

L Series
 Humidity/-temperature sensors for use in heating, ventilation and air conditioning

- **Four designs**
 - duct version (LK)
 - wall mounting (LW)
 - rod-shaped Ø 12mm (LP)
 - room version (LI)
- **Different physical outputs**
 - humidity and temp., 2 x active
 - humidity active / temp. passive
 - humidity only, active
 - temperature only, active or passive
- **Output signals**
 - 0...1 V
 - 0...5 V
 - 0...10 V
 - 4...20 mA (only LK and LW)
 - passive (temperature)
- **Special versions**
 - sealing for increased requirements, e.g. condensation
 - sealing against vibrations
- **Filter**
 - protective basket ZE07 (IP 20)
 - filter with membrane ZE08 (IP30)
 - PTFE sintered filter ZE05 (IP65)
- **Rod-shaped sensor with 2 types of connection**
 - 6-pin plug-in connection
 - and assembled cable
 - permanently attached cable

Technical data

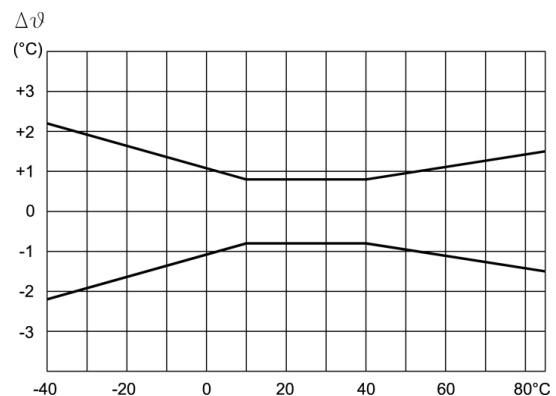
Humidity

| | | |
|--------------------------|------------------------------|------------------|
| sensing element | calibrated sensor chip calHT | |
| output range | 0...100 %rh | |
| accuracy | | |
| 30...80 %rh | at 10...40°C | ±3 %rh |
| < 30 %rh or > 80 %rh | at 10...40°C | ±5 %rh |
| influence of temperature | < 10°C or > 40°C | typ. ±0.06 %rh/K |

Temperature / active output

| | | |
|-----------------|------------------------------|--|
| sensing element | calibrated sensor chip calHT | |
| output ranges | 0...+50°C | |
| | -20...+80°C | |
| | -30...+70°C | |
| | 0...+100°C | |
| accuracy | | |
| at 10...40°C | ±0.8 K | |
| <10°C and >40°C | s. diagramm | |

Temperature accuracy



Temperature / passive output

| | |
|----------------------------------|-----------------|
| sensing elements | Pt100 Pt1000 |
| other sensing elements on demand | e. g. NTC |

Electrical data

| | |
|---------|---------------------------------------|
| outputs | 2 x 0...1 V |
| | 2 x 0...5 V |
| | 2 x 0...10 V |
| | 2 x 4...20 mA |
| | passive temperature outputs on demand |

| | |
|-------------------|-----------------------------------|
| Supply voltage | |
| LP, LK, LW, LI | |
| output: 0...1V | 6...30 V DC |
| 0...5V | 24 V AC \pm 10% or 9...30 V DC |
| 0...10 V | 12...30 V DC |
| LK, LW, LI | |
| output: 0...10 V | 24 V AC \pm 10% or 13...30 V DC |
| LK, LW | |
| output: 4...20 mA | 12...30 V DC |

| | |
|------------------------------------|------------------|
| load resistance for output 0...1 V | > 1 kOhm |
| output 0...5 V | > 10 kOhm |
| output 0...10 V | > 10 kOhm |
| output 4...20 mA | see load diagram |

General data

| | |
|------------------|--|
| measuring medium | air, pressureless, non-aggressive, non-condensing |
| min. air speed | 0.5 m/s |

| | |
|-----------------------|-------------|
| operating temperature | |
| type LK, LW | -40...+80°C |
| type LP | -30...+80°C |
| type LI | -20...+60°C |

| | |
|---------------------|-------------|
| storage temperature | -40...+85°C |
|---------------------|-------------|

degree of protection of measuring head (series LK, LW, LP)

| | |
|--------------------------------|------|
| with protective basket ZE07 | IP20 |
| with membrane filter ZE08 | IP30 |
| with PTFE sintered filter ZE05 | IP65 |

