



# KNX S0250 basic

## Ultrasonic Probe

---

Item number 70153





<b>1. Safety and usage instructions .....</b>	<b>3</b>
<b>2. Description .....</b>	<b>3</b>
<b>3. Commissioning .....</b>	<b>4</b>
3.1. Addressing of the device at the bus .....	4
<b>4. Transmission protocol .....</b>	<b>5</b>
4.1. Listing of all communication objects .....	5
<b>5. Parameter setting .....</b>	<b>7</b>
5.1. General settings .....	7
5.1.1. Distance measurement .....	7
5.1.2. Filling height measurement .....	7
5.1.3. Fill level measurement .....	8
5.2. Tank and calculation (only for fill level measurement) .....	9
5.2.1. Rectangular tank .....	9
5.2.2. Spherical tank .....	10
5.2.3. Cylinder vertical .....	10
5.2.4. Cylinder horizontal .....	10
5.2.5. Settings for all tank types .....	10
5.3. Threshold Values .....	10
5.3.1. Threshold Value 1 / 2 / 3 / 4 / 5 .....	11

This manual is amended periodically and will be brought into line with new software releases. The change status (software version and date) can be found in the contents footer. If you have a device with a later software version, please check **www.elsner-elektronik.de** in the menu area "Service" to find out whether a more up-to-date version of the manual is available.

## Clarification of signs used in this manual



Safety advice.



Safety advice for working on electrical connections, components, etc.

### **DANGER!**

... indicates an immediately hazardous situation which will lead to death or severe injuries if it is not avoided.

### **WARNING!**

... indicates a potentially hazardous situation which may lead to death or severe injuries if it is not avoided.

### **CAUTION!**

... indicates a potentially hazardous situation which may lead to trivial or minor injuries if it is not avoided.



**ATTENTION!** ... indicates a situation which may lead to damage to property if it is not avoided.

### ETS

In the ETS tables, the parameter default settings are marked by underlining.

---

# 1. Safety and usage instructions

---



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

---



## **CAUTION!** **Live voltage!**

- Inspect the device for damage before installation. Only put undamaged devices into operation.
  - Comply with the locally applicable directives, regulations and provisions for electrical installation.
  - Immediately take the device or system out of service and secure it against unintentional switch-on if risk-free operation is no longer guaranteed.
- 

Use the device exclusively for building automation and observe the operating instructions. Improper use, modifications to the device or failure to observe the operating instructions will invalidate any warranty or guarantee claims.

Operate the device only as a fixed-site installation, i.e. only in assembled condition 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.

---

**For information on installation, maintenance, disposal, scope of delivery and technical data, please refer to the installation instructions.**

---

## 2. Description

---

The **Ultrasonic Probe KNX SO250 basic** is used for measurement of the fill level of liquids in tanks or for distance measurement. In addition to application areas like rain-water cisterns or fuel tanks, also e. g. fish ponds or wells or the parking distance of trucks can be monitored.

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 **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)

---

## 3. Commissioning

---

Configuration is made using the KNX software as of ETS 5. The **product file** can be downloaded from the ETS online catalogue and the Elsner Elektronik website on **[www.elsner-elektronik.de](http://www.elsner-elektronik.de)**.

After the bus voltage has been applied, the device will enter an initialisation phase lasting a few seconds. During this phase no information can be received or sent via the bus.

### 3.1. Addressing of the device at the bus

---

The equipment is delivered with the individual address 15.15.255. This can be changed via the ETS. There is a button and a control LED on the unit for this purpose.

