

**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**

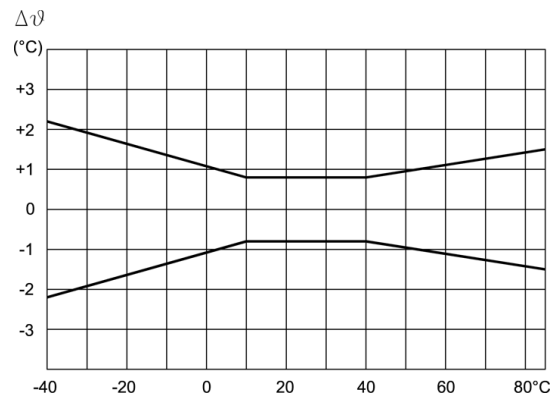
**Humidity**

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 ± 10% or 9...30 V DC
0...10 V	12...30 V DC
LK, LW, LI	
output: 0...10 V	24 V AC ± 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
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min. air speed	0.5 m/s
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operating temperature	
type LK, LW	-40...+80°C
type LP	-30...+80°C
type LI	-20...+60°C

storage temperature	-40...+85°C
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degree of protection of measuring head (series LK, LW, LP)

with protective basket ZE07	IP20
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with membrane filter ZE08	IP30
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with PTFE sintered filter ZE05	IP65
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degree of protection of housing

type LP, LK, LW	IP65
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type LI	IP30
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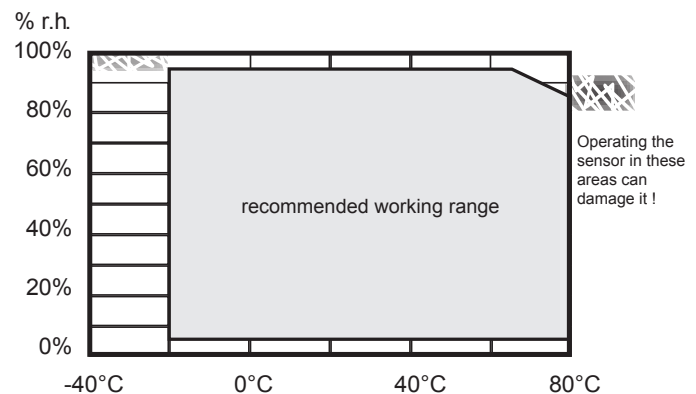
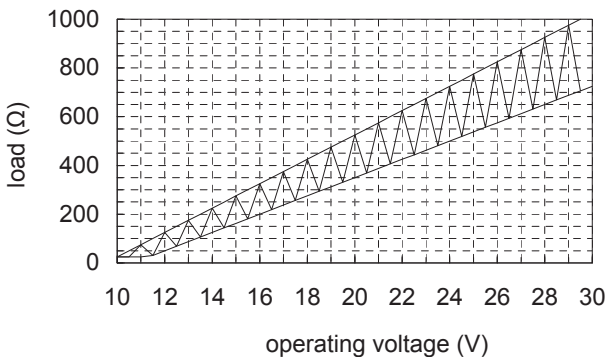
material of housing	
type LP, LK, LW	PC (light grey / white)
type LI	ABS (white)