degree of protection of housing

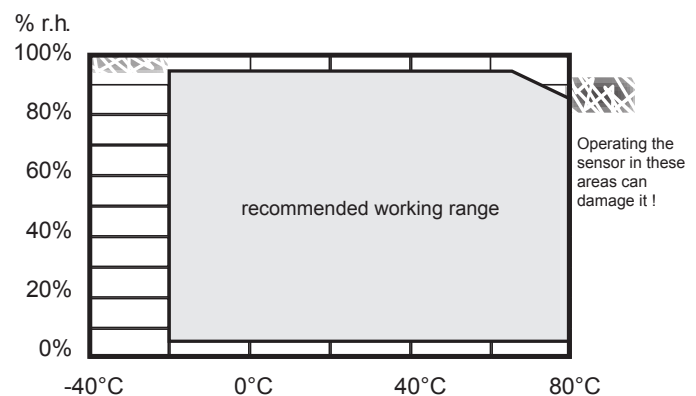
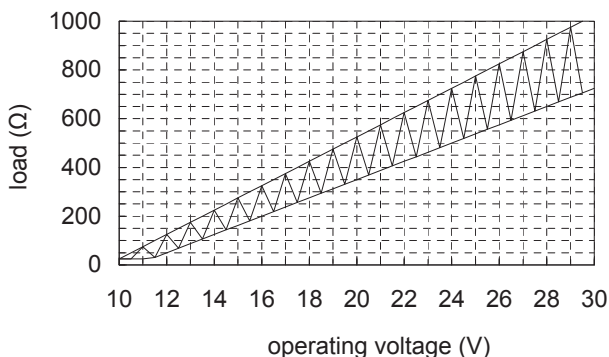
| | |
|-----------------|------|
| type LP, LK, LW | IP65 |
| type LI | IP30 |

| | |
|---------------------|-------------------------|
| material of housing | |
| type LP, LK, LW | PC (light grey / white) |
| type LI | ABS (white) |

Directive about electromagnetic compatibility **2014/30/EU**

| | |
|------------------|-------------|
| DIN EN 61326-1 | issue 07/13 |
| DIN EN 61326-2-3 | issue 07/13 |