## 4. Transmission protocol

### 4.1. Listing of all communication objects

#### Abbreviations

EIS types:

EIS 1 Switching 1/0

EIS 5 Floating decimal value

EIS 6 8 bit value

EIS 9 Float value

#### Flags:

C Communication

R Read

W Write

T Transmit

U Update

No.	Name	Function	EIS-type	Flags
0	Measured value in Litres	Output	5	C R T
1	Measured value in m <sup>3</sup>	Output	9	C R T
2	Measured value in %	Output	6	C R T
3	Measured value in m	Output	9	C R T
4	Measured value request	Input	1	C R W
5	Lock measurement	Input	1	C R W
6	Sensor fault	Output	1	C R T
7	Min/max adjustment	Input	1	C R W
8	Request max fill level	Input	1	C R W
9	Max fill volume in Litres	Output	5	C R T
10	Max fill volume in m <sup>3</sup>	Output	5	C R T
11	Threshold value 1 in litres: 16 bit value	Input / Output	5	C R W T U
12	Threshold value 1 in m <sup>3</sup> : 16 bit value	Input / Output	9	C R W T U
13	Threshold value 1 in %: 16 bit value	Input / Output	5	C R W T U
14	Threshold value 1 in m: 16 bit value	Input / Output	9	C R W T U
15	Threshold value 1: 1 = increase   0 = decrease	Input	1	C R W
16	Threshold value 1: increase	Input	1	C R W
17	Threshold value 1: decrease	Input	1	C R W
18	Threshold value 1: switching output	Output	1	C R T
19	Threshold value 1: switching output lock	Input	1	C R W
20	Threshold value 2 in litres: 16 bit value	Input / Output	5	C R W T U

No.	Name	Function	EIS-type	Flags
21	Threshold value 2 in m <sup>3</sup> : 16 bit value	Input / Output	9	C R W T U
22	Threshold value 2 in %: 16 bit value	Input / Output	5	C R W T U
23	Threshold value 2 in m: 16 bit value	Input / Output	9	C R W T U
24	Threshold value 2: 1 = increase   0 = decrease	Input	1	C R W
25	Threshold value 2: increase	Input	1	C R W
26	Threshold value 2: decrease	Input	1	C R W
27	Threshold value 2: switching output	Output	1	C R T
28	Threshold value 2: switching output lock	Input	1	C R W
29	Threshold value 3 in litres: 16 bit value	Input / Output	5	C R W T U
30	Threshold value 3 in m <sup>3</sup> : 16 bit value	Input / Output	9	C R W T U
31	Threshold value 3 in %: 16 bit value	Input / Output	5	C R W T U
32	Threshold value 3 in m: 16 bit value	Input / Output	9	C R W T U
33	Threshold value 3: 1 = increase   0 = decrease	Input	1	C R W
34	Threshold value 3: increase	Input	1	C R W
35	Threshold value 3: decrease	Input	1	C R W
36	Threshold value 3: switching output	Output	1	C R T
37	Threshold value 3: switching output lock	Input	1	C R W
38	Threshold value 4 in litres: 16 bit value	Input / Output	5	C R W T U
39	Threshold value 4 in m <sup>3</sup> : 16 bit value	Input / Output	9	C R W T U
40	Threshold value 4 in %: 16 bit value	Input / Output	5	C R W T U
41	Threshold value 4 in m: 16 bit value	Input / Output	9	C R W T U
42	Threshold value 4: 1 = increase   0 = decrease	Input	1	C R W
43	Threshold value 4: increase	Input	1	C R W
44	Threshold value 4: decrease	Input	1	C R W
45	Threshold value 4: switching output	Output	1	C R T
46	Threshold value 4: switching output lock	Input	1	C R W
49	Threshold value 5 in %: 16 bit value	Input / Output	5	C R W T U
50	Threshold value 5 in m: 16 bit value	Input / Output	9	C R W T U
51	Threshold value 5: 1 = increase   0 = decrease	Input	1	C R W
52	Threshold value 5: increase	Input	1	C R W
53	Threshold value 5: decrease	Input	1	C R W
54	Threshold value 5: switching output	Output	1	C R T
55	Threshold value 5: switching output lock	Input	1	C R W
56	Software version	readable	16 bit	C R



