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# **Installation Instructions and Techn. Documentation**

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**Electronic tank monitoring devices with data messaging**

**Tank-Spion Digital LX-NET**

**Tank-Spion Digital LX-GSM**

**Tank-Spion Quadro LX-Q-NET**

**Tank-Spion Quadro LX-Q-GSM**



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## GENERAL

The electronical tank content display device of LX-Serie is to be used for monitoring of tank levels in pressureless liquid tanks.

This documentation is to be used for the devices LX-GSM, LX-Q-GSM and LX-NET, LX-Q-NET. Beside the liter monitoring several other functions are available, in most cases with an extra module or adaptor. These functions are temperature measuring, data transmission or binding to facility management systems.

The devices LX-GSM and LX-NET provide an output relay. It operates automatically depending on the tank filling level. Besides it can be operated by remote control (telecontrol). The relay is able to control an alert unit, to switch a magnetic valve or to protect a pump from running dry. The relay has opening and closing contacts for switching two separate current circuits.

### Level probe:

Die Geräte-Sets LX-GSM und LX-NET werden jeweils mit 1 Tankmesssonde geliefert.

The LX-GSM and LX-NET sets are provided with 1 level probe each.

The LX-Q-GSM and LX-Q-NET types offer 4 measuring inputs for up to 4 level probes. They monitor the individual content of each tank and total stock.

The level probe can be mounted by standard with a 1" or 1½" screw thread. For mounting in plastic tanks a grommet and a PG-screwing is provided.

Electric supply: 230V AC.

A special type of the monitoring device for DC 24V or DC 12V can be delivered.

The monitoring device has a LCD display by 2 x 16 characters.

The indicated values are not calibrated for billing purposes.

For the intended operation and to adhere the warranty the following instructions for mounting and use are to be followed and to be handed over to the user.

### **Device types:**

The Q (quadro) device types provide 4 measuring inputs but no output relay.

The other device types provide only 1 measuring input and one output relay.

### **LX-GSM + LX-NET:**

These sets are usually delivered with one standard measuring probe.

### **LX-Q-GSM + LX-Q-NET:**

These 'Quadro' sets are presented usually without measuring probes.

### **LX-GSM + LX-Q-GSM:**

Additionally to liter monitoring these device types report the status by SMS.

They need a SIM card for mobile network. Prepaid is recommended.

The SIM card is not included.

The recipient can either be a mobile phone or the [www.oilview.de](http://www.oilview.de) system.

### **LX-NET + LX-Q-NET:**

These device types have a LAN jack (RJ45) for direct Ethernet connection.

Your browser gets a HTML data page from the device. For calling the data page from Internet the router port must be forwarded.

Data binding to [www.oilview.de](http://www.oilview.de) web server is available too.

## MOUNTING INSTRUCTIONS

Only qualified persons are allowed to install the measuring probe and to connect the display device. Follow the regulation for each liquid, especially for the risk of water pollution and for flammable liquids.

Condition for proper operation of measuring device is a professional installation. Follow the technical rules for planning, construction and operation of the entire facility.

Additionally follow the rules of preventions of accidents by the government safety organizations and the instructions of mounting and operation of the storage tanks too.

- Condition for proper operation is a pressureless storage tank. The tank must have proper ventilation. Oil tanks and gasoline tanks must be equipped with a level limiter.
- The cable entry in the tank has to be made watertight and vapor tight appropriately.
- The measuring probe and display device are not security devices. They do not replace the level limiter of a tank.
- Installation of the display device in explosive zones is not permitted.  
Ask for an EEx-probe with Zener barrier. The tank level probe must be mounted inside the tank with a cable protection pipe.
- 230V AC: The display device is connected to the power supply. Operating is only permitted with closed box lid.
- Type 230V AC :  
The display device is connected to the power supply system and may normally only to be used with box cover closed.
- Type 12V / 24V DC:  
As a special model this device type is supplied by a low voltage power supply of 24 V (DC 20V-28V) or 12V (DC 11V-15V).