Working range of humidity and temperature

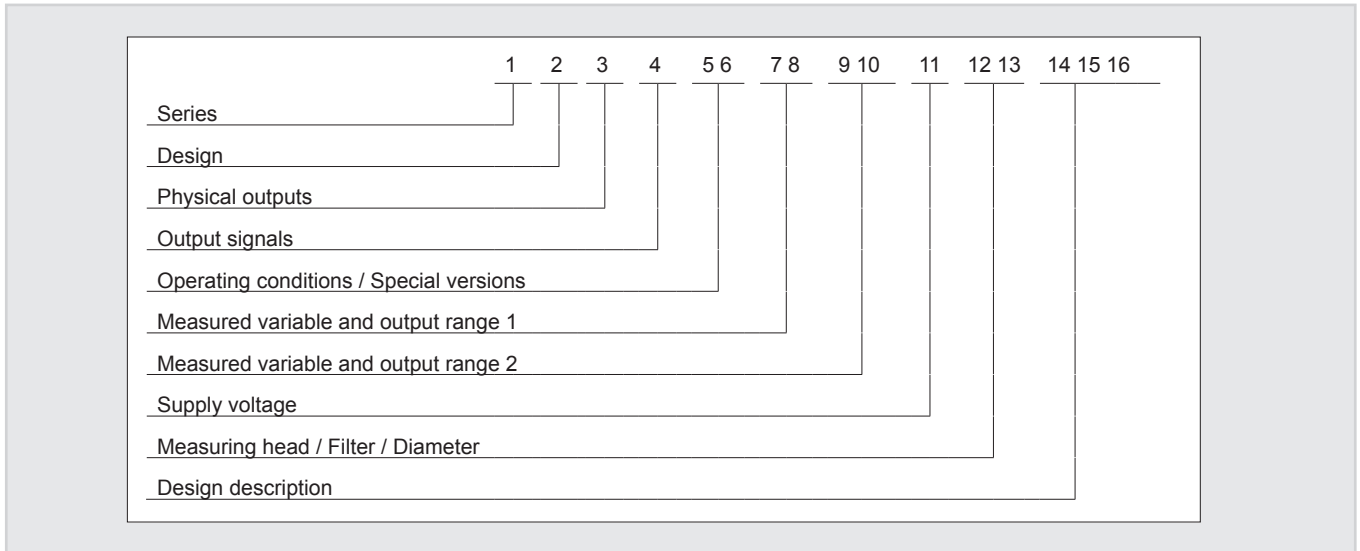


Accessories

| Designation | Order reference | Info sheet | Description |
|---------------|---|------------|--|
| ZE36 | ZE36 | F5.2 | adapter required for sensor tubes \varnothing 12mm for humidity standard ZE 31/1 and wall console 20.009 |
| ZE 31/1 | ZE 31/1-12 + ZE36 ZE 31/1-33 + ZE36 ZE 31/1-75 + ZE36 ZE 31/1-84 + ZE36 ZE 31/1-97 + ZE36 | F5.2 | humidity standard 12 %rh and 25°C 33 %rh and 25°C 75 %rh and 25°C 84 %rh and 25°C 97 %rh and 25°C |
| Wall console | 20.009 + ZE36 | F5.1 | wall console for wall-mounting of rod shaped- and duct sensors |
| Flange | 20.045 | | fixing flange for sensor tubes \varnothing 12mm with rubber sealing |
| Cable LPx2.02 | LPF2.02.67-xx.x LPK2.02.67-xx.x LPC2.02.67-xx.x | | cable, with 6-pin coupling for rod shaped sensor LP with plug-in connection unshielded, IP67, up to max. 10 m (xx.x = length in m, e.g. 01.5 = 1.5 m) for humidity sensor LPF2 for humidity/-temperature sensor LPK for humidity sensor with passive temperature output LPC |

Product Key
L Series

The 16 character alphanumeric order number for the desired type is composed of the order code listed below,



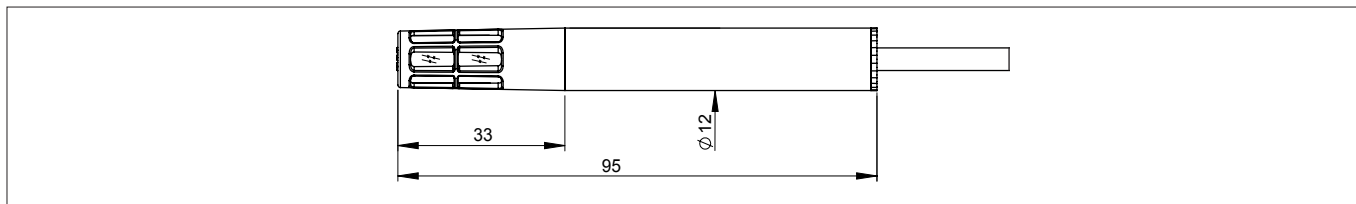
| | Technical Data | Options | Order Code |
|------|---|--|------------|
| 1 | Series | L Series | L |
| 2 | Design | Duct version | K |
| | | Wall mounting | W |
| | | Rod shaped, plastic, Ø 12mm | P |
| | | Room version | I |
| 3 | Physical outputs | Humidity and temperature, 2 x active | K |
| | | Humidity active / temperature passive | C |
| | | humidity only, active | F |
| | | Temperature only, active or passive | T |
| 4 | Output signals | 1x 0...1V or 2x 0...1V or 1x 0...1V/1x passive | 1 |
| | | 1x 0...5V or 2x 0...5V or 1x 0...5V/1x passive | 8 |
| | | 1x 0...10V or 2x 0...10V or 1x 0...10V/1x passive | 2 |
| | | 1x 4...20 mA or 2x 4...20 mA or 1x 4...20 mA/1x passive | 3 |
| | | Temperature passive, only | 5 |
| 5 6 | Operation conditions / special versions | Standard | 00 |
| | | Sealing against vibrations (optional for types LK, LW, LP) | 0V |
| | | Sealing for increased requirements (e.g. condensation) (optional for types LK, LW, LP) | 0S |
| 7 8 | Measured variable and output range 1 | None / no humidity measurement | 00 |
| | | Relative Humidity 0...100 % rh | F1 |
| 9 10 | Measured variable and output range 2 | None / no temperature measurement | 00 |
| | | Temperature 0 ... 50°C | 05 |
| | | Temperature 0 ... 100°C | 01 |
| | | Temperature -20 ... 80°C | 28 |
| | | Temperature -30 ... 70°C | 37 |
| | | Temperature -40 ... 60°C | 46 |
| | | Temperature passive Pt100 cl. B | C1 |
| | | Temperature passive Pt1000 | C5 |
| | | Further output ranges on demand | |

