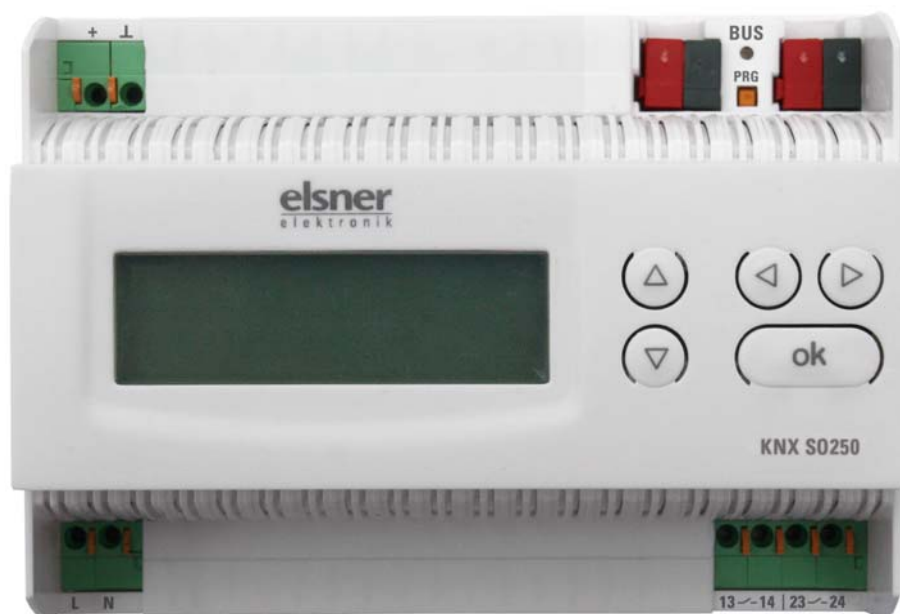




Tank Sensor KNX S0250



Item number 70151

Technical Data and Installation Notes



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The Ultrasonic Probe KNX SO250 is used for measurement of the fill level of liquids in tanks or for distance measurement. In addition to application areas like rainwater cisterns or fuel tanks, also e. g. fish ponds or wells or the parking distance of trucks can be monitored. Please follow the "Instructions for assembly and operation" on page 4.

The display directly indicates the distance/fill level. The integrated key pad is used for selection of the tank dimensions and setting of two relay switching outputs. When the relays are switched an additional acoustic alarm can be emitted. The KNX software ETS software allows individual parameterization of all bus functions of the KNX SO250. Five switching outputs with adjustable threshold values are available.

Functions:

- **Distance measurement**
- **Fill level measurement** in spherical, rectangular and cylinder tanks. Several similar tanks as battery
- Setting of the two **relays** with the integrated display and keypad
- Setting of **bus functions** by means of the KNX software ETS. 5 switching outputs with adjustable threshold values (Threshold values can be set by parameter or via communication objects)

The **programme file** (format VD2) and the **manual** can be downloaded from the Elsner Elektronik homepage on www.elsner-elektronik.de in the "Service" menu.

Technical Data

Evaluation Unit

Housing:	Plastic material
Colour:	White
Mounting:	Snap-on fitting on mounting rails
Protection category:	IP 20
Dimensions:	approx. 123 x 89 x 61 (W x H x D, mm), 7 width units
Weight:	approx. 345 g
Ambient temperature:	Operation -5...+45 °C, Storage -25...+70°C
Ambient air humidity:	max. 95% R. H., avoid bedewing
Operating voltage:	230 V AC , 50 Hz
Power consumption:	max. 4 W
Outputs:	<ul style="list-style-type: none"> • KNX data • 2 x Relay, potential-free NOC, max. 250 V AC / 7 A
Data output:	KNX +/- bus terminal plug
BCU type:	Own micro controller
PEI type:	0
Group addresses:	max. 254
Allocations:	max. 255
Communication objects:	57