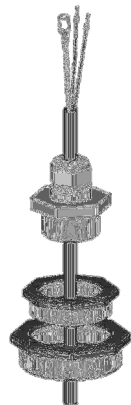
In case of inappropriate installation you lose any warranty.

## MOUNTING OF LEVEL PROBE

- In case of cellar steel tanks or subgrounded tanks use the included screwing joint for mounting the measuring probe.
- If an old fuel gauge was used dismount it and use the tank screwing port.
- Subgrounded tanks normally provide an idle screwing port. Dismount the dummy screwing.
- If there is no other appropriate opportunity the measure probe can be installed in the bearing pipe. We recommend the use of a 1" T pipe collar with a 1" nipple for the head of the bearing pipe.  
The cable of the measuring probe comes out of the T pipe collar on the side. Occasional bearing for control parallel to the cable of the measuring probe is still possible.

### Mounting:

- Switch off the oil burner and lock the suction pipe if necessary.
- Clear the screwing port of the tank.
- Put the cable of the probe through the screwing joint. Put the measuring probe into the tank.
- Mount the screwing joint with PTFE sealing tape.
- Sink the measuring probe down to the ground of the tank. Fix the cable with the PG screwing. The measuring probe may optionally lay or stand on the ground of the tank.
- Zero-point calibration is normally not required..
- If necessary unlock the suction pipe, switch on the oil burner and check the functions.



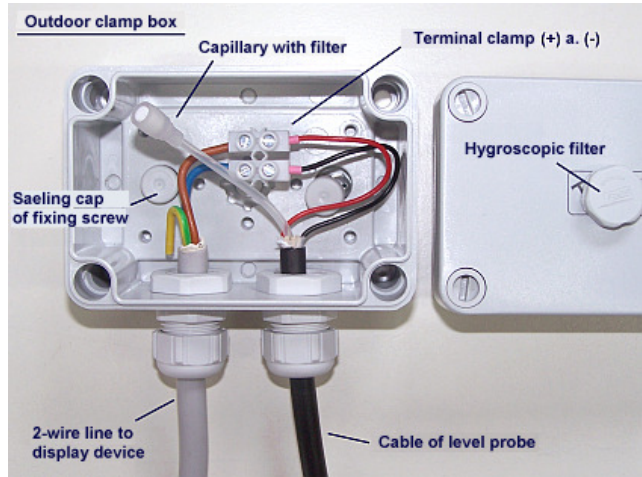


## Probe box :

To be used

- outdoors
- in manhole pit (buried tanks)
- in damp locations.

The probe box must be watertight and ventilated (for pressure balance of the hydrostatic level probe).



## ELECTRIC INSTALLATION

### Interconnection of measuring probe to display device

Probe supply: Low-voltage DC

Connection: Connect the 2-wire probe cable as follows:  
Red(+) => clamp 1 , Black (-) => clamp 2.

Air capillary: The air capillary must have ventilation to atmosphere. The end of the probe's cable and the air capillary must be protected against humidity.

Extension: The cable of the probe can be extended up to 100 m, e.g. with NYM or YR (damp location) or NYY (soil). Line diameter at least 2 x 0.4 mm<sup>2</sup>.  
In case of cable extension in a manhole pit or outdoors it is recommended to use a waterproof clamp box with special air pressure ventilation (accessories).

Shielding: Near to power lines it is recommended to use a shielded probe signal line. (Cable shielding has to be grounded.)

### Supply voltage:

Voltage: AC 230 V, 50 Hz

Clamps: PE (protective conductor), N (neutral conductor), L (phase).  
Cable is not included in scope of delivery.

