Hydrostatic Probe LMK 457, LMK 458 and LMK 458H

1.1 Information on the operating manual

Please verify that all listed parts are undamaged included in the delivery and check for consistency specified in your order:
- hydrostatic probe
- mounting instructions

2. Product identification

The device can be identified by its manufacturing label. It provides the most important Data. By the ordering code, the part can be clearly identified.

1.2 Symbols used

DANGER! – dangerous situation, which may result in death or serious injuries

WARNING! – potentially dangerous situation, which may result in death or serious injuries

CAUTION! – potentially dangerous situation, which may result in minor injuries

NOTE – tips and information to ensure a failure-free operation

1.3 Target group

WARNING! To avoid operator hazards and damages of the device, the following instructions have to be worked out by qualified technical personnel.

1.4 Limitation of liability

By non-observance of the operating manual, inappropriate use, modification or damage, no liability is assumed and warranty claims will be excluded.

1.5 Intended use

- The hydrostatic probes LMK 457 and LMK 458 have been designed especially for shipbuilding and offshore applications with rough environmental and operation conditions. The probes are suitable for level measurement of fluids or pasty media (no solids and frozen media) in open tanks, containers, or reservoirs. As medium all fluids can be used which are compatible with the materials of housing, sealing and cable. Based on a rugged and reliable capacitive ceramic sensor the probe is qualified for measuring small filling heights with high accuracy. Typical areas of use are ballast tanks, fuel and oil tanks as well as service and waste water tanks. The probes as standard complies with the requirements of Germanischer Lloyd (GL) and Det Norske Veritas (DNV). The certificates are available for download on our homepage: http://www.bdsensors.com/products/downloads/certificates

It is the operator’s responsibility to check and verify the suitability of the device for the intended application. If any doubts remain, please contact our sales department in order to ensure proper usage. BD SENSORS is not liable for any incorrect selections and their effects!

The hydrostatic probe has to be used according to the area of application specified above! In addition it has to be ensured, that this medium is compatible with the media wetted parts.

The technical data listed in the current data sheet are engaging. If the data sheet is not available, please order or download it from our homepage. (http://www.bdsensors.com)

WARNING! – Danger through improper usage!

1.6 Package contents

Please verify that all listed parts are undamaged included in the delivery and check for consistency specified in your order:
- hydrostatic probe
- mounting instructions

2. Product identification

The device can be identified by its manufacturing label. It provides the most important data. By the ordering code, the part can be clearly identified.

nominal pressure range type designation ordering serial number

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www.bdsensors.com
4. Electrical Installation

**WARNING!** Install the device only when depressurized and currentless!

Establish the electrical connection of the device according to the technical data shown on the manufacturing label, the following table and the wiring diagram.

### Pin configuration:

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>cable colours (DIN 47100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply +</td>
<td>wh (white)</td>
</tr>
<tr>
<td>optionally (only Pl 100):</td>
<td>bn (brown)</td>
</tr>
<tr>
<td>Supply T+</td>
<td>ye (yellow)</td>
</tr>
<tr>
<td>Supply T−</td>
<td>gy (grey)</td>
</tr>
<tr>
<td>Supply T−</td>
<td>pk (pink)</td>
</tr>
<tr>
<td>Shield</td>
<td>ye/gn (yellow / green)</td>
</tr>
</tbody>
</table>

### Wiring diagram:

```
   +---+---+
   | Vp | Vt |
   |    |    |
   +----+--+
        |   |
        |   |
        |   |
        |   |
        +---+
```

### A minimum static bending radius has to be complied with. For static installation use the 10-fold cable diameter, for dynamic applications use the 20-fold diameter.

### Prevent the damage or removal of the PTFE filter which is fixed over the end of the air tube on devices with cable outlet and integrated air tube.

### For the electrical connection a shielded and twisted multicore cable has to be used; if a cable extension is necessary, also a shielded cable has to be used.

### If a transition is desired from a probe cable with gauge tube to a cable without gauge tube, then we recommend our terminal box KL 1 or KL 2.

### Devices with TPE-cable:
- Application in water with a temperature >70°C destroys the cable.
- Applications at media temperatures >70°C have to be clarified with BDSENSORS in advance.

5. Initial start-up

**WARNING!** Before start-up, the user has to check for proper installation and for any visible defects.

**WARNING!** The device can be started and operated by authorized personnel only, who have read and understood the operating manual!

**WARNING!** The device has to be used within the technical specifications, only (compare the data in the datasheet).

6. Placing out of service

**WARNING!** When dismantling the device, it must always be done in the depressurized and currentless condition! Check also if the medium has to be drained off before dismantling!

