Sewi KNX AQS/TH-D L-Pr
Indoor combined sensor

Technical specifications and installation instructions

Item numbers 70399 (white), 70699 (jet black)

KNX®

1. Description

The **Sensor Sewi KNX AQS/TH-D L-Pr** for the KNX building bus system captures brightness and the presence of persons in rooms. It measures the CO2 concentration, the temperature, the air humidity and the air pressure and calculates the dewpoint. Via the bus, the indoor sensor can receive external values of temperature, humidity and CO_2 concentration and process it further with its own data to a total value (mixed value, e.g. room average).

All measurement values can be used for the control of limit-dependent switching outputs. States can be linked via AND logic gates and OR logic gates. Multi-function modules change input data as required by means of calculations, querying a condition, or converting the data point type. In addition, an integrated manipulated variable comparator can compare and output variables that were received via communication objects.

Integrated PI-controllers control ventilation (according to humidity or CO_2 concentration) and heating/cooling (according to temperature). The **Sewi KNX AQS/TH-D L-Pr** can output a warning to the bus as soon as the comfort field, as per DIN 1946, is left.

Functions:

- **Brightness measurement** with **brightness regulation**
- **Presence of persons is detected**
- Measuring the **CO_2 concentration** of the air, the **temperature** and **air humidity** (relative, absolute), each with **mixed value calculation**. The share of internal measurement value and external value can be set as a percentage
- Bus message, whether the values for temperature and air humidity are within the **comfort field** (DIN 1946). **Dew point** calculation
- **Air pressure measurement.** Output of the value as normal pressure and optionally as barometric pressure
- **Threshold values** can be adjusted per parameter or via communication objects
- **PI-controller for heating** (one or two-stage) and **cooling** (one or two-stage) according to temperature. Regulation according to separate setpoints or basic setpoint temperature
- **PI controller for ventilation** according to humidity and CO_2 concentration: Ventilate/Air (one-stage) or Ventilate (one or two-stage)
- **8 AND and 8 OR logic gates**, each with 4 inputs. All switching events as well as 16 logic inputs in the form of communications objects can be used as inputs for the logic gates. The output of each gate can be configured optionally as 1-bit or 2 x 8-bit
- **8 multi-function modules** (computers) for changing the input data by calculations, by querying a condition or by converting the data point type
- **4 manipulated variable comparators** to output minimum, maximum or average values. 5 inputs each for values received via communication objects
- **Summer compensation** for cooling systems. A characteristic curve matches the target temperature in the room to the external temperature and sets the minimum and maximum target temperature values

Configuration is made using the KNX software ETS. The **product file** can be downloaded from the Elsner Elektronik website on **www.elsner-elektronik.de** in the "Service" menu.

1.0.1. Scope of delivery

- Combined sensor

1.1. Technical data

Housing	Plastic
Colours	• White similar to signal white RAL 9003 (skirting)/ grey white RAL 9002 (cover) • Jet black RAL 9005
Assembly	Surface, ceiling installation
Protection category	IP 30
Dimensions	Ø approx. 105 mm, height approx. 32 mm
Total weight	approx. 55 g
Ambient temperature	Operation 0…+50°C, storage -30…+70°C
Ambient humidity	max. 85% RH, avoid condensation
Operating voltage	KNX bus voltage
Bus current	max. 20 mA
Data output	KNX +/- bus plug-in terminal
BCU type	Integrated microcontroller

PEI type	0
Group addresses	max. 2000
Assignments	max. 2000
Communication objects	449
CO₂ sensor:	
Measurement range	0...2000 ppm
Resolution	1 ppm
Accuracy	± 50 ppm ± 3% of the measured value
Temperature sensor:	
Measurement range	0°C … +50°C
Resolution	0.1°C
Accuracy*	±0.5°C at 0…+50°C
Humidity sensor:	
Measurement range	0% RH … 85% RH
Resolution	0.1% RH
Accuracy	± 7,5% RH at 0…10% ± 4,5% RH at 10…85%
Pressure sensor:	
Measurement range	300 mbar … 1100 mbar
Resolution	0.1 mbar
Accuracy	±4 mbar
Brightness sensor:	
Measurement range	0 lux … 2,000 lux (higher values can be measured and output)
Resolution	1 lux at 0…2,000 lux
Accuracy	±15% of the measurement value at 30 lux … 2,000 lux
Presence sensor:	
Coverage angle	approx. 94° × 82° (see also *Coverage area of the presence detector*)
Range	approx. 5 m

* Follow the instructions on *Measuring accuracy*.

The product conforms with the provisions of EU directives.

1.1.1. Measuring accuracy

Deviations in measured values due to interfering sources (see chapter *installation site*) must be corrected in the ETS in order to achieve the specified accuracy of the sensor (offset).

After applying the operating voltage, it can take up to 15 minutes until the **CO_2 measured value** is output correctly.

During **Temperature measurement**, the self-heating of the device is taken into consideration by the electronics. The software compensates the self-heating by reducing the measured temperature by 1.0°C.

2. Installation and start-up

2.1. Installation notes

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

CAUTION!
Live voltage!
There are unprotected live components inside 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.

2.2. Installation location

Install and use only in dry interior rooms! Avoid condensation.

The sensor is installed surface mounted on ceilings.

To detect the presence of persons make sure that the desired area is covered by the sensor's coverage angle and that no obstacles obstruct the capturing.