*Refer to the figure on the following page.*

*The capillary in the probe's cable must have ventilation. The capillary filter stays attached!*

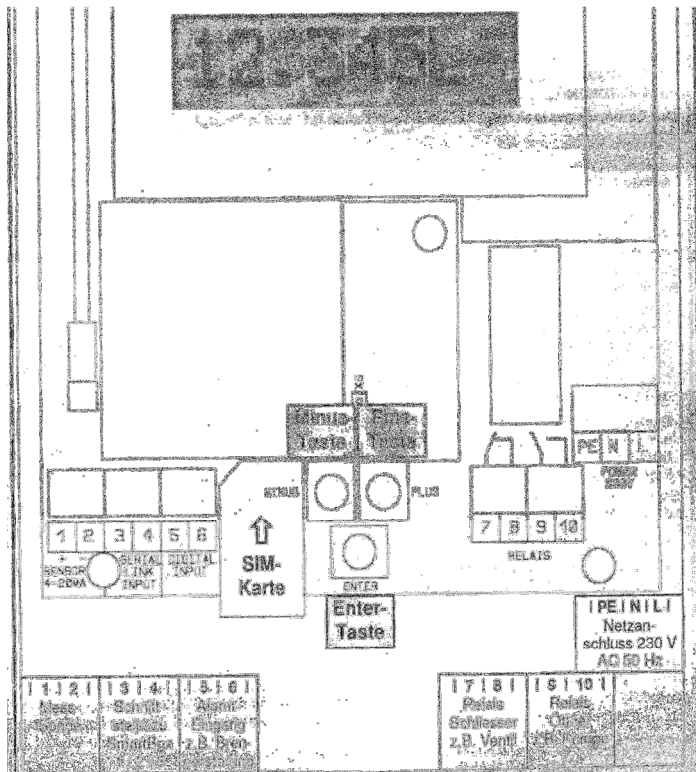
*Refer to probe instructions.*

### Caution:

*Do never connect device type DC 24V or 12V to 230V.*

## CONNECTION CLAMPS

If LX-GSM  
and LX-NET



### Relay connection:

The LX-GSM and LX-NET devices do have a double output relay. By this relay two separate electric circuits can be switched simultaneously, e.g. a signalling device on/off and an electric valve off/on too.

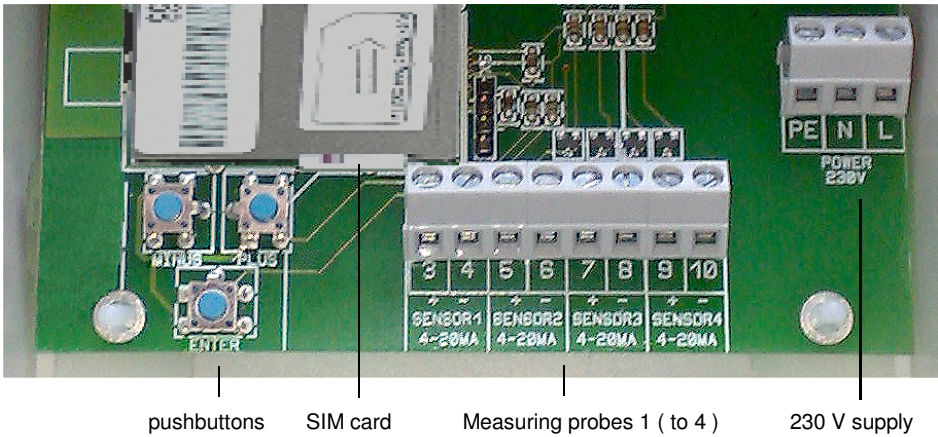
Under initial conditions the relay contacts 7-8 are closed and relay contacts 9-10 are opened.

In case of event the relay operates so both contact pairs switch over. Then contacts 7-8 do open and 9-10 do close.

At power outage or when the device goes out of order then the relay is under initial condition. in

	<i>Initial state</i>	<i>Event state</i>
<b>Relay output</b>	Contact 7 - 8 links Contact 9 - 10 opened	Contact 7 - 8 opened Contact 9 - 10 links
<b>Schaltspannung</b>	Max. 250 V AC	
<b>Voltage</b>	Max. 3,5 A	
<b>Steuerfunktion</b>	For setup see menu item "6. Relay" and GSM command #S (at LX-GSM)	

## For LX-Q-GSM :



## For LX-GSM / LX-Q-GSM :

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### DEVICE MESSAGES (SMS)

See additional documentation:

“ **Messages, Commands a. Parameters** ati **GSM-Messenger, LX-GSM, LX-Q-GSM** “

If the device will be linked to the [www.oilview.de](http://www.oilview.de) system for remote management then these communication details via mobile phone are not relevant. The complete parameter setup will be done via the OilView system.

