Product documentation

Leakage sensor
Art. No. LES01

Table of Contents

1 Product definition

1.1 Product catalogue

Product name: Leakage sensor

Use: Sensor

Design: SM

Art. No. LES01

1.2 Function
General

The device is used to monitor unintentionally leaking water in residential and functional buildings. The device cannot prevent leaking water, but still warn it as soon as possible. The water damage can be kept minor by early detection of the leak.

The device is fitted on the area that is to be monitored and, in combination with an appropriate KNX evaluation unit, it is a convenient and smart solution to detect leaks. The evaluation unit evaluates the signals of the device and transmits the appropriate telegrams to the KNX. KNX pushbutton interfaces or similar binary inputs can be suitable evaluation units.

ⓘ The device is a conventional sensor that is operated on an evaluation unit (e.g. KNX pushbutton interface).

Application examples

In bathrooms or wet rooms:
- Below or next to the bathtub
- Below or next to the shower
- Under the wash basin
- Behind vanities

In the kitchen area:
- Behind the kitchen unit
- Behind the dishwasher
- Under the sink (e.g. in the cupboard)

In utility rooms or functional spaces:
- Below or behind washing machines
- In the boiler room
- In supply shafts with water pipes
- In cellar rooms with a risk of backflow

In living areas:
- Below or behind aquariums
- In the heating manifold of underfloor heating systems

2 Mounting, electrical connection and operation

2.1 Safety instructions

Electrical devices may only be mounted and connected by electrically skilled persons.

Failure to observe the instructions may cause damage to the device and result in fire and other hazards.

Danger of electric shock. During installation and cable routing, comply with the regulations and standards which apply for SELV circuits.

2.2 Device components

The device consists of a unit, including connection cable. The device may not be opened.

ⓘ The device will be destroyed if it is opened.

2.2.1 Parts
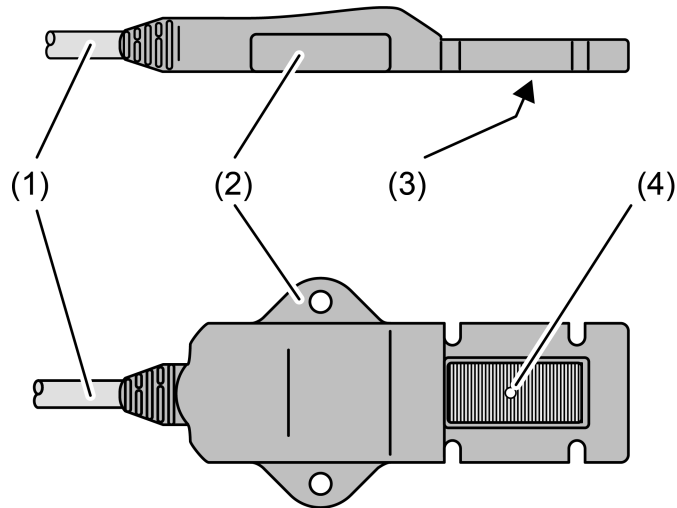

Figure 1: Device components Leakage sensor

(1) Connecting cable
(2) Fixing strap
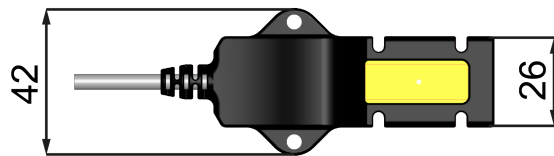(3) Sensor surface
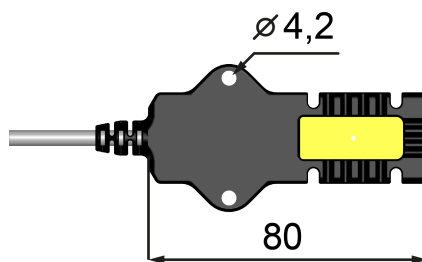(4) Ventilation opening