## 5. Parameter setting

### 5.1. General settings

#### 5.1.1. Distance measurement

##### **Sensor settings:**

Sensor measures	<b>Distance</b> • Filling height • Filling level
Distance offset in cm	<u>12</u> ... 200
Use malfunction object	Yes • <u>No</u>

##### **Measuring behaviour:**

Perform measuring	<u>cyclically</u> • on request and cyclically
Measuring cycle in seconds (only for "cyclic" sending)	1 ... 7200; <u>5</u>
Use object measuring block If the object is used: for value: 1 = Block measurement   0 = release measurement Value before 1st communication: 0	Yes • <u>No</u>

Note: If the measurement is made on request the measured value will be sent immediately.

##### **Transmission behaviour:**

Measured value	<ul style="list-style-type: none"> <li>• <u>send cyclically</u></li> <li>• send in case of change</li> <li>• send in case of change and cyclically</li> </ul>
from change in % (only for sending "in case of change")	<u>1</u> ... 50
send cyclically every (only for "cyclic" sending)	<u>5 sec</u> ... 2h
Output of the measured value in	m
General sending delay after power up and programming	<u>5 sec</u> • 10 sec • 20 sec • 30 sec • 1 min • 2 min • 5 min

#### 5.1.2. Filling height measurement

##### **Sensor settings:**

Sensor measures	<b>Distance</b> • <b>Filling height</b> • Filling level
Distance offset in cm	<u>12</u> ... 200
Max. filling height in cm	1 ... 254; <u>200</u>
Use malfunction object	Yes • <u>No</u>

**Measuring behaviour:**

Perform measuring	<u>cyclically</u> • on request and cyclically
Measuring cycle in seconds (only for "cyclic" sending)	1 ... 7200; <u>5</u>
Use object measuring block If the object is used: for value: 1 = Block measurement   0 = release measurement Value before 1st communication: 0	Yes • <u>No</u>

Note: If the measurement is made on request the measured value will be sent immediately.

**Transmission behaviour:**

Measured value	<ul style="list-style-type: none"> <li>• <u>send cyclically</u></li> <li>• send in case of change</li> <li>• send in case of change and cyclically</li> </ul>
from change in % (only for sending "in case of change")	<u>1</u> ... 50
send cyclically every (only for "cyclic" sending)	<u>5 sec</u> ... 2h
Output of the measured value in	m
General sending delay after power up and programming	<u>5 sec</u> • 10 sec • 20 sec • 30 sec • 1 min • 2 min • 5 min

**5.1.3. Fill level measurement****Sensor settings:**

Sensor measures	<u>Distance</u> • Filling height • <b>Filling level</b>
Use malfunction object	Yes • <u>No</u>

**Measuring behaviour:**

Perform measuring	<u>cyclically</u> • on request and cyclically
Measuring cycle in seconds (only for "cyclic" sending)	1 ... 7200; <u>5</u>
Use object measuring block If the object is used: for value: 1 = Block measurement   0 = release measurement Value before 1st communication: 0	Yes • <u>No</u>

Note: If the measurement is made on request the measured value will be sent immediately.

**Transmission behaviour:**

Measured value	<ul style="list-style-type: none"> <li>• <u>send cyclically</u></li> <li>• send in case of change</li> <li>• send in case of change and cyclically</li> </ul>
from change in % (only for sending "in case of change")	<u>1</u> ... 50
send cyclically every (only for "cyclic" sending)	<u>5 sec</u> ... 2h
Output of the measured value in	<u>Litre</u> • cubic metres • % • m
Send max. filling amount on request	Yes • <u>No</u>
Send max. filling amount in (only when filling amount is sent on request and measured value is displayed in % or in m)	<u>Litre</u> • cubic metres
General sending delay after power up and programming	<u>5 sec</u> • 10 sec • 20 sec • 30 sec • 1 min • 2 min • 5 min