The product conforms with the provisions of EC guidelines

EMC Directive 2004/108/EC

Low Voltage Directive 2006/95/EC

The following standards and/or technical specifications have been applied:

EN 50491-5-1: 2010

EN 50491-5-2: 2011

Air ultrasonic probe

Housing:	Plastic material
Colour:	Black
Protection category:	IP 52
Liquid resistance:	Water, fuel
Dimensions:	Total diameter approx. 60 mm, total head height approx. 45 mm, thread 1½ inches
Connection lead:	RG 58 coaxial cable with BNC plug length 10 m, can be extended to max. 40 m
Total weight:	approx. 400 g
Ambient temperature:	+0...+40 °C
Measurement range:	12...250 cm

Installation and commissioning

Installation, testing, operational start-up and troubleshooting should only be performed by an electrician.



DANGER!

Risk to life from live voltage (mains voltage)!

There are unprotected live components within the device.

- National legal regulations are to be followed.
- Ensure that all lines to be assembled are free of voltage and take precautions against accidental switching on.
- Do not use the device if it is damaged.
- Take the device or system out of service and secure it against unintentional use, if it can be assumed, that risk-free operation is no longer guaranteed.

The device is only to be used for its intended purpose. Any improper modification or failure to follow the operating instructions voids any and all warranty and guarantee claims.

After unpacking the device, check it immediately for possible mechanical damage. If it has been damaged in transport, inform the supplier immediately.

The device may only be used as a fixed-site installation; that means only when assembled and after conclusion of all installation and operational start-up tasks and only in the surroundings designated for it.

Elsner Elektronik is not liable for any changes in norms and standards which may occur after publication of these operating instructions.

Instructions for assembly and operation

Evaluation device:



Must only be installed and operated in dry, indoor spaces.
Avoid condensation.

Ultrasonic probe:



Do not cause any mechanical stress on the front part (rubber)!



The measuring head must be dry:

It must not be washed by liquids!
No condensation, no droplet formation!



The measuring track must be free:

No steam, fog, etc. between the sensor and the measuring surface.
Steam is formed e.g. when a warm fluid is poured into a tank.

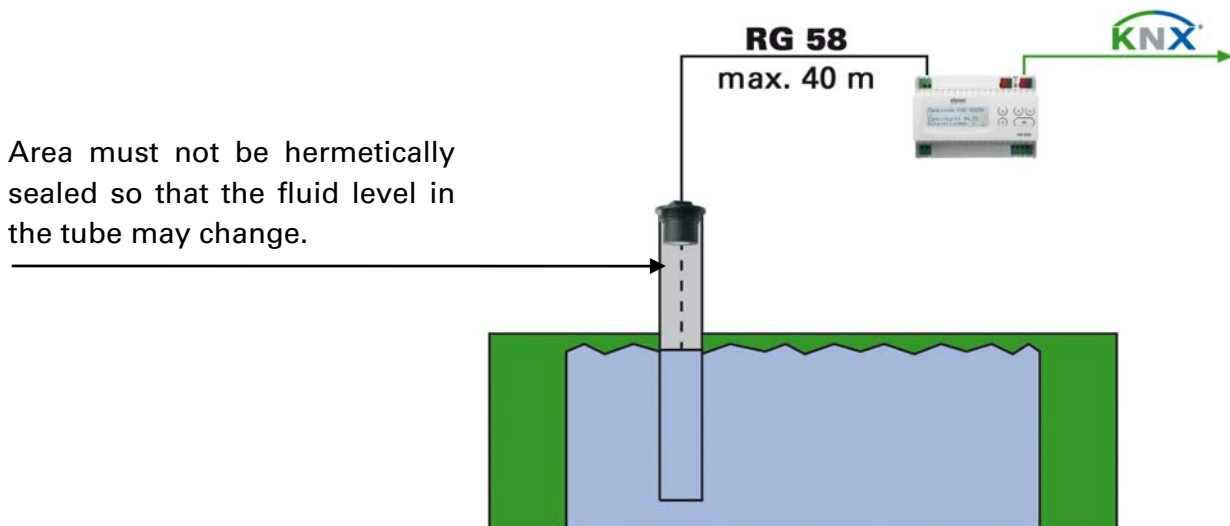


The measured surface must be still:

No waves, no vibrations!