| Technical Data | | Options | | | | | Order Code |
|----------------|---------------------------------------|--|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|------------------------------|
| 11 | Supply voltage | Output signal | LP rod-shaped | LW wall | LK duct | LI room | |
| | | 0 ... 1 V | 6 ... 30 V DC | 6 ... 30 V DC | 6 ... 30 V DC | 6 ... 30 V DC | 6 |
| | | 0 ... 5 V | 9 ... 30 V DC or 24 V AC ± 10% | 9 ... 30 V DC or 24 V AC ± 10% | 9 ... 30 V DC or 24 V AC ± 10% | 9 ... 30 V DC or 24 V AC ± 10% | 9 |
| | | 0 ... 10 V | | 13 ... 30 V DC or 24 V AC ± 10% | 13 ... 30 V DC or 24 V AC ± 10% | 13 ... 30 V DC or 24 V AC ± 10% | E Standard |
| | | 0 ... 10 V | 12 ... 30 V DC | 12 ... 30 V DC | 12 ... 30 V DC | 12 ... 30 V DC | C |
| | | 4...20 mA | | 12 ... 30 V DC | 12 ... 30 V DC | | C |
| | | Temperature sensors with passive output signal | | | | | |
| 12 13 | Measuring head / Filter / Diameter | ZE05: PTFE sintered filter, Ø 12 mm | | | | | 05 |
| | | ZE07: protective cage, plastic, open, Ø 12 mm | | | | | 07 |
| | | ZE08: protective cage, plastic, with membrane, Ø 12 mm | | | | | 08 |
| 14 15 16 | Description of design | Rod shaped sensor, 6-pin plug-in connection Sensor tube length, incl. plug = 101 mm | | | | | 6S 4 |
| | | Rod shaped sensor, with permanently attached cable, 1.5 m, Sensor tube length = 95 mm | | | | | 1K 4 |
| | | special lengths for rod shaped sensors | | | | | xx 4 |
| | | e.g. 2.0 m 2.5 m 3.0 m 3.5 m | | | | | 02 4 2K 4 03 4 3K 4 |
| | | Duct sensor, sensor tube length 220 mm (standard) | | | | | 00 G |
| | | Wall mounting, sensor tube length 50 mm (standard) | | | | | 00 1 |
| | | Room sensor | | | | | 00 0 |

Ordering Example

| | L | P | K | 2 | 0V | F1 | 37 | C | 05 | 1K 4 |
|---|---|---|---|---|----|----|----|---|----|------|
| Series: L Series | | | | | | | | | | |
| Design: Rod shaped | | | | | | | | | | |
| Physical outputs: 2 active outputs | | | | | | | | | | |
| Output signals: 2 x 0...10 V | | | | | | | | | | |
| Operation conditions / special versions: Sealing against vibrations | | | | | | | | | | |
| Measured variable and output range 1: 0...100% rh | | | | | | | | | | |
| Measured variable and output range 2: -30...70°C | | | | | | | | | | |
| Supply voltage: 12...30 V DC | | | | | | | | | | |
| Measuring head / Filter / Diameter: PTFE sintered filter ZE05 / 12 mm | | | | | | | | | | |
| Description of design with permanently attached cable, 1.5 m Sensor tube length = 95 mm | | | | | | | | | | |

Dimensional drawing rod-shaped sensor LP with permanently attached cable



Configuration of series LP with permanently attached cable

Humidity 0...1/5/10 V

| | conductor colour | connection |
|----------|------------------|--------------|
| supply | brown | GND |
| | green | + UB |
| humidity | white | 0...1/5/10 V |

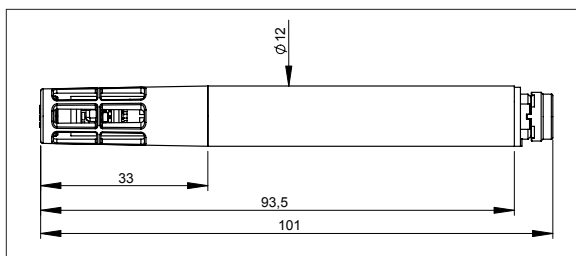
Humidity and temperature active 0...1/5/10V

| | conductor colour | connection |
|-------------|------------------|--------------|
| supply | brown | GND |
| | green | + UB |
| humidity | white | 0...1/5/10 V |
| temperature | yellow | 0...1/5/10 V |