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

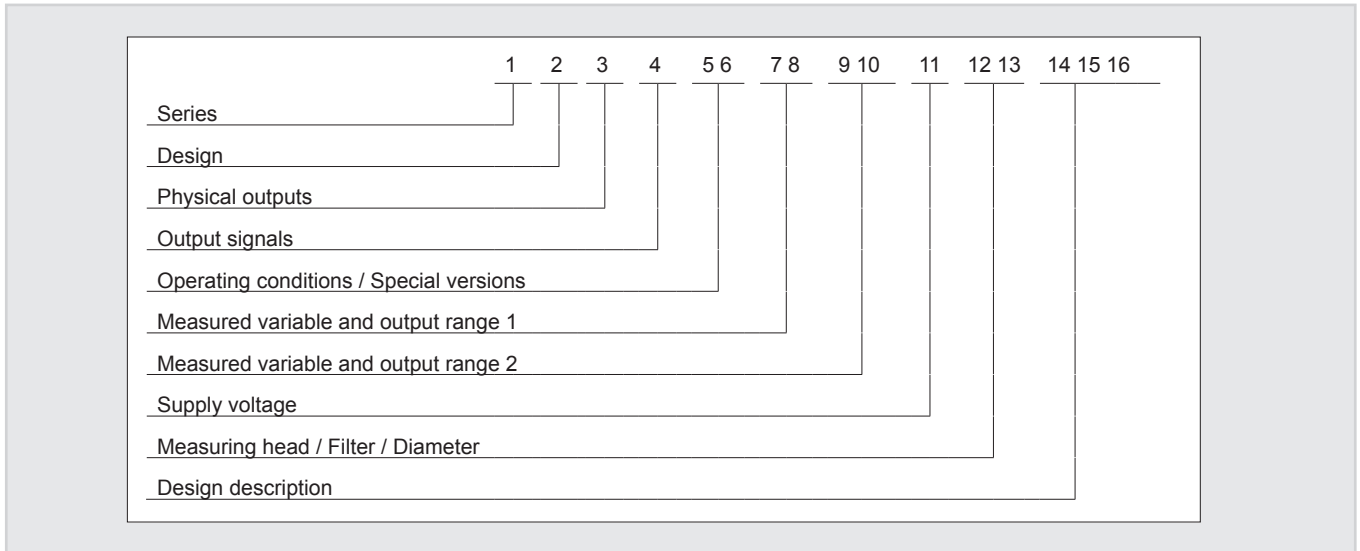


## Accessories

Designation	Order reference	Info sheet	Description
ZE36	ZE36	F5.2	adapter required for sensor tubes Ø 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 Ø 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,



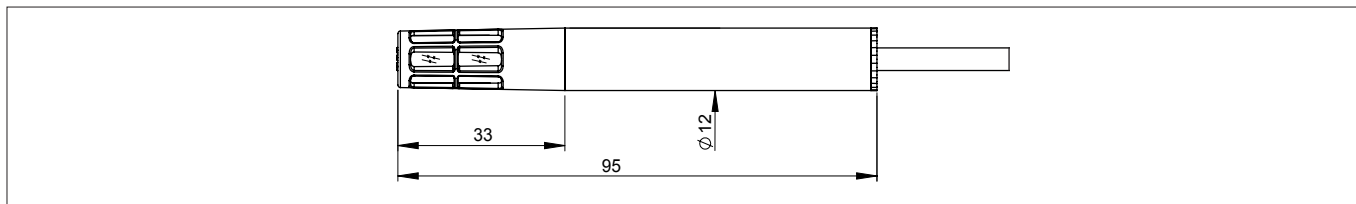
	Technical Data	Options	Order Code
1	Series	L Series	L
2	Design	Duct version	K
		Wall mounting	W
		Rod shaped, plastic, Ø 12mm	P
		Room version	I
3	Physical outputs	Humidity and temperature, 2 x active	K
		Humidity active / temperature passive	C
		humidity only, active	F
		Temperature only, active or 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	<b>Output signal</b>	<b>LP rod-shaped</b>	<b>LW wall</b>	<b>LK duct</b>	<b>LI room</b>	
		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 <b>Standard</b>
		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						0	
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

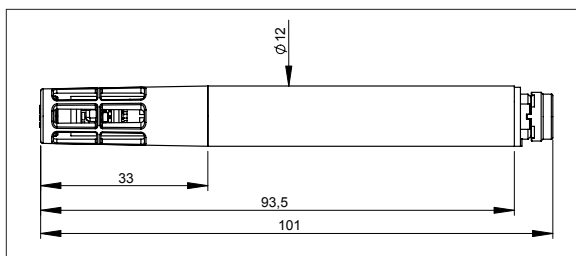
#### Humidity 0...1/5/10 V temperature passive, 4-wire

	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

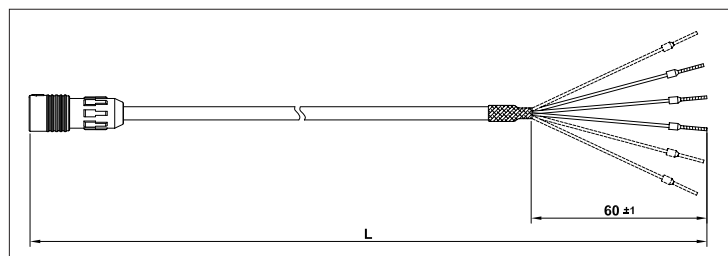
#### Humidity and temperature active 0...1/5/10V

