1 General
Carefully read through the manual before starting work. Observe the relevant health and safety and accident prevention regulations.
If you do not understand this manual or parts of it, please ask us.
Observe warnings to avoid hazards for personnel or the product.
The manual forms part of the product, therefore if selling or handing on, please give it to the new owner.
Observe the manual and other information about the level sensor (e.g. data sheets) and keep available for the entire service life

1.1 Signs and symbols
► Action step: Requests action
1 Item number: Refers to an item number in a figure
● Lists

1.2 Liability exclusion
We accept no responsibility for damage or interruption of operations:
● that result from non-observation of this manual.
● if spare parts or accessories are used that have not been approved by the manufacturer.
● in the event of independent (non-authorised) repairs, conversions and changes.

1.3 Manufacturer
elobau GmbH & Co. KG
Zeppelinstr. 44
D-88299 Leutkirch/Germany
Tel.: +49 (0)7561 970-0
Fax: +49 (0)7561 970-100
Web: www.elobau.com
E-Mail: info@elobau.com

1.4 Guarantee
A guarantee of 24 months from the date of purchase applies for this product.
Defects that occur during this guarantee period in the form of material and/or manufacturing errors, are rectified free of charge, either by repair or supply of a replacement.
To the extent permitted by law, other claims for compensation are excluded.
The guarantee is not applicable in the event of interventions by third parties or dismantling by third parties without prior agreement.
The guarantee is also not applicable in the event of intentional damage or incorrect handling.
The provision of a repair or replacement under the guarantee does not extend the guarantee period.
We reserve the right to charge for costs resulting from unjustified claims, e.g. installation or operating errors.
2  Safety

2.1  Use

Intended use

The level sensor is intended solely for level measurement of liquid media.

Media contacting parts (see datasheet) must be sufficiently chemically resistant against the medium. Observe the specified range of use according to the datasheet.

► Check, whether the ordered variant matches the application.

Every non-intended use or all activities performed on the level sensor that are not described in this manual represent a not permitted, incorrect use outside the legal limits of liability of the manufacturer.

Only operate level sensors in intact and undamaged condition and with the originally fitted focus tube (option). Adhere to all applicable safety conditions, laws and directives.

Reasonably foreseeable misuse

In the event of incorrect use, hazards can arise for persons or property.

Incorrect use includes for example:

● Use in heavily contaminated or crystallising media.

● Severely mechanically loading the level sensor (e.g. levering / bending movements or tightening/loosening by hitting).

● Not complying with technical data.

2.2  Warning instructions

2.2.1  Signal words

The severity of the hazard and its consequences are graded in the manual through use of a signal word and colours.

| ![DANGER] | Indicates an immediately threatening danger. If not avoided, death or severe injuries will result. |
| ![WARNING] | Indicates a possibly dangerous situation. If not avoided, death or severe injuries may result. |
| ![CAUTION] | Indicates a possibly dangerous situation. If not avoided, light or minor injuries may result. |
| ![NOTICE] | Indicates a possibly dangerous situation. If not avoided, property damage may result. |

2.2.2  Pictograms

These pictograms are used in this manual as necessary.

**Warning of a general hazard**

This warning sign occurs prior to activities where a number of causes may lead to hazards.

**Warning of dangerous electrical voltage**

This warning sign occurs prior to activities where there is a risk of electric shock, possibly with fatal consequences.

2.3  Personnel

Only specially trained, authorised specialised personnel may assemble, install, program, maintain and repair the level sensor as well as performing any other work.

2.4  Conformity

The CE mark is part of the name plate. The level sensor conforms to the state of the art plus the applicable safety conditions at the time of bringing into circulation within the scope of its intended use.
From a design point of view, reasonably foreseeable misuse cannot be avoided without limiting the intended functionality.

2.5 Changes/conversion
Any unauthorised change or conversion is expressly forbidden.

3 Transport/storage
Only store and transport the level sensor in a sensor protected by bubble wrap packaging.

4 Technical data
Performance data, dimensions and/or functions see supplied product specification/drawing/data-sheet.

Focus tube
Variants (material) are available, dependent on the medium. Resistance is dependent on the temperature and duration for which the focus tube is exposed to the medium.