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### DEVICE PARAMETERS (SMS)

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See additional documentation:

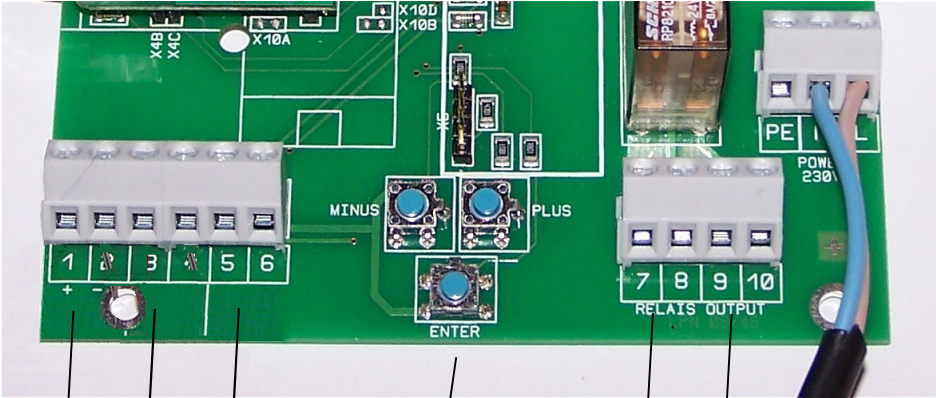
“ **Messages, Commands a. Parameters** ati **GSM-Messenger, LX-GSM, LX-Q-GSM** “

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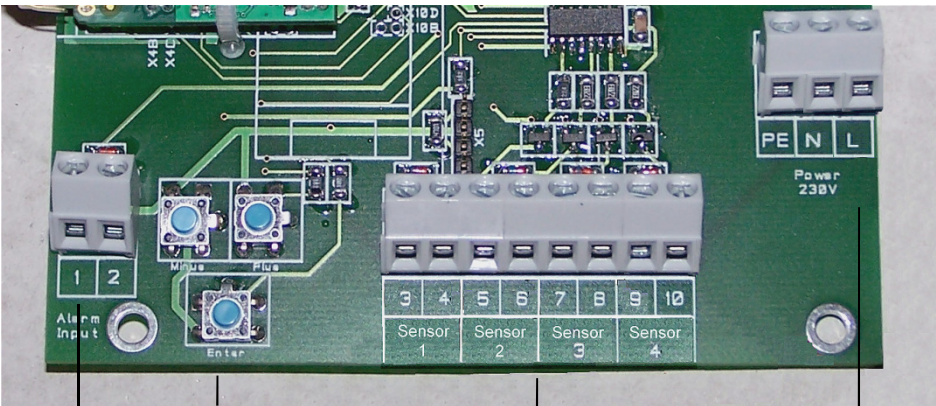
## For LX-NET / LX-Q-NET :

### LX-NET connection clamps:



Probe | Serial-Link-In | Digital-In (Alarm)    **Pushbuttons**    Relay contact pairs    230V supply

### LX-Q-NET connection clamps:



Alarm input | **Pushbuttons**    Measuring probes 1 ( to 4 )    230V supply



## INITIAL SETUP

The initial setup is carried out after completed mounting.

Determine the tank data and enter them into the mode:

You find **3 push buttons** (blue) on the PCB positioned between the connection clamps.

- Press ENTER => Device enters the setup mode  
Displayed step „1. Measur probe“
- You can step through the menu items by pressing PLUS or MINUS.  
Press ENTER to step into a sub-menu.
- Press PLUS or MINUS for selection; press ENTER to confirm.
- After completing Step 7 you reach „8. Exit“.
- Press ENTER to exit the setup mode:  
The device returns to the display mode and shows the current stock.
- You find additional setup options in step 9 to 24, reachable by pressing PLUS.