To avoid wave formation in fluids, the measured area can be separated using a measuring tube (\varnothing at least 50 mm).

Please note: the measuring area is only calm as long as the end of the tube is below the surface of the liquid.



Loud surrounding noise (e.g. when filling metal tanks) may disrupt the measurement.

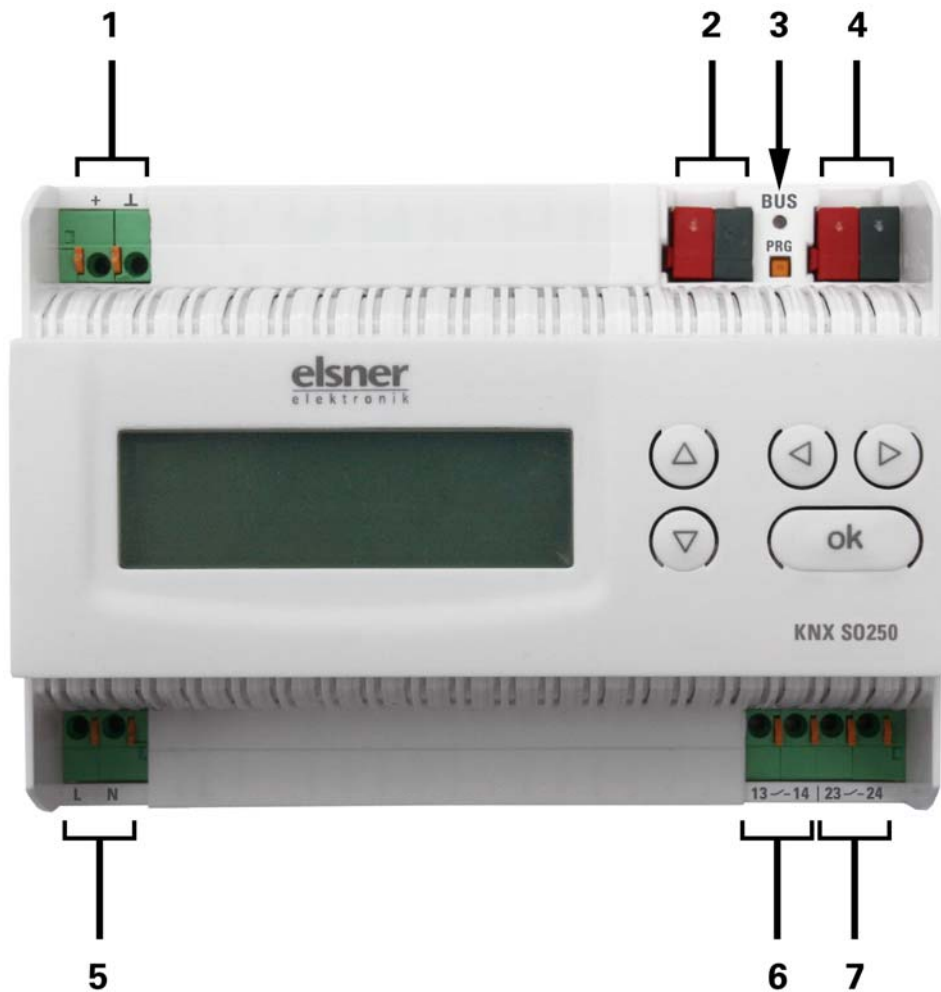
Please contact us with any questions regarding the area of application or installation.

Connection

Ensure that all connections are made correctly. Incorrect connection can result in destruction of the tank sensor or of connected electronic devices.