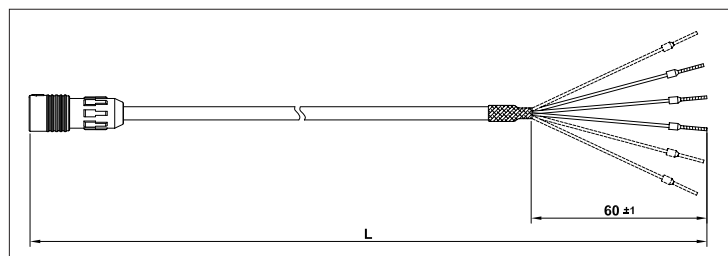
Humidity 0...1/5/10 V temperature passive, 4-wire

| | conductor colour | connection |
|-------------|------------------|--------------|
| supply | brown | GND |
| | green | + UB |
| humidity | white | 0...1/5/10 V |
| temperature | blue | T1 |
| temperature | yellow | T1 |
| temperature | pink | T2 |
| temperature | grey | T2 |

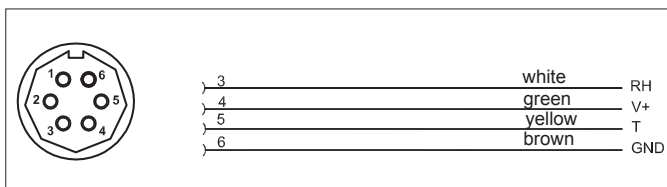
Dimensional drawing rod-shaped sensor LP with plug-in connection and additional cable voltage output and / or temperature passive, 3-wire



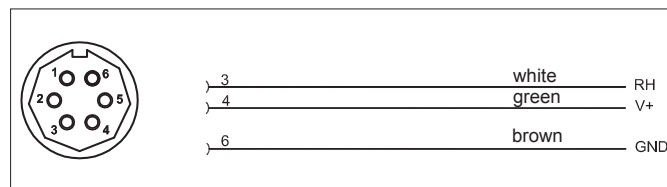
Dimensional drawing cable LPx2.02.67...



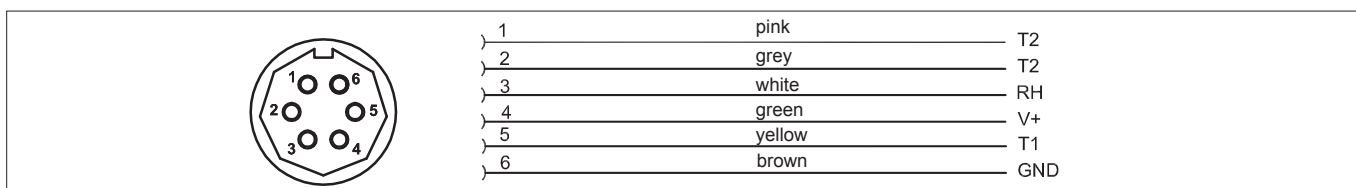
Pin assignment of accessory cable LPK2.02.67... (2x 0...1/5/10 V)



