent checksum (CRC)	\$ARGO-HYTOS;LubMon Visu SN:xxxx;...;CRC:x[CR][LF]
3	RMemO[CR]	Reading of the memory organization	Date; time [h]; ... [CR][LF]
4	RMem[CR]	Reading of the complete memory inclusive of header	\$Time [h]; ...[CR][LF]...; [CR][LF]...
5	RMemH-n[CR]	Reading of records of the last n-hours	\$Time [h]; ... ; CRC:x[CR][LF]...
6	RMemS[CR]	Reading the number of storable data sets	MemS: xxxx[CR][LF]
7	RMemU[CR]	Reading the number of stored data sets	MemU: xxxx[CR][LF]

Table 7: Serial communication – read commands

### 9.3 Ethernet connection

The Ethernet version of the LubMon Visu (SCSO 900-1010) has the ability to carry out the communication via a company network. For this, the LubMon Visu is connected to the network with a standard Cat5/5e network cable with RJ45 plug. The desired IP address can be set via the display menu. For communication, the device is by default addressed via the port :80. Communication takes place via the serial commands described above.



<b>Error: No communication with the connected sensors</b>	
<b>Possible cause</b>	<b>Measure</b>
› Cable not properly connected	▶ First, please check the correct electrical connection of the sensor or the data and power cable. Please be aware of the prescribed connection assignment.
› Wrong or defective cable	▶ Only use data cables, recommended by ARGO-HYTOS.
<b>Error: No communication with the PC</b>	
<b>Possible cause</b>	<b>Measure</b>
› USB interface is not activated	▶ Activate the USB interface in the menu under System Settings > Communication Mode
› Interface configuration is incorrect	▶ Check and possibly correct the settings of the interface parameters (9600, 8, 1, N, N). Test the communication using a terminal program, if necessary by using an interface tester.
› Wrong communication port selected	▶ Check and correct the selection of the communication port (e.g. COM1)
› Incorrect spelling of commands with communication via terminal program	▶ Check the spelling of the sensor commands. Note in particular the capitalization and lowercase ▶ In case of invalid commands, the device returns the input string with a leading question mark

Table 8: Troubleshooting

Description	Order No.
<b>Sensors</b>	
› LubCos H <sub>2</sub> O	› SCSO 300-1000
› 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 Particle Monitor	› SPCO 200-1000
› OPCom Particle Monitor PE	› SPCO 300-2000
› OPCom Particle Monitor without LCD	› SPCO 300-1200
<b>Data cable with open ends</b>	› SCSO 100-5020
› Side 1: M12 8-pole, 90° angled, IP67	
› Side 2: open	
› Length: 5m, shielded	
› Temperature range -25°C ... 90°C	
› Oil-resistant	
<b>Connector</b>	› SCSO 900-5010
› Terminal block	
› 3,5 mm; 8 contacts	
› Contact material: Bronze	
<b>USB cable</b>	› SCSO 900-5060
› USB 2.0 St (A)-St(B)	
› Length: 3,0 m, double shielded	
› Color: black	
<b>Universal power supply</b>	› SCSO 100-5080
› Input range: 100 ... 240VAC 50/60Hz	
› Output voltage: 24VDC / max. 0,63A / 15W	
› Temperature range in operation: 0 ... 40°C	
› Compatible with data cable SCSO 100-5030	
› Supply line: Euro power cord 2-pole, 1,5m	
<b>Thermal printer</b>	› SCSO 900-5070
› Print area 48 mm	
› Size: 75 x 80 x 41	
<b>Mounting clips</b>	› SCSO 900-5030
› For installation of the LubMon Visu	
› Screw terminal, steel, galvanized	
› Set of 2	
<b>Sensor connector</b>	› SCSO 100-5010
› M12 8-pole, straight, IP67	
› Suitable for cable diameter 6 ... 8 mm	
› Temperature range -20°C ... 85°C	

Table 9: Accessories

## 12. Technical data

### 12.1 Technical data

Module data	Size	Unit
<b>Power supply</b>		
Voltage	9...33	VDC
Power input	typ.100 max. 300 (without connected sensors) max. 1500 (with connected sensors)	mA mA mA
<b>Ambient conditions</b>		
Temperature, operation	0...+60	°C
Temperature, storing	+5...+50	°C
Humidity, operation	0...95	%
Humidity, storing	0...95	%
<b>Connections</b>		
RJ45 <sup>1)</sup>	1x	
8-pole switch contact; provided with a thread	3x	
USB-B	1x	
SD card slot	1x	
<b>Operation</b>		
Membrane keyboard	6	keys
<b>Display</b>		
Graphical display	128 x 32	Pixel
Brightness	adjustable	