## 5.2. Tank and calculation (only for fill level measurement)

---

### 5.2.1. Rectangular tank

---

Tank design	<ul style="list-style-type: none"> <li>• <b><u>Rectangular</u></b></li> <li>• Spherical tank</li> <li>• Cylinder vertical</li> <li>• Cylinder horizontal</li> </ul>
Volume indicated in	<u>Litres</u> • Cubic metres
Volume in Litres Volume in cubic metres	1 ... 100.000; <u>1,000</u>
Fill height in cm	1 ... 254; <u>200</u>
Fill level correction	Yes • <u>No</u>
Correction of (only if fill level is corrected)	<u>Minimum</u> • Maximum • Minimum and Maximum
Shall correction be maintained after programming?	Yes • <u>No</u>

Note: When the fill level is adjusted the parameter fill height and/or sensor head distance is adjusted in the software.

### 5.2.2. Spherical tank

Tank design	<ul style="list-style-type: none"> <li>• <u>Rectangular</u></li> <li>• <b>Spherical tank</b></li> <li>• Cylinder vertical</li> <li>• Cylinder horizontal</li> </ul>
Inside diameter in cm	1 ... 254; <u>100</u>

### 5.2.3. Cylinder vertical

Tank design	<ul style="list-style-type: none"> <li>• Rectangular</li> <li>• Spherical tank</li> <li>• <b>Cylinder vertical</b></li> <li>• Cylinder horizontal</li> </ul>
Inside diameter in cm	1 ... 1000; <u>100</u>
Filling height in cm	1 ... 254; <u>200</u>

### 5.2.4. Cylinder horizontal

Tank design	<ul style="list-style-type: none"> <li>• <u>Rectangular</u></li> <li>• Spherical tank</li> <li>• Cylinder vertical</li> <li>• <b>Cylinder horizontal</b></li> </ul>
Inside diameter in cm	1 ... 254; <u>100</u>
Length in cm	1 ... 100.000; <u>200</u>

### 5.2.5. Settings for all tank types

Number of tanks in a battery	1 ... 100; <u>10</u>
Sensor head distance for max. fill level in cm	<u>12</u> ... 200

Note: If the overall volume exceeds 670,760 Litres correct display of the measured value is only possible in m<sup>3</sup>.

## 5.3. Threshold Values

Use threshold value 1	Yes • <u>No</u>
Use threshold value 2	Yes • <u>No</u>
Use threshold value 3	Yes • <u>No</u>
Use threshold value 4	Yes • <u>No</u>
Use threshold value 5	Yes • <u>No</u>

### 5.3.1. Threshold Value 1 / 2 / 3 / 4 / 5

#### Threshold value:

Unit Note: for distance measurements only "cm" allowed!	Litre • cubic metres • % • <u>cm</u>
Threshold value setpoint per	<u>Parameter</u> • Communication object

For selection of „Threshold value setpoint per parameter“:

Threshold value in Litre	1 ... 10.000.000; <u>1.000</u>
Threshold value in m <sup>3</sup>	1 ... 10.000.000; <u>10</u>
Threshold value in %	0 ... 100; <u>10</u>
Threshold value in cm	1 ... 254; <u>10</u>
Hysteresis of the threshold value in %	<u>0</u> ... 50

For selection of „Threshold value setpoint per communication object“:

The value communicated last shall be maintained	<ul style="list-style-type: none"> <li>• <u>not</u></li> <li>• after restoration of voltage</li> <li>• after restoration of voltage and programming</li> </ul>
Start threshold value in Litre Start threshold value in m <sup>3</sup> Start threshold value in % Start threshold value in cm valid until 1st communication (not for output after ... programming)	1 ... 10.000.000; <u>1.000</u> 1 ... 10.000.000; <u>10</u> 0 ... 100; <u>10</u> 1 ... 254; <u>10</u>
Type of threshold change	<ul style="list-style-type: none"> <li>• <u>Absolute value with a 16 bit comm. object (l)</u></li> <li>• <u>Absolute value with a 32 bit comm. object (m3 and cm)</u></li> <li>• <u>Absolute value with a 8 bit comm. object (%)</u></li> <li>• Increase/decrease with one comm. object</li> <li>• Increase/decrease with two comm. objects</li> </ul>
Step size (only for "increase/decrease" with one/two comm. object(s))	0,1 • 0,2 • 0,5 • <u>1</u> • 2 • 5 • 10 • 20 Liter 0,1 • 0,2 • 0,5 • 1 • 2 • 5 • 10 • 20 m <sup>3</sup> <u>1</u> • 2 • 3 • 4 • 5 • 10 % <u>1</u> • 2 • 5 • 10 cm
Hysteresis of the threshold value in %	<u>0</u> ... 50