After the auxiliary voltage is applied the device will enter an initialisation phase lasting 5 seconds. During this phase no information can be received via the bus.

Casing



- 1 Connection measurement probe, +/screen ⊥
- 2 Bus connection (KNX terminal +/-)
- 3 Programming LED and programming button
- 4 Bus connection (KNX terminal +/-)
- 5 Operating voltage input 230 V AC, L/N
- 6 Relay output 1 (close-circuit contact), 13/14
- 7 Relay output 2 (close-circuit contact), 23/24

Connections 1, 5, 6 and 7 suitable for solid conductors up to 1.5 mm² or fine-wire conductors

Operation

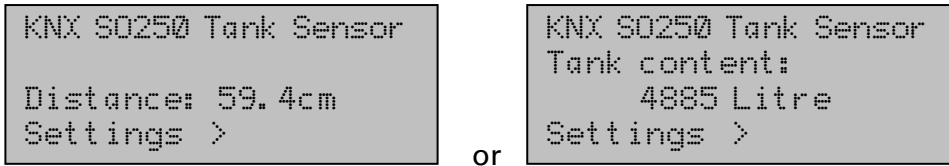
The display of the KNX SO250 is only used for defining the specifications for the two output relays. Additional parameterization options can be found in the ETS programme file.



The bus allows blocking of a measurement and to request a repeated measurement. The blocking and the measured value also apply for the relays.

Standard display screen

Standard screen:



The display shows the currently measured distance and/or the tank content (according to the setting). If a measurement is not possible the message "No echo received!" will be displayed.

The following settings can be made directly at the KNX SO250 Tank Sensor:

- Distance measurement
- Fill level measurement
- Relay set-up
- Acoustic alarm

The display will be dimmed after keys have not been operated for 60 seconds.

Function of the keys in the display menu

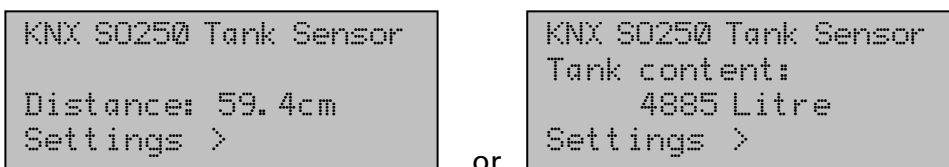
- Key \triangleright : Confirm the selection, continue with next step.
- Key \triangleleft : Go to previous step.
- Key ∇ and \triangle : Change setting (select a setting or change a value). The cursor (flashing rectangle) indicates which menu item is selected.
- Key ok: Confirm the setting and return to the standard display screen.

Distance measurement

The KNX SO250 Tank Sensor can measure distances. The following settings are made in the menu "Distance measurement":

- Unit of the distance display
- Time interval between measurements

Standard screen:



Press key \triangleright once to enter the "Settings" menu.

```
Distance measurement. > █
Fill level meas. >
Relay set-up >
Acoustic alarm >
```

Move the cursor (flashing rectangle on the right) using the keys ∇ and \triangle to the menu item "Distance measurement" and press key \triangleright .

```
Display in mm > █
Display in cm >
Display in m >
```

Move the cursor using the keys ∇ or \triangle to the required setting. You can display the distance in millimetres (mm), centimetres (cm) or meters (m). Confirm your selection by pressing the key \triangleright .

```
Measurement
frequency?
Once every 8 sec. █
```

Use the keys ∇ and \triangle to set the required time interval for the measurements.

Setting options: From 1 s to 9 s in increments of one second from 10 s to 50 s in increments of ten seconds, from 1 min to 120 min in increments of 10 minutes.

Confirm your selection by pressing the key \triangleright . You will automatically return to the standard screen.