Information
In the event of deviations from the specification, contact elobau. Validation performed by testing.

5 Description

1 Name plate
2 Tank O-ring seal
3 Focus tube O-ring seal
4 Ultrasonic transducer
5 Tube vent hole
6 Focus tube (option)
7 Tank flat seal
8 4-hole flange
9 Level sensor head

Information
The figure is for illustration purposes only. See additional datasheet (separate document).

Method of operation
The ultrasonic transducer (4) generates a sound pulse and emits it. The sound is reflected at the surface of the medium (e.g. diesel) in the tank. The ultrasonic transducer (4) records the echo. Based on the time of flight, the electronics in the level sensor head (9) determine the fill level. The level sensor head (9) outputs the result via a current or voltage signal that depends on the tank filling level. The interface is used for power supply and transfer of the measured values to the control unit. The purpose of the focus tube (6) is to guide the sound. If the vehicle has a sloping orientation it prevents the sound from being scattered in the tank (the surface of the medium remains horizontal). Instead the sound is transmitted directly back to the level sensor for evaluation.

Measurement is not possible in the range < 50 mm from the ultrasonic transducer (4). Measurements are dependent on the reflection of the medium. Smooth surfaces, or under certain circumstances moving media, delivery good measurement results.

Information
For actual applications contact elobau.
5.1 Type code

<table>
<thead>
<tr>
<th>Item</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>Reference ● 2 = Base number level sensor</td>
</tr>
<tr>
<td>2</td>
<td>U</td>
<td>Measuring method ● U = Ultrasound</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>Housing / flange ● F = Vehicle housing</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Material / flange / thread ● 1 = PA</td>
</tr>
<tr>
<td>5</td>
<td>0610</td>
<td>Installation length in mm ● Typical: 610 mm</td>
</tr>
</tbody>
</table>
| 6    | 1       | Output signal ● 0 = Voltage output 1-5 V  
Heavy 1 = Current output 4-20 mA  
2 = Current output 0-20 mA  
3 = Voltage output 0-5 V  
4 = Voltage output 0-10 V  
7 = Voltage output 0-5-4.5 V  
... = TBD other signal outputs |
| 7    | 0       | Display ● 0 = No display |
| 8    | 1       | Focus tube ● 0 = No focus tube  
Heavy 1 = With focus tube, material PA  
... = other materials, TBD |
| 9    | B       | Seal ● A = Flat seal, material NBR  
B = Flat seal, material FKM  
C = O-Ring, material NBR  
D = O-Ring, material FKM  
... = other seals, TBD |
| 10   | A       | Connection ● A = AMP 3 pole |
| 11   | 01      | Sequence number ● 00 = Output signal averaged over 20s  
01 = Output signal averaged over 1s  
xx = Sequential number from 02 |

For further details see the supplied datasheet.
6  Fitting/putting into service

Observe the information and instructions of the tank manufacturer.
Comply with the electrical specifications.
► Check the level sensor and lead for damage.

6.1 Mechanical connection

**WARNING**

Danger due to pressurised media
Escaping media can result in severe injuries.
► Ensure that the system is depresurised before the level sensor is installed/removed.
► Check the tank level.
► If necessary, empty the tank before the level sensor is installed/removed.
► If necessary, wear personal protective equipment (safety gloves, safety glasses).
► Capture any escaping media in a suitable vessel.

**NOTICE**

Danger due to incorrect installation
Level sensors can be damaged by too high tightening torques.
► Avoid severe impacts or vibrations.
► Adhere to the installation tolerances and installation location.
► Adhere to the tightening torques (datasheet).
► Be aware of the effect of the medium!

Risk of incorrect measurements arising from:
● Foam formation
● Outgassing (e.g. with petrol), which change the physical properties of the air.
● Formation of condensation on the ultrasonic transducer due to water and water vapour.
● Soiling of the ultrasonic transducer.

An inclined position upon installation reduces the possible range.
► If necessary fit a suitable seal on the sealing surface.
► Install the level sensor in the tank using screws. Adhere to the tightening torques in the datasheet.