### Setup / Programming :

You find the complete documentation of the setup in the enclosed leaflet,

refer to **Setup and Operation**

## FUNCTION CHECK

After fueling or once a year please check if the displayed liters are correct.

## MAINTANCE

It is recommended to check once year if the displayed liters are correct. For a simple check lift the level probe by the cable so that the probe is above the liquid level. In this state the device should display 0 liters (+tolerance). In case of large deviation we recommend to do an Offset calibration for the measuring probe again. Refer to the setup step "9.Offset probe" and if applicable to the setup "10.Trim height".

### **New level probe:**

In case mounting of a new level probe it is necessary reset to "default values" in step "9. Offset probe".

## For LX-NET / LX-Q-NET :

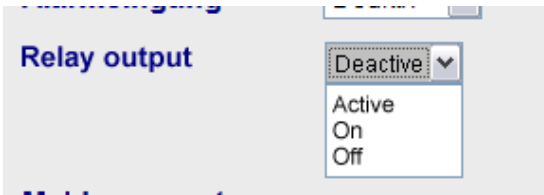
### NETWORK CONNECTION

<b>Network connection:</b>	<p>The LX-(Q)-NET device has a directly connectivity to LAN/Ethernet network with 10 / 100 Mbit TCP/IP protocol.</p> <p>Inside the housing you find the RJ45 jack for connecting a CAT-5 network cable. The plug of the network cable has to be pushed through the inlet at bottom side of the housing.</p>
<b>Additional documentation:</b>	<p>See documentation "<b>Devices with network bindung</b>".</p> <p>The LX-(Q)-NET supports DHCP protocol. The device should get a fixed IP. The network parameter setup has to be done at menu item "15.Network".</p> <p>After that and after parameter setup at your network router the device can be called directly by a browser.</p>

### Remote controlling of the relay:

The LX-NET device supports a remote control function for the relay.

Since version V3.42 respectively V4.02 the output relay can be operated by remote commands from browser at the 'CONFIG' page of the LX-NET device.



Deactive = No switching  
Active = State depends on level.  
On = Makes the relay operate (fix).  
Off = Makes the relay release state (fix).

## BROWSER ACCESS

### Show content in browser:

Entering the IP address in your browsers address line the device will be called:

### GOK / TECSON Config

**Betreiber:** Tecson Team  
**Standort:** Felde  
**Geräte-ID:** 2-9999

Tank-Nr.	Bezeichnung	Bestand	in %	Tankgröße	Freiraum
Tank 1:	Heat.oil	<b>3.800 L</b>	<b>35 %</b>	10.750 L	0 L
Tank 2:	Heat.oil	<b>60.000 L</b>	<b>60 %</b>	100.000 L	0 L
Tank 3:	Heat.oil	<b>Error E09</b>		37.500 L	
Tank 4:	Heat.oil	<b>9.500 L</b>	<b>100 %</b>	9.500 L	0 L

Alarmeinangang: **Ok**

## Parameter setup via Browser:

Clicking the 'CONFIG' button opens a next page in the browser.  
Here you can setup several parameters for the device.

### GOK / Tecson

Betreiber:

Standort:

Geräte ID: 2-14 V3.42

Neues Passwort:

Tanks	Bezeichnung	Befüllgrenze	Temperaturgrenzwert
Tank 1:	<input type="text" value="Wasser"/>	95 % <input type="button" value="v"/>	<input type="text"/> °C
Tank 2:	<input type="text" value="Heizöl"/>	95 % <input type="button" value="v"/>	
Tank 3:	<input type="text" value="Heizöl"/>	95 % <input type="button" value="v"/>	
Tank 4:	<input type="text" value="Heizöl"/>	95 % <input type="button" value="v"/>	

**Alarমেingang**  Deaktiv

**Relaisausgang**  Deaktiv

- Aktiv = Relais schaltet selbständig, abh. von Tankinhalt.
- Ein = Relais wird hierdurch ferngeschaltet auf EIN.
- Aus = Relais wird hierdurch ferngeschaltet auf AUS.