2.2.2 Dimensions (mm)

Figure 2: Top view

Figure 3: Bottom view

Figure 4: Page view

Figure 5: Front view

2.3 Fitting and electrical connection

Fitting the leakage sensor

The device should be mounted on a place where water leaks can be detected early.
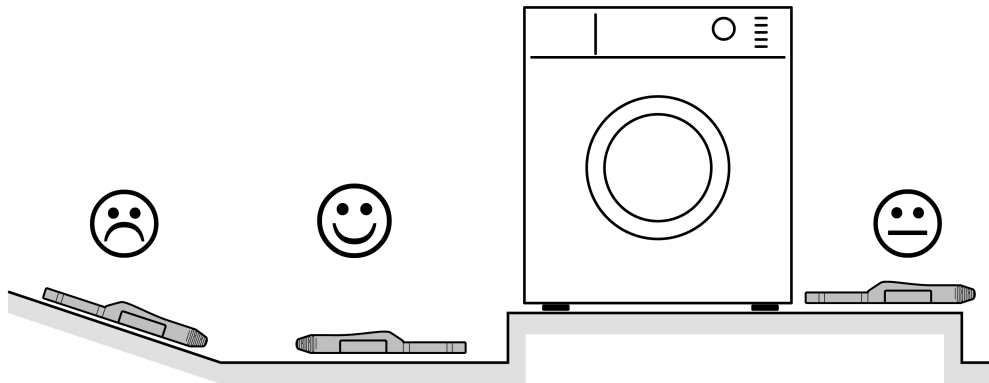
Figure 6: Appropriate and inappropriate locations for fitting

ⓘ Do not place the device on sloping surfaces, ridges or pedestals(figure 6).

Precondition: an appropriate fitting site
- Place the device directly on the surface that is to be monitored. The sensor surface of the device must point downwards.
- Mount the device on the supporting surface, e.g. with a screw assembly.

ⓘ The vent opening may not be used to mount the device.

Figure 7: Fitting the device

ⓘ For proper function, liquid must be able to reach the sensor surface.

ⓘ Do not mount the device to the substrate with sealing compound (silicone, acrylic or similar).
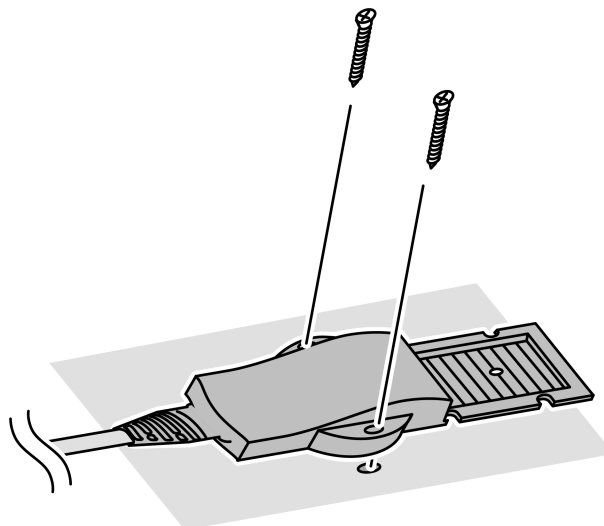
▪ Fit the connecting cable, e.g. with nail clamps.

ⓘ The vent opening supports the sensor function and should be free of dirt.

Connecting the leakage sensor
The device is directly connected to an evaluation unit (e.g. KNX pushbutton interface) and electrically supplied by it.

(5)