**WARNING!** Depending on the medium, it may cause danger for the user. Comply therefore with adequate precautions for purification.

7. Maintenance

In principle, this device is maintenance-free. If desired, the housing of the device can be cleaned when switched off using a damp cloth and non-aggressive cleaning solutions. With certain media, however, the diaphragm may be polluted or coated with deposit. It is recommended to define corresponding service intervals for control. After placing the device out of service correctly, the diaphragm can usually be cleaned carefully with a non-aggressive cleaning solution and a soft brush or sponge. If the diaphragm is calcified, it is recommended to send the device to BD SENSORS for decalcification. Please read therefore the chapter "Service/Repair" below.

8. Service / Repair

8.1 Recalibration

During the life-time of a probe, the value of offset and span may shift. As a consequence, a deviating signal value in reference to the nominal pressure range starting point or end point may be transmitted. If one of these two phenomena occurs after prolonged use, a recalibration is recommended to ensure furthermore high accuracy.

8.2 Return

Before every return of your device, whether for recalibration, decalcification, modifications or repair, it has to be cleaned carefully and packed shutter-proofed. You have to enclose a notice of return with detailed defect description when sending the device. If your device came in contact with harmful substances, a declaration of decontamination is additionally required. Appropriate forms can be downloaded from our homepage www.bdensors.com. Should you dispatch a device without a declaration of decontamination and if there are any doubts in our service department regarding the used medium, repair will not be started until an acceptable declaration is sent.

**If the device came in contact with hazardous substances, certain precautions have to be complied with for purification!**

9. Disposal

The device must be disposed according to the European Directives 2002/96/EG and 2003/108/EG (on waste electrical and electronic equipment) Waste of electrical and electronic equipment may not be disposed by domestic refuse!

**WARNING!** Depending on the measuring medium, deposit on the device may cause danger for the user and the environment. Comply with adequate precautions for purification and dispose of it properly.

10. Warranty conditions

The warranty conditions are subject to the legal warranty period of 24 months from the date of delivery. In case of improper use, modifications or damages to the device, we do not accept warranty claims. Damaged diaphragms will also not be accepted. Furthermore, defects due to normal wear are not subject to warranty services.

11. Declaration of conformity / CE

The delivered device fulfils all legal requirements. The applied directives, harmonised standards and documents are listed in the EC declaration of conformity, which is available online at: http://www.bdensors.com. Additionally, the operational safety is confirmed by the CE sign on the manufacturing label.

12. Error handling

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible cause</th>
<th>Error detection / corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>no output signal</td>
<td>wrong connected</td>
<td>inspect the connection</td>
</tr>
<tr>
<td></td>
<td>line break</td>
<td>inspect all line connections necessary to supply the device (including the connector plug)</td>
</tr>
<tr>
<td></td>
<td>defective amperemeter (signal input)</td>
<td>inspect the amperemeter (fine-wire fuse) or the analogue input of the PLC</td>
</tr>
<tr>
<td></td>
<td>analogue output signal too low</td>
<td>verify the value of the load resistance</td>
</tr>
<tr>
<td></td>
<td>supply voltage too low</td>
<td>verify the output voltage of the power supply</td>
</tr>
<tr>
<td></td>
<td>defective energy supply</td>
<td>inspect the power supply and the applied supply voltage at the device</td>
</tr>
<tr>
<td></td>
<td>small shift of output signal</td>
<td>careful cleaning with non-aggressive cleaning solution and a soft brush or sponge; incorrect cleaning can cause irreparable damages on diaphragm or seals</td>
</tr>
<tr>
<td></td>
<td>diaphragm is highly contaminated</td>
<td>check the diaphragm; if it is damaged, please send the device to BD SENSORS for repair</td>
</tr>
<tr>
<td></td>
<td>diaphragm is calcified or coated with deposit</td>
<td>if possible, it is recommended to send the device to BD SENSORS for decalcification or cleaning</td>
</tr>
<tr>
<td></td>
<td>large shift of output signal</td>
<td>manually, thermally or chemically damaged cable</td>
</tr>
<tr>
<td></td>
<td>wrong or no output signal</td>
<td>check the cable; a possible consequence of a damaged cable is pitting corrosion on the stainless steel housing; if you determine this please return the device to BD SENSORS for repair</td>
</tr>
</tbody>
</table>

If you detect an error, please try to eliminate it by using this table or send the device to our service address for repair.

**Improper action and opening can damage the device. Therefore repairs on the device may only be executed by the manufacturer!**