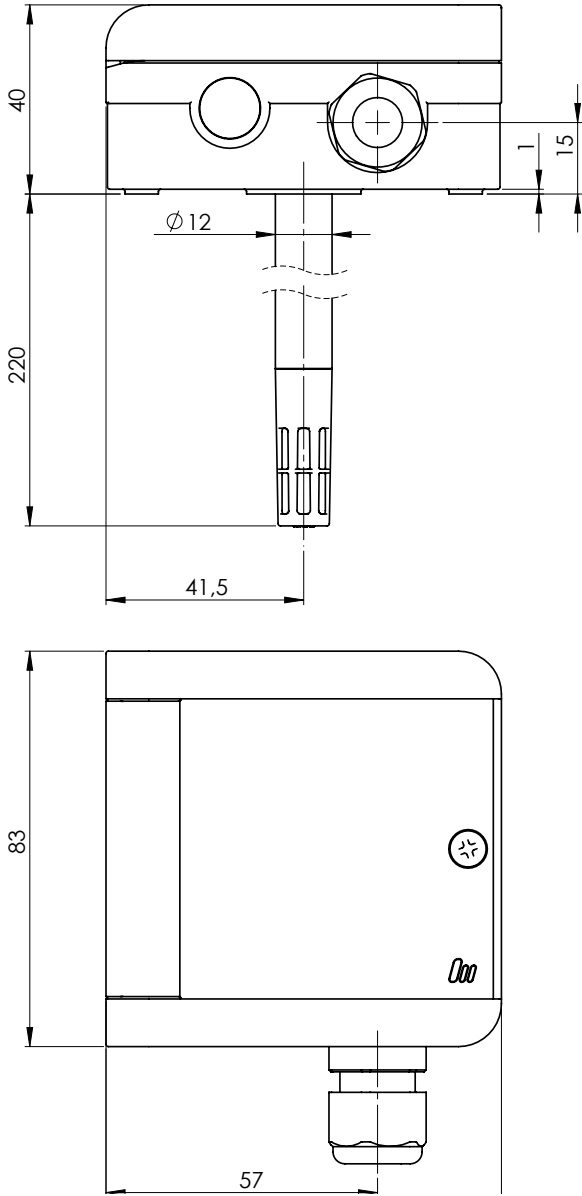
Pin assignment of accessory cable LPF2.02.67... (0...1/5/10 V)



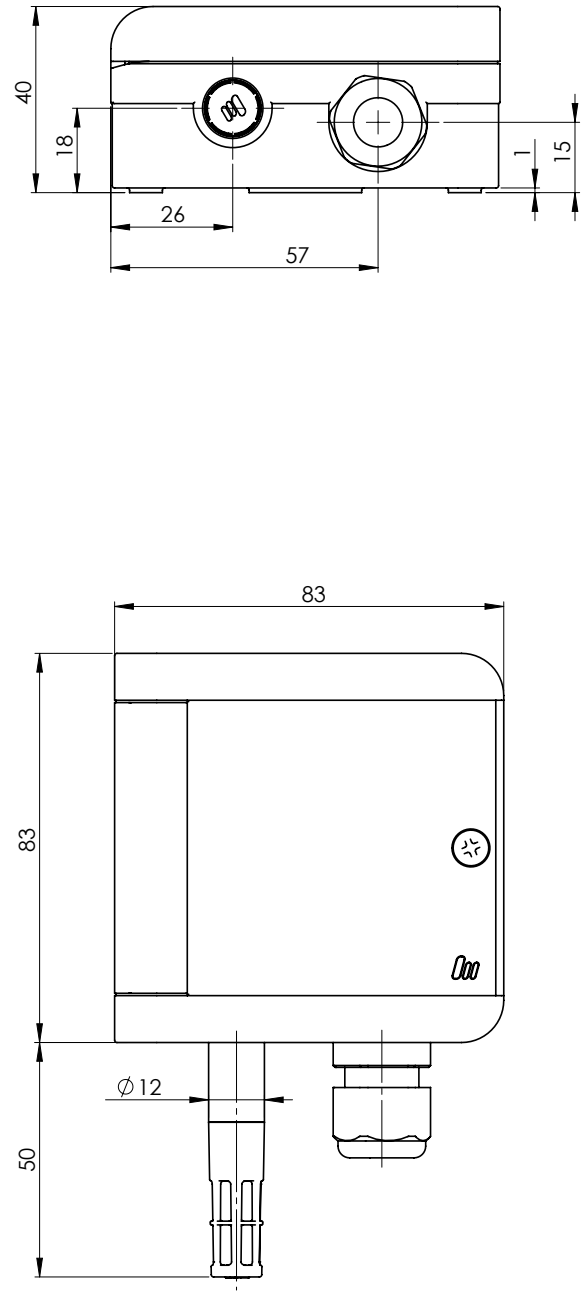
Pin assignment of accessory cable LPC2.02.67... (0...1/5/10 V and temperature passive, 3-wire)