The focus tube can be shortened bearing in mind the following information:
● The tube end must not be sloping.
● The tube end must be smooth and free from fibres
● The interior of the tube must be clean
● Level measurements cannot be made when the liquid surface is more than 8 mm beyond the tube end
● When measurements are made more than 8 mm beyond the tube end the output signal is undefined
● The electrical output signal, related to the absolute measuring length, remains unchanged
● The useful range of the output signal is limited dependent on the tube shortening
● The previous limit value of the output signal is no longer reached at the new tube end
● The output signal at the shortened tube end is equal to the output signal with the unshortened tube if a measuring length corresponding to the new tube length is set

6.2 Electrical connection

► Check for the voltage-free state of the connection.
► Connect the level sensor in accordance with the wire colours/connector pin assignments in the datasheet.
► Route the wiring harnesses so that no damage can arise (e.g. due to kinks, breaks, rubbing points).
► Route wires so that they are rigidly fixed if they will be exposed to temperatures less than -5°C.
► After installing, hand over the installation manual to the end-user.

6.3 Putting into service

► Observe the information and instructions of the level sensor manufacturer.
► Ensure that the electrical specification are adhered to.
► Check the intactness of the sensor lead and housing parts.
► Connect the power and check operation of the level sensor.
6.4 Faults/troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| No or implausible measured values    | Level sensor connected incorrectly | ▶ Check for correct connection  
                                       | Focus tube soiled                     | ▶ Clean tube                                |
|                                      | Vent hole clogged              | ▶ Clean hole                                               |
|                                      | Ultrasonic transducer (groove) soiled | ▶ Clean ultrasonic transducer |
|                                      | Extreme sloping position       | ▶ Position level sensor/vehicle in a level position         |
|                                      | Unknown                        | ▶ Switch off the power to the level sensor and then switch back on |

7 Maintenance

7.1 Level sensor

▶ Check visually and check operation.
▶ Check for correct seating/leak-tightness.
▶ Do not operate the level sensor if the seals on the flange or focus tube (6) are damaged.
▶ Check the connection leads for damage.
▶ Clean the focus tube (6) and vent hole (5) if they are highly soiled.
▶ If the ultrasonic transducer (4) is soiled, clean with a damp cloth.

Identify replacement parts, e.g. damaged seals using the product specification/drawing/datasheet and contact elobau.
8 Dismantling/disposal

8.1 Dismantling

► Disconnect from the power and depressurise.
► Pull out the power plug.
► If applicable, empty the tank.
► Undo screws and demount the level sensor.
► If necessary, close the tank opening with the cover.

8.2 Disposal

► Disconnect from the power and depressurise before the level sensor is installed/removed.
► Check the tank level.
► If necessary, empty the tank before the level sensor is installed/removed.
► If necessary, wear personal protective equipment (safety gloves, safety glasses).
► Capture any escaping media in a suitable vessel.

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<tr>
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<tr>
<th>WARNING</th>
<th>Danger for man and the environment due to chemicals!</th>
</tr>
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<tbody>
<tr>
<td>!</td>
<td>The shipper is responsible for damage.</td>
</tr>
<tr>
<td>▶</td>
<td>Observe the safety data sheet of the medium.</td>
</tr>
<tr>
<td>▶</td>
<td>Protect against possible emissions (vapours, liquids)!</td>
</tr>
</tbody>
</table>

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<td>Observe the safety data sheet of the medium.</td>
</tr>
<tr>
<td>▶</td>
<td>Only dispose of the suction pipe when it is emptied and cleaned.</td>
</tr>
<tr>
<td>▶</td>
<td>Only demount the level sensor when the tank is empty.</td>
</tr>
<tr>
<td></td>
<td>Do not smoke!</td>
</tr>
<tr>
<td></td>
<td>Only demount the level sensor once it is depressurised and disconnected from the power.</td>
</tr>
<tr>
<td></td>
<td>Dispose of packaging and used parts according to the relevant national regulations.</td>
</tr>
<tr>
<td></td>
<td>Do not dispose of the level sensor in domestic waste; e.g. dispose of in the collection centre of a waste management utility.</td>
</tr>
</tbody>
</table>