max. 3 m

BR = +5 V

BU = GND
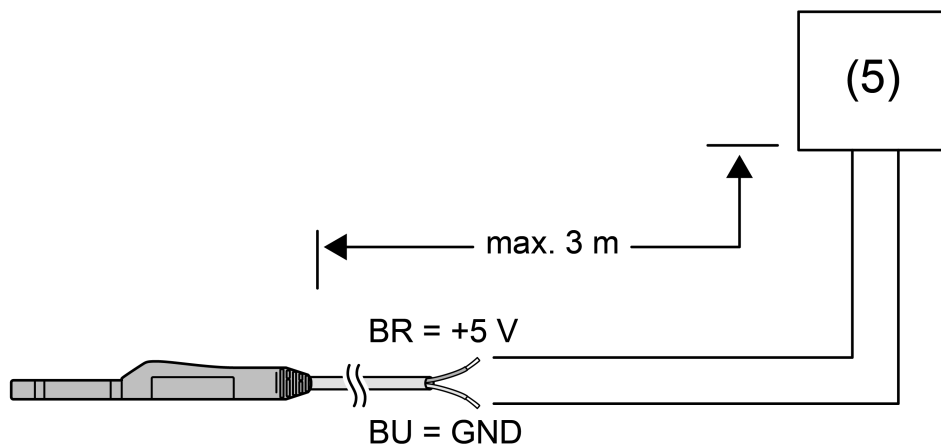
Figure 8: Connecting the device

(5) Evaluation unit

▪ Connect the device to an evaluation unit that supplies and monitors the device.

ⓘ Observe the polarity:
Brown = **+**
Blue = **- / GND**

ⓘ Reverse polarity protection protects the device from incorrect connection (Polarity from **+** and **- / GND**). The device does not function but is not destroyed.

ⓘ The device will be destroyed if it is connected to a voltage source that allows for a high current (voltage)!

2.4 Commissioning and function

Commissioning of the leakage sensor

The following specification must be set in the parameters of the evaluation unit (e.g. KNX pushbutton interface):

- Debounce time: 127 ms

Function of the leakage sensor

The device monitors the electrical conductivity between the conductive coatings on the sensor surface. If it is dampened with water, the device detects the change and signals it.

The device is electrically supplied by an evaluation unit. The signaling of an alarm takes place by short-circuiting the supply voltage. The device supplies itself internally while it is short circuited.

When the sensor surface is moistened, the device signals an alarm (rising edge) of the evaluation unit. An internal clock measures the time beginning at this moment. The device of the evaluation unit signals an alarm for the duration of 1 minute. The device signals an alarm as long as the sensor surface is moistened. Even if the sensor surface is free from liquid within the first minute, the device still signals an alarm for one minute. After the minute is up, the device checks to see if the sensor surface is still moistened. As soon as the sensor surface is no longer moistened, the device cancels the alarm signal (falling edge).

The signal is recorded by the KNX device used by the evaluation unit and transmitted to the KNX in accordance with the project design. As a rule, the polarity of the KNX telegrams can be set in the parameters of the KNX device. In accordance with the project design, "1" telegrams or "0" telegrams are transmitted on the KNX if there is a rising or falling edge.

The device does not function in the event of prolonged supply voltage failure. The device automatically resumes functioning upon the return of the supply voltage.

ⓘ The device cannot prevent water from leaking, but detects and registers it early, so that the impact of water damage can be reduced.

ⓘ The sensor surface can be damaged if it comes into contact with aggressive media (e.g., detergent solutions, scrubbing brines or acidic condensation from condensing boilers). The sensor area is to be checked after every alarm. The device is to be exchanged in the event of significant damage from corrosion.

2.5 Obvious misuse

The device works with the lower surface of the sensor. The upper surface of the sensor is not active. The device is not suitable for use as a dew sensor.
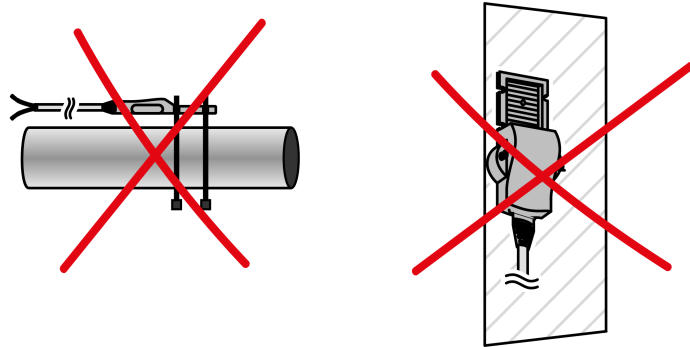
Figure 9: Examples of obvious misuse of the device