When selecting an installation location, please ensure that the measurement results of **temperature, humidity and CO_2** are affected as little as possible by external influences. Possible sources of interference include:

- Direct sunlight
- Drafts from windows and doors
- Draughts from ducts coming from other rooms or the outdoors
- Warming or cooling of the building structure on which the sensor is mounted, e.g. due to sunlight, heating or cold water pipes
- Connection lines and empty ducts which lead from warmer or colder areas to the sensor

Measurement variations from such sources of interference must be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset).

2.2.1. Coverage area of the presence detector

Angle of coverage: approx. 94° × 82°
Range: approx. 5 m

Segmentation of the coverage area

Fig. 1
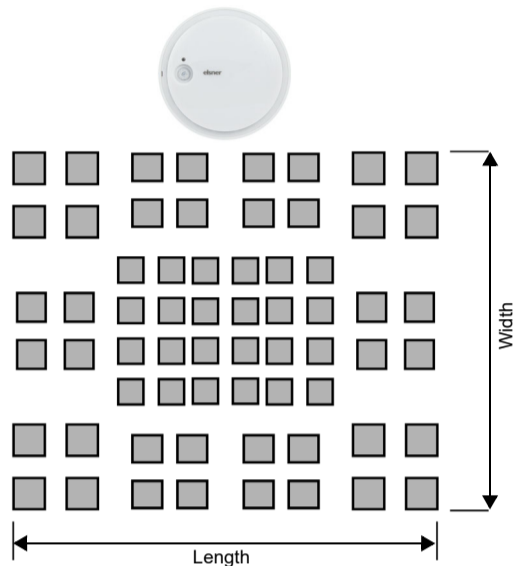
Size of the coverage area

Distance	Length	Width
2.50 m	approx. 5.40 m	approx. 4.30 m
3.50 m	approx. 7.50 m	approx. 6.10 m

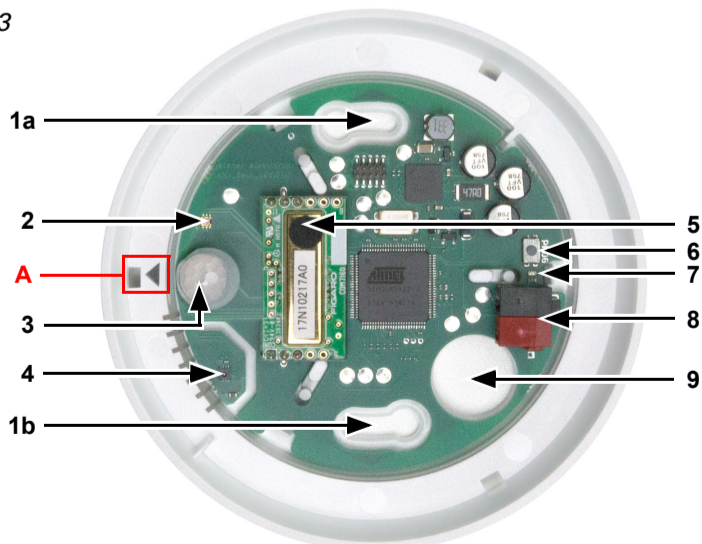## 2.3. Construction of the sensor

2.3.1. Housing from the outside

Fig. 2
1 Brightness sensor
2 Presence sensor
A Recess to open the housing. When closing the housing, the recess aligns to the marking on the skirting

2.3.2. Printed circuit boards / connections

Fig. 3

1 a+b Long holes for mounting (hole distance 60 mm)
2 Brightness sensor
3 Presence sensor
4 Sensors for temperature, humidity, pressure
5 CO_2 sensor
6 Programming button
7 Programming LED

8 KNX-terminal BUS +/-
9 Cable bushing
A Mark for aligning the cover

2.4. Assembly

Fig. 4

Open the housing. To do this, carefully lift the cover from the skirting. Start at the recess (Fig. 2: A).
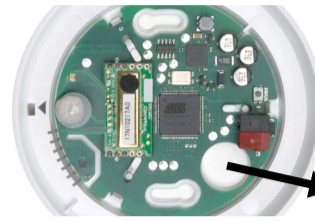

Fig. 5

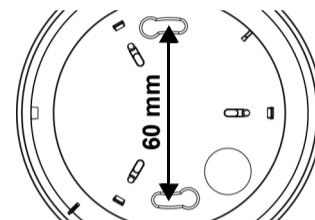Lead the bus cable through the cable bushing in the skirting.

Fig. 6

Screw the skirting to the ceiling.

Hole distance 60 mm.

Fig. 7

Connect the KNX bus to the KNX terminal.

Fig. 8

Close the housing by positioning the cover and snapping it into place. To do this, align the recess on the cover to the marking on the skirting (Fig. 2+3: A).

2.5. Notes on mounting and commissioning

Never expose the device to water (e.g. rain) or dust. This can damage the electronics. You must not exceed a relative humidity of 85%. Avoid condensation.

The air slots on the side must not be closed or covered. The brightness sensor and the presence sensor must not be painted over or covered.

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.

The presence sensor has a start-up phase of approx. 15 seconds during which the presence of persons is not detected.

3. Addressing the equipment

The equipment is delivered with the bus address 15.15.255. You can program a different address in the ETS by overwriting the address 15.15.255 or by teaching the device via the programming button.

The programming button is on the inside of the housing (Fig. 3: No. 6).

4. Maintenance

The brightness sensor, the presence sensor and the air slots on the side must not get dirty or covered. As a rule, it is sufficient to wipe the device with a soft, dry cloth twice a year.