Fill level measurement

The KNX SO250 Tank Sensor can measure the fill level of liquids in tanks. Possible tank designs are rectangular tanks, spherical tanks, vertical or horizontal tanks. If more than one similar tank exist in a battery only one tank needs to be described for the KNX SO250 to calculate the content according to the specified tank number. The following settings are made in the "Fill level measurement" menu:

- Tank design
- Tank volume/capacity/fill height
- Probe distance to liquid for full tank
- Number of tanks in a battery
- Unit of the fill level display
- Time interval for measurements

Standard screen:

```
KNX SO250 Tank Sensor
Distance: 59.4cm
Settings >
```

or

```
KNX SO250 Tank Sensor
Tank content:
4885 Litre
Settings >
```

Press key \triangleright once to enter the "Settings" menu.


```
Distance measurement. >
Fill level meas. >
Relay set-up >
Acoustic alarm >
```

Move the cursor (flashing rectangular at the right side) using the keys ∇ and \triangle to the menu item "Fill level measurement" and press key \triangleright .

```
Rectangular tank >
Spherical tank >
Cylinder vertical >
Cylinder horizont. >
```

Move the cursor using the keys ∇ or \triangle to the required setting. The KNX SO250 can determine the fill level of rectangular tanks, spherical tanks, vertical or horizontal cylindrical tanks.

Press key \triangleright to confirm your selection and continue as described for the relevant tank design.

Rectangular tank

```
Tank volume in l >
Tank volume in m³ >
Please select unit!
```

Move the cursor (flashing rectangular at the right side) using the keys ∇ and \triangle to the required setting. You can specify the capacity of a tank in Litres (l) or cubic metres (m³). Press key \triangleright to confirm your selection.

```
Maximum capacity
of tank:

5000 Litres >
```

or

```
Maximum capacity
of tank:

5000 m³ >
```

Use the keys ∇ and \triangle to select the maximum capacity of a tank (in a later step the number of existing tanks can be specified).

Setting options: *Litres*: 1 to 99 l in increments of one Litre, 100 to 900 l in increments of hundred Litres, 1000 to 100,000 l in increments of thousand Litres. *Cubic metres*: 1 to 99 m³ in increments of one cubic metre, 100 to 900 m³ in increments of hundred cubic metres, 1000 to 100,000 m³ in increments of thousand cubic metres.

Press key \triangleright to confirm your selection.

```
Maximum fill level
of tank:

230 cm
```

Use the keys ∇ and \triangle to select the maximum fill level of the tank (1 to 254 cm).

Press key \triangleright to confirm your selection and continue as described in "Settings for all tank designs".

Spherical tank

Interior diameter
of tank:

200 cm █

Use the keys ∇ and \triangle to select the inside diameter of a tank (1 to 1000cm).

Press key \triangleright to confirm your selection and continue as described in “Settings for all tank designs”.

Cylinder vertical

Interior diameter
of tank:

200 cm █

Use the keys ∇ and \triangle to select the inside diameter of a tank (1 to 1000 cm). Press key \triangleright to confirm your selection.

Maximum fill level
of tank:

230 cm █

Use the keys ∇ and \triangle to select the maximum fill level of the tank (1 to 254 cm).

Press key \triangleright to confirm your selection and continue as described in “Settings for all tank designs”.

Cylinder horizontal

Tank length:

200 cm > █

Use the keys ∇ and \triangle to select the length of the tank.

Setting options: 1 to 99 cm in increments of one centimetre, 100 to 900 cm in increments of hundred centimetres, 1000 to 100,000 cm in increments of thousand centimetres.

Press key \triangleright to confirm your selection.

Interior diameter
of tank:

200cm █

Use the keys ∇ and \triangle to select the inside diameter of the tank (1 to 1000 cm).

Press key \triangleright to confirm your selection and continue as described in “Settings for all tank designs”.