3 Technical data

Rated voltage	DC 3,3 ... 5 V SELV
Current consumption	typ. 0,5 mA
Short-circuit current	max. 100 mA
Protection class	III
Ambient temperature	0 ... +50 °C
Storage/transport temperature	-40 ... +100 °C
Connecting cable	2 m
Degree of protection	IP 67

4 Application examples

4.1 Example: "KNX pushbutton interface"

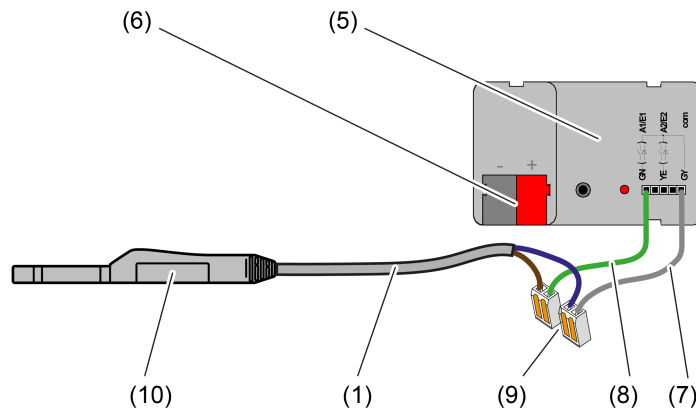| Example: direct operation on jung knx pushbutton interface 2-gang (Art. no.: 2076-2 T) |
| --- |
| This application example shows the direct operation of the leakage sensor on a KNX pushbutton interface without additional voltage supply. |

Figure 10: Connecting the leakage sensor to the KNX pushbutton interface

(1)   Connecting cable of the leakage sensor
(5)   Evaluation unit (here: KNX pushbutton interface)
(6)   Device connection terminal KNX
(7)   Connecting cable reference potential (com) of the KNX pushbutton interface
(8)   Channel 1 connecting cable of the KNX pushbutton interface
(9)   Two-conductor terminals
(10) Leakage sensor

ℹ️   Maximum one sensor may be connected to a channel of an jung KNX pushbutton interface. With simultaneous signaling of alarms on both channels, the second message will sent delayed on the KNX.

The KNX pushbutton interface is planned with the ETS and brought into operation. So that the leakage sensor can be operated on the KNX pushbutton interface, in the parameters of the KNX pushbutton interface, the following settings are to be changed:
-      "Function of Channel x" = binary input

       This parameter defines the functions of the channel.

- "Delay after bus voltage returns" = 5 seconds

    After reset or bus voltage return, the application program of the KNX pushbutton interface can be disabled for a defined time period until the corresponding reactions are executed. No pending signals will be evaluated on the inputs during this time and the switch outputs are not controlled! Even a feedback will only be transmitted after the time delay has elapsed at the earliest. Within the first few seconds (approx. 4 seconds), the leakage sensor signals an alarm after it is supplied with voltage. The alarm is triggered and then cancelled during the start-up phase of the device. For each evaluation unit implemented, a lag time can be set depending on bus voltage discovery, through which the transmission of the first KNX telegrams can be suppressed due to the startup phase of the leakage sensor.

- "Debounce time for binary inputs" = 127 ms

    Specifies the software debounce time for all binary inputs together. On the basis of the time set here, a signal edge is evaluated at the input with a delay.

- "Function of the input" = "Switching"

    With the "Switching" function, the ETS displays two 1-bit communication objects (switching object 1.1 and 1.2). It is possible to use these two objects to transmit different switching telegrams to the KNX depending on the signal edge at the input. The input parameter on the parameter page "Input" can be used to define which object value is transmitted to the KNX when there is a rising or falling edge at the input (no reaction, ON, OFF, TOGGLE - switchover of the object value).

- "Command on rising edge" = ON

    This parameter can be used to define which object value is transmitted first to the KNX via the first communication object of the input when there is a rising edge.

- "Command on falling edge" = OFF

    This parameter can be used to define which object value is transmitted first to the KNX via the first communication object of the input when there is a falling edge.