**Meldeparameter**

Meldeziel:

Kritischer Grenzwert: 15 %

## Password:

The initial password for config access at the device is: **tank**  
The password is changeable here.  
It is recommended to store an individual device password.

## ERROR CODES

<u>Error code</u>	<u>Meaning</u>
Error E 1	Invalid value setup.
Error E 2	Measuring value of the probe is too low ! If current is less than 3.5 mA => Probe error.
Error E 3	Measuring value too high for probe offset/zero calibration. The probe must not be plunged! A probe's current above 4.5 mA is invalid as zero point.
Error E 4	Offset/zero calibration necessary for setup. Return to step 9 for calibration.
Error E 5	Set height is larger than tank height. (Wrong input.)
Error E 6	Current measuring value is too low as reference point. Make sure probe is plunged! Level height setup is too large (=> measuring value is too small). Execute again 9.Offset probe. Otherwise defect of probe!
Error E 7	Current measuring value too small for set corresponding tank height or tank volume. Make sure probe is plunged.
Error E 8	Current measuring value (or mA) is too high. Check electrical connection and check measuring range of the probe. Switch 230V supply voltage off and on. Check setup steps 1 to 5. Execute again 9.Offset probe. Otherwise defect of probe.
Error E 9	Current value is 0 mA. Check probe connection (polarity) and electrical extension.
Error E10	Calibration error. Switch 230V supply voltage off and on. Else defect of probe.
Error E11	Warning – The liquid level in the tank is too low for an exact calibration. (Press OK to continue anyway.)
Error E12	Yet no measurement data is received from the external tanks 2 ... 4.

	<b>LX-(Q)-NET: Error-Messages at network communication</b>
Error N1	No network communication. A problem with the internal network module. The device automatically executes a 'Reset' for the internal network module and retrys initial communications. Try disconnection of network plug, wait... and remount the network plug.
Error N2	Error at the network communication. Check the connections at the device and at the network router... Check parameter setup at menu item '15.Network'... Check the function '15.Network > Test > Ping: Yes' ... Try to connect another network device at this network cable, e.g. a Laptop. If it does not work please contact your network admin. Error N2 only occurs in case of a domain like www.oilview.de is entered for destination. In case of entering an individual dest-IP, no Error N2 messages will be shown. Important: The destination adress must be a <u>fixed</u> IP address. Otherwise the device retrys sending again and again. Periodically 'Sending...' will be displayed caused by an unreachable destination IP address.
Send-	'Sending' is shown in the display in case of current sending of a data message. The message's destination can be setup as an IP address at menu item '15.Network => Dest. ...' Periodically 'Sending...' will be displayed caused by an unreachable destination IP address. The destination should be a fixed IP address. IP + Port should be setup in correct manner.

	<b>LX-(Q)-GSM: Error messages of GSM module / SIM card / Mobile network</b>
Error M0	GSM modem is inactivated. Entering PIN => 0000 deactivates the modem completely.
Error M1	Internal communication error. The device automatically executes an internal reset and retrys communication with the internal modem again.
Error M2	SIM card is not inserted or is not readable or is defective. Please check the SIM card in a mobile phone.
Error M3	PUK code must be entered. Wrong PIN has been entered three times so the SIM card is locked. Insert that SIM card in a mobile phone and enter the PUK code to unlock it.
Error M4	Prepaid is empty. Please recharge the prepaid.
Error M5	No mobile network available for the SIM card. (An external antenna could help.)
Error M6	Disturbance or network error when sending SMS.
Error M7	Mobile network logon failed or has been rejected.
Error M8	Interlock is activ! In case of lots of failed network logon trials the device will retry logon only once a day. This mode operates for 255 days. By pushing the [Enter] button the device does one logon trail to mobile network again. In case of successfully sending an SMS the interlock is removed.
Error M9	No destination mobile number has been set up. #T command has not been sent or OilView connection has not yet been linked.