Settings for all tank designs

```
Sensor distance
from liquid when
tank is full:
 15cm
```

Use the keys ∇ and \triangle to select the distance of the probe to the liquid for full tank (12 to 200 cm). Press key \triangleright to confirm your selection.

```
Number of tanks
in a battery:

 2 tanks
```

Use the keys ∇ and \triangle to select how many of the described tanks exist in one battery (1 to 100 tanks). Press key \triangleright to confirm your selection.

```
Display in Litres >
Display in m3 >
Display in % >
```

Move the cursor to the required setting using the keys ∇ or \triangle . The KNX SO250 can indicate the tank fill volume in Litres (l), cubic metres (m³) or percent (%). Press key \triangleright to confirm your selection.

```
Measurement
frequency?

Once every 8 sec.
```

Use the keys ∇ and \triangle to specify the required time interval for the measurements.

Setting options: From 1 s to 9 s in increments of one second, from 10 s to 50 s in increments of ten seconds, from 1 min to 120 min in increments of 10 minutes. Press key \triangleright to confirm your selection. You will automatically return to the standard screen.

Relay set-up

Standard screen:

```
KNX SO250 Tank Sensor
Distance: 59.4cm
Settings >
```

or

```
KNX SO250 Tank Sensor
Tank content:
 4885 Litre
Settings >
```

Press key \triangleright once to enter the "Settings" menu.

```
Distance measur. >
Fill level meas. >
Relay set-up >
Acoustic alarm >
```

Move the cursor (flashing rectangular at the right side) to the menu item "Relay set-up" using the keys ∇ or \triangle and press key \triangleright .

```

Set relay 1      >■
Set relay 2      >

```

Move the cursor to the required relay using the keys ▾ or ▴. The set-up options are the same for both relays. Press key ▷ to confirm your selection.

```

Switch on relay 1
if measurement
value is too high >■
value is too low  >

```

Move the cursor to the required setting using the keys ▾ or ▴. The relay can be switched on in case of a too high or too low measured value. Press key ▷ to confirm your selection.

```

Max. measurement
value for relay 1
to be switched on: - ■

```

or

```

Min. measurement
value for relay 1
to be switched on: - ■

```

Use the keys ▾ and ▴ to select the required limit value for the relay (1% to 99% or not used). ---).

For fill level measurements 1% refers to: tank empty, 100% refers to: tank full. For distance measurements 1% refers to: 12 cm, 100% refers to: 254 cm (i.e. 50%: distance 121 cm).

Press key ▷ to confirm your selection. You will automatically return to the standard screen.

Acoustic alarm

The KNX SO250 Tank Sensor can optionally emit an acoustic alarm if the actual values are below or above the values specified for the relays.

Standard screen:

```

KNX SO250 Tank Sensor
Distance: 59.4cm
Settings >

```

or

```

KNX SO250 Tank Sensor
Tank content:
4885 Litre
Settings >

```

Press key ▷ once to enter the "Settings" menu.

```

Distance measur. >
Fill level meas. >■
Relay set-up     >
Acoustic alarm   >

```

Move the cursor (flashing rectangular on the right side) to the menu item "Acoustic alarm" using the keys ▾ or ▴ and press key ▷.

```
Acoustic alarm off>■
with relay 1      >
with relay 2      >
with relay 1 & 2  >
```

Move the cursor to the required setting using the keys ▾ or ▲. The KNX SO250 can emit an acoustic alarm if relay 1 is switched on, if relay 2 is switched on or if relay 1 or relay 2 is switched on.

Press key ▷ to confirm your selection. You will automatically return to the standard screen.

Language

Standard screen:

```
KNX SO250 Tank Sensor
Distance: 59.4cm
Settings >
```

or

```
KNX SO250 Tank Sensor
Tank content:
  4885 litres
Settings >
```

Press key ▷ once to enter the "Settings" menu.

```
Language > ■
```

Move the cursor (flashing rectangular on the right side) to the menu item "Language" using the keys ▾ or ▲ and press key ▷.

```
Sprache : Deutsch ■
Language : English
Langue : Français
Lingua : Italiano v
```

Move the cursor to the desired language using the ▾ or ▲ keys (German, English, French, Italian or Spanish).

Press key ▷ to confirm your selection. You will automatically return to the standard screen.