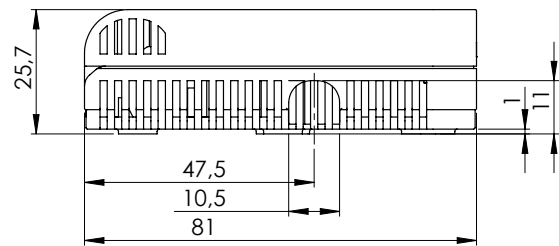
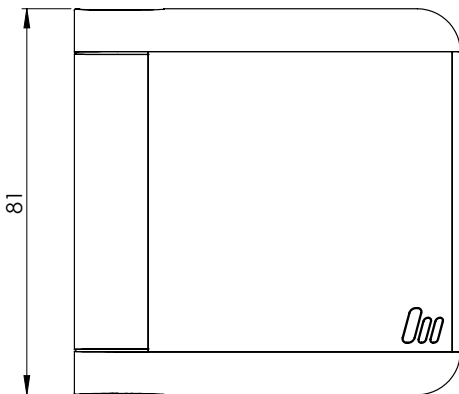
Dimensional drawing series LK



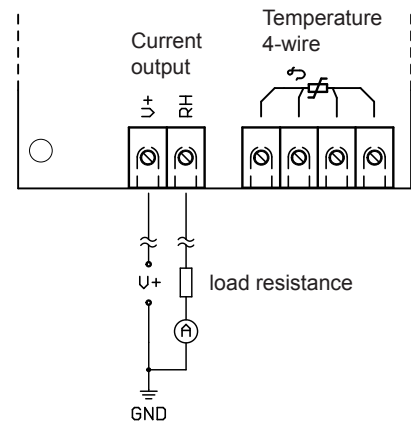
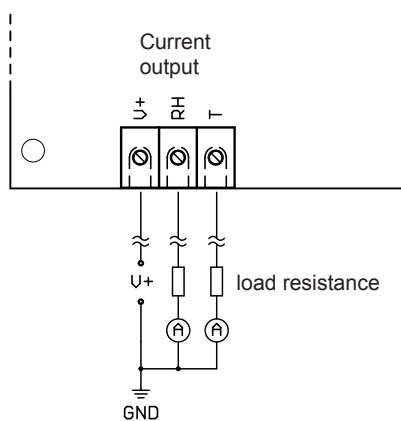
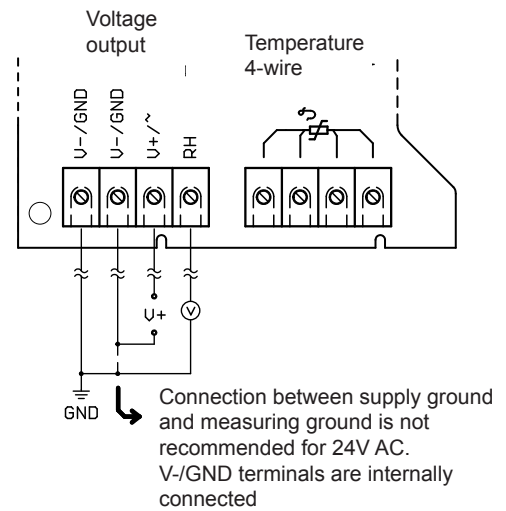
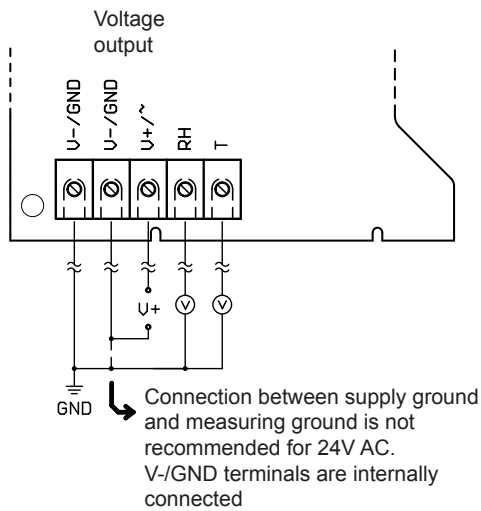
Dimensional drawing series LW