## TECHNICAL DATA

### Display device

Supply voltage:	Type AC : 230 V 50 Hz Type DC : 12V or 24V version	
Power consumption:	<= 4 VA	
Measuring input:	4 - 20mA ; U <sub>0</sub> = 20V	Resolution 10 Bit      Accuracy: ± 1 %
Output via plug-in adaptor: (optional pug-in on mainboard)		<ul style="list-style-type: none"> <li>▪ 0 - 5 V DC or</li> <li>▪ 4-20 mA 2-wire (passive)</li> <li>▪ M-Bus Adaptor</li> <li>▪ LINK Adaptor for serial data output to PC-Link or H-Protocol-Box</li> </ul>
Dimensions W x D x H	208x120x60 [mm]	Box material: ABS Protection Rating: IP 65
Relay at LX-NET or LX-GSM	Double relay opening / closing:	Relay switching voltage: max. 250 V AC Relay switching current: max. 3,5 A

### Measuring probe (standard)

Voltage:	U <sub>b</sub> of probe 12-30V-DC <i>Measur. input of device: ~20V DC</i>	Protection Rating (probe): IP 68 referring to IEC 529
Materials:	V4A ; POM; FPM; HD-PE	Length of cable: 5m, (5m units of extra length deliverable)
Mounting orientation:	Vertically suspended, contact to ground of tank, or horizontal	
Temperatur range:	Liquid temperature: 0 °C to + 45 °C, higher on request	

## LIQUIDS

Liquids at ambient temperature and not aggressive towards wetted probe material			
<b>Heating oil</b>	<i>DIN 51603-1</i>	<b>Water</b>	
<b>Diesel oil</b>	<i>DIN EN 590</i>	<b>Glycerin</b>	
<b>Bio diesel oil</b>	<i>DIN EN 14214</i>	<b>Glycol</b>	
<b>Petroleum</b>	<i>After consulting !</i>	<b>Carbamide solution</b>	<i>e.g. AdBlue</i>
<b>Plant oil</b>	<i>After consulting !</i>		
<b>Motor oil</b>	<i>Used oil only after consulting!</i>	<b>Gasoline</b> flash point < 55 °C	<i>Only with EEx probe and Zener barrier !</i>
<b>Other</b>	<i>On request !</i>		



## ACCESSORIES

<b>Order no.</b>	<b>Component</b>	<b>Application</b>
12080	Clamp box IP 65, special, waterproof and ventilated	For extension of the probe's cable (outdoors) or in the tank's manhole pit.
12064	Output adaptor 0 - 5 V linearized / standardized	Retrofitable pluggable module. E.g. for facility management systems.
12065	Analoge output adaptor 4-20 mA, 2-wire passive	Retrofitable pluggable module. Current signal linearized / standardized.
12036 12037	PC-Link Lite PC-Link Extended <b>Note:</b> Für die serielle Datenausgabe wird ein 'LINK Adapter' benötigt: Art.Nr. 12038.	Add-on set for data transmission to a PC. Software for displaying and interpretation, incl. automatic generating of email messages.
<i>OilView-Account</i>	Data base and front end <a href="http://www.oilview.de">www.oilview.de</a>	Web server for oil tank content management. Ask TECSON.

## LABELING

<b>CE</b>	<p>Safety examination EN 61010-1 (2011) EMV examination: EN 61000-6-2 (2006) and EN 61000-6-4 (2011)</p> <p>For LX-(Q)-GSM: Radio examination EN 301 511 (2003)</p> <p>For Conformity Declaration refer to 'www.tecson.de' at menu item 'Documentation -&gt; CE Declaration'.</p>
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<b>Manufacturer:</b>	<p><b>TECSON GmbH &amp; Co KG</b> Wulfsfelder Weg 2a D-24242 Felde GERMANY</p> <p>Tel. (+49) 4340 / 402530 Fax (+49) 4340 / 402529</p> <p style="text-align: right;"><a href="http://www.tecson.de">www.tecson.de</a> <a href="mailto:info@tecson.de">info@tecson.de</a></p>
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