4.2 Example "valve drive (motor-operated) with controller"

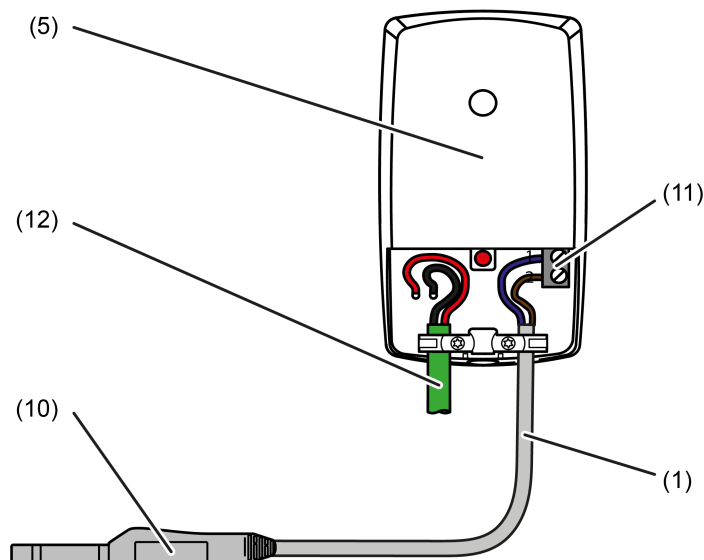| |
|---|
| **Example: direct operation on KNX valve drive (motor-operated) with controller (Art. no.: 2177SVR)** |
| This application example shows the direct operation of the leakage sensor on KNX valve drive (motor-operated) with controller. |

Figure 11: Connecting the leakage sensor to KNX valve drive (motor-operated) with controller

(1) Connecting cable of the leakage sensor

(5) Evaluation unit (here: KNX valve drive (motor-operated) with controller)

(11) Device connection terminal for potential-free contact or remote sensor

(10) Leakage sensor

(12) Connecting cable KNX

The KNX valve drive (motor-operated) with controller is planned with the ETS and brought into operation. So that the leakage sensor can be operated on the KNX valve drive (motor-operated) with controller, the following settings are to be changed in the parameters of the KNX valve drive (motor-operated) with controller, on the "entry" side of the parameters:

- "Function of the input" = "Switching"

    With the "Switching" function, the ETS displays two 1-bit communication objects (switching 1.1 and 1.2). It is possible to use these two objects to transmit different switching telegrams to the KNX depending on the signal edge at the input. The input parameter on the parameter page "Input" can be used to define which object value is transmitted to the KNX when there is a rising or falling edge at the input (no reaction, ON, OFF, TOGGLE - switchover of the object value).

- "Delay after reset or when bus voltage returns" = 5 seconds

   This parameter defines the delay after a reset or bus voltage return. Within the first few seconds (approx. 4 seconds), the leakage sensor signals an alarm after it is supplied with voltage. The alarm is triggered and then cancelled during the start-up phase of the device. For each evaluation unit implemented, a lag time can be set depending on bus voltage discovery, through which the transmission of the first KNX telegrams can be suppressed due to the startup phase of the leakage sensor.

- "Debounce time": 127 ms

   The debounce time of the signal is defined by the device software via the parameter "Debounce time". The debounce time is defined for the functions of the binary input, after which actuation period the binary inputs identify a valid actuation of the connected contacts. In this way, it is possible to prevent the device from mistakenly identifying short conduction faults as a signal. The debounce time makes it possible to adapt the signal evaluation to the contact quality of the connected switches or push-buttons as well. The debounce time must be increased in the ETS if undesirable signal evaluations with very fast edge changes occur regularly or sporadically resulting in rapidly changing states of the KNX telegrams.

- "Command on rising edge" = ON

   This parameter can be used to define which object value is transmitted first to the KNX via the first communication object of the input when there is a rising edge.

- "Command on falling edge" = OFF

   This parameter can be used to define which object value is transmitted first to the KNX via the first communication object of the input when there is a falling edge.

5 Appendix

5.1 Index

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