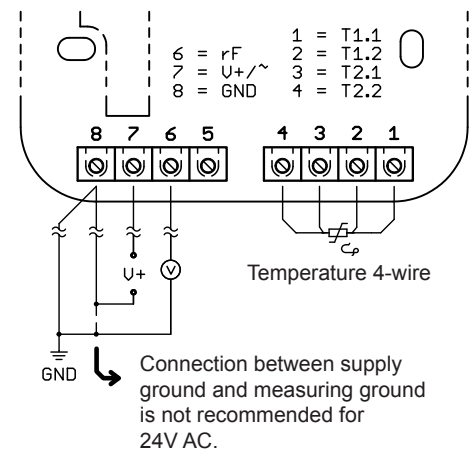
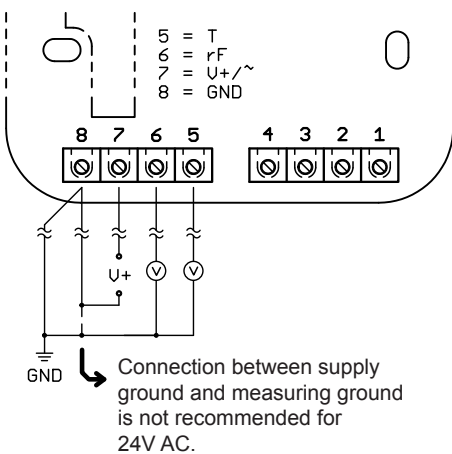
Dimensional drawing series LI



Pin assignment of series LK, LW



Pin assignment of series LI



ESD protection advice

The sensors of the L Series contain components, which can be damaged by the effects of electrical fields or by charge equalisation when touched.

The following protective measures must be taken when the housing of the sensor is to be opened for connection:

- Before opening the housing of the sensor, ensure electrical potential equalisation between you and your environment.
- Pay particular attention to ensure that this potential equalisation is maintained while you are working with the opened housing.

Mounting instructions

| | |
|---------------|---|
| Position | <p>Install the sensor at a place where characteristic levels of humidity occur. The sensor tube resp. measuring head or measuring chamber should be exposed to the flow of air. Avoid installation next to heaters, doors or on outer walls. Avoid places exposed to the sun.</p> <p>The sensors for wall mounting (series LW) and the room versions (series LI) can be mounted on a patress or directly on the wall. It is important that the surface is even.</p> <p>When mounting the sensors on a patress, avoid external air getting onto the humidity measuring element of the sensor by sealing it appropriately.</p> <p>The sensor should be mounted in such a way that no water can get into it.</p> <p>To close the housing the screw is tightened until it stops.</p> <p>We recommend that you lay the connection lines in a loop so that any water that may be present can run off.</p> |
| Fixing flange | <p>For mounting the fixing flange (for duct mounting of series LK/LP), a hole pattern is printed on the packaging. To fix the sensor, simply open the opening tab of the flange by finger pressure or with the help of a pair of pliers. The sensor can be fixed in the flange at any position.</p> |
| Connection | <p>The electrical connection must be carried out by qualified personnel only.</p> <p>Lines to and from the sensor must not be installed parallel to strong electromagnetical fields.</p> <p>In the case of a possible overvoltage please install surge protection devices.</p> |

User instructions

| | |
|--|--|
| Dew formation | <p>Dew formation and splashes do not damage the sensor, although measurement readings are corrupted until all moisture on and around the sensing element has dried up completely.</p> |
| Contaminated filters | <p>If the PTFE sintered filter ZE05 and the membrane filter ZE08 is contaminated with dust, grease and oils, this can have a negative impact on the dynamic behaviour of the sensor.</p> |
| Cleaning of PTFE sintered filter ZE05 and protective basket ZE07 | <p>If necessary, soiled filters and protective baskets can be screwed off and rinsed carefully. Bear in mind the sensors will not measure accurately until filters are completely dry. Please do not touch the highly sensitive sensing element.</p> |
| Cleaning of sensor chip | <p>Loose dust can be carefully cleaned off the humidity sensing element using distilled water or by blowing the dust carefully off. Please do not touch the highly sensitive humidity sensing element</p> |
| Damaging influences | <p>Depending on type and concentration, agents that are corrosive and contain solvents, can result in faulty measurements and can cause the sensor to break down. Substances deposited on the sensor (e. g. resin aerosols, lacuer aerosols, smoke deposits etc.) are damaging as they eventually form a water-repellent film.</p> |

This information is based on current knowledge and is intended to provide details of our products and their possible applications. It does not, therefore, act as a guarantee of specific properties of the products described or of their suitability for a particular application. It is our experience that the equipment may be used across a broad spectrum of applications under the most varied conditions and loads. We cannot appraise every individual case. Purchasers and/or users are responsible for checking the equipment for suitability for any particular application. Any existing industrial rights of protection must be observed. The quality of our products is guaranteed under our General Conditions of Sale. Data sheet L -Serie_EN. Issue: February 2018. Subject to modifications.