#### Switching output:

Switching delay from 0 to 1	<u>none</u> • 1 sec ... 2h
Switching delay from 1 to 0	<u>none</u> • 1 sec ... 2h

When the following conditions apply, the output is (TV = Threshold value) (SD = Switching distance)	<ul style="list-style-type: none"> <li>• <math>\overline{TV \text{ above} = 1} \mid TV - SD \text{ below} = 0</math></li> <li>• <math>\overline{TV \text{ above} = 0} \mid TV - SD \text{ below} = 1</math></li> <li>• <math>TV \text{ below} = 1 \mid TV + SD \text{ above} = 0</math></li> <li>• <math>TV \text{ below} = 0 \mid TV + SD \text{ above} = 1</math></li> </ul>
Switching output sends	<ul style="list-style-type: none"> <li>• <u>In case of change</u></li> <li>• In case of change to 1</li> <li>• In case of change to 0</li> <li>• In case of change and cyclically</li> <li>• In case of change to 1 and cyclically</li> <li>• In case of change to 0 and cyclically</li> </ul>
Send switching output in a cycle of	<u>5 sec</u> ... 2 h

**Blocking:**

Use block of the switching output	Yes • <u>No</u>
-----------------------------------	-----------------

If „use block of switching output: Yes“ is selected:

Evaluation of the blocking object	<ul style="list-style-type: none"> <li>• <u>if value 1: block</u>   if value 0: <u>release</u></li> <li>• if value 0: block   if value 1: <u>release</u></li> </ul>
Value of the blocking object before 1. communication	<u>0</u> • 1

**Behaviour of switching output**

with blocking	do not send telegram • send 0 • send 1
with release	(depending on switching output sending procedure)

The switching output procedure depends on the value of the parameter „Switching output sends ...“ (see „Switching output“).

Switching output sends in case of change	<ul style="list-style-type: none"> <li>• do not send telegram</li> <li>• send status of the switching output</li> </ul>
Switching output sends in case of change to 1	<ul style="list-style-type: none"> <li>• do not send telegram</li> <li>• wenn Schaltausgang = 1 → sende 1</li> </ul>
Switching output sends in case of change to 0	<ul style="list-style-type: none"> <li>• do not send telegram</li> <li>• if switching output = 0 → send 0</li> </ul>
Switching output sends in case of change and cyclically	send switching output status
Switching output sends in case of change to 1 and cyclically	for switching output = 1 → send 1
Switching output sends in case of change to 0 and cyclically	for switching output = 0 → send 0



## Questions about the product?

---

You can reach the technical service of Elsner Elektronik under  
**Tel. +49 (0) 70 33 / 30 945-250** or  
**service@elsner-elektronik.de**

We need the following information to process your service request:

- Type of appliance (model name or item number)
- Description of the problem
- Serial number or software version
- Source of supply (dealer/installer who bought the device from Elsner Elektronik)

For questions about KNX functions:

- Version of the device application
- ETS version used for the project

---

**elsner**

**Elsner Elektronik GmbH** Control and Automation Engineering

Sohlengrund 16  
75395 Ostelsheim  
Germany

Phone +49 (0) 70 33 / 30 945-0 info@elsner-elektronik.de  
Fax +49 (0) 70 33 / 30 945-20 www.elsner-elektronik.de

---