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

Table 10: Technical Date

### 12.2 Dimensional drawing

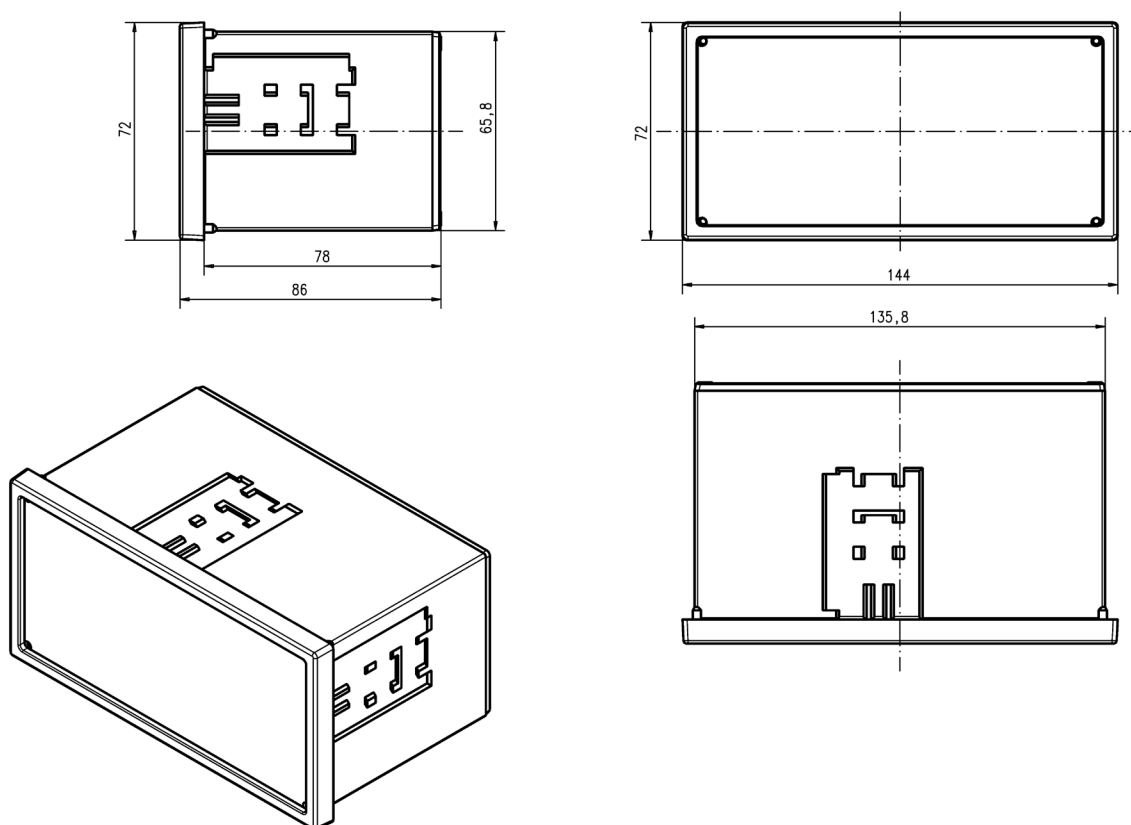


Fig. 11: Dimensions

### 13. Contact address

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ARGO-HYTOS GMBH  
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**EG - Konformitätserklärung**  
EC - Declaration of Conformity



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www.argo-hytos.com

Die EG - Konformitätserklärung gilt für folgendes Gerät:

The EC - Declaration of Conformity applies to the following unit:

Anzeige und Datenlogger für Ölzustandssensoren

Display and data logger for oil condition sensors

**LubMon Visu**

Material-Nr.:

Material-No.:

**29043901, 29570300**

Wir bestätigen die Übereinstimmung mit den grundlegenden Anforderungen der europäischen Richtlinie(n):

We confirm the conformity according to the essential requirements of the European directive(s):

**2004/108/EG**

**2004/108/EC**

Folgende Norm(en) wurde(n) angewandt:

The following standard(s) was (were) applied:

**DIN EN 55011: 2009 + A1: 2010**  
**DIN EN 61000-4-2: 2009**  
**DIN EN 61000-4-3: 2006 + A1: 2008 + A2: 2010**  
**DIN EN 61000-4-4: 2004 + A1: 2010**  
**DIN EN 61000-4-6: 2009**

Die Beurteilung und Prüfung des Gerätes erfolgte durch das EMV-Prüflabor:

The evaluation and testing of the device was carried out by the EMC testing laboratory:

**E&C Testlab GmbH**  
**Industriestraße 8**  
**D-78647 Trossingen**

Kraichtal, 10.02.2016

(Ort und Datum der Ausstellung)

(Place and date of issue)

(Unterschrift) Roman Krähling / Dokumentenverantwortlicher

(Signature) Roman Krähling / Responsible for documents

(Unterschrift) Dr. Marcus Fischer / Technischer Geschäftsführer

(Signature) Dr. Marcus Fischer / Technical director

International

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China	ARGO-HYTOS Fluid Power Systems	info.cn@argo-hytos.com
Czech Republic	ARGO-HYTOS s.r.o ARGO-HYTOS Protech s.r.o	info.cz@argo-hytos.com info.protech@argo-hytos.com
France	ARGO-HYTOS SAS	info.fr@argo-hytos.com
Germany	ARGO-HYTOS GMBH	info.de@argo-hytos.com
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