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

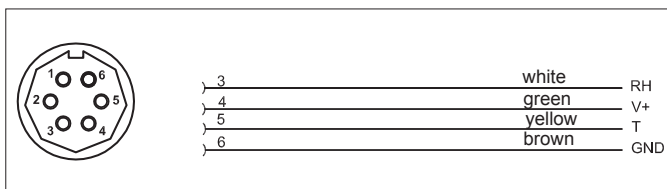
### Dimensional drawing rod-shaped sensor LP with plug-in connection and additional cable voltage output and / or temperature passive, 3-wire



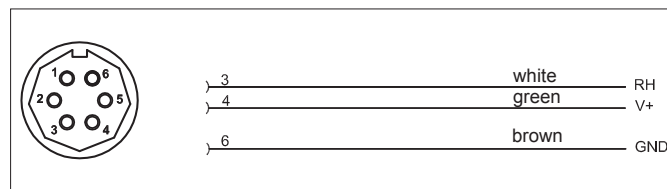
### Dimensional drawing cable LPx2.02.67...



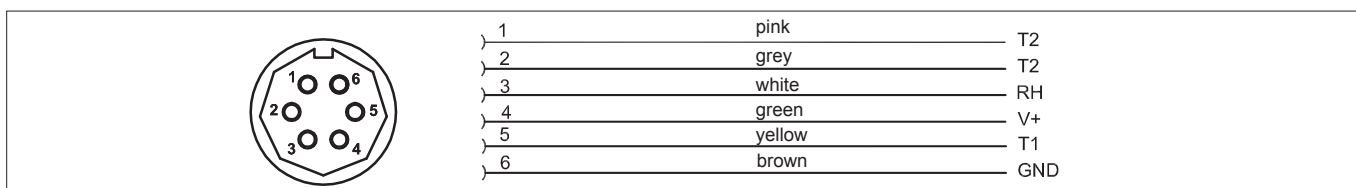
### Pin assignment of accessory cable LPK2.02.67... (2x 0...1/5/10 V)



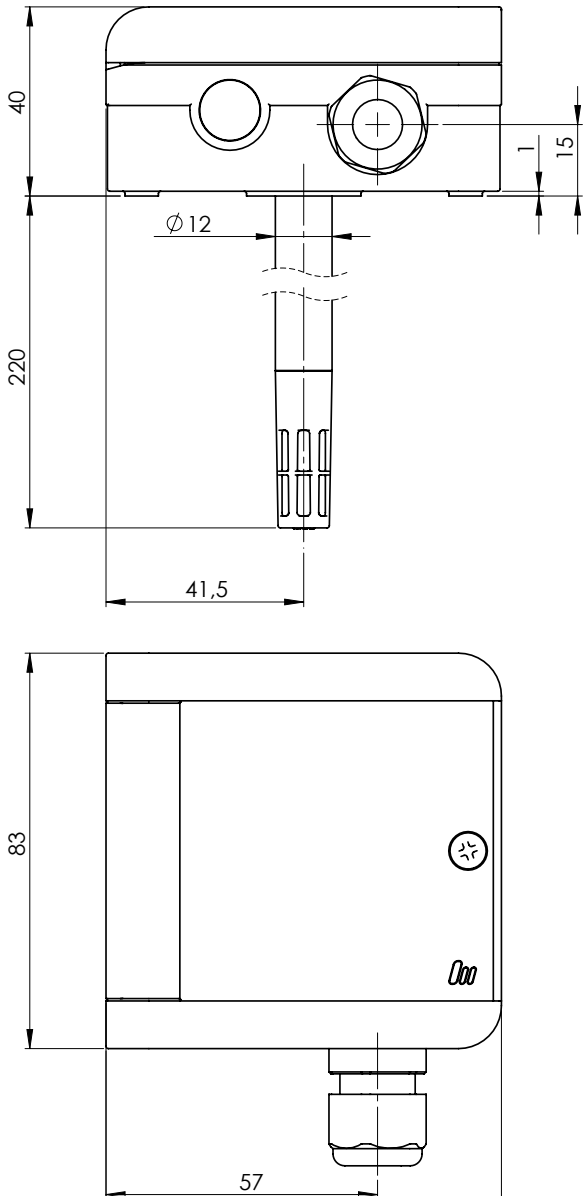
### Pin assignment of accessory cable LPF2.02.67... (0...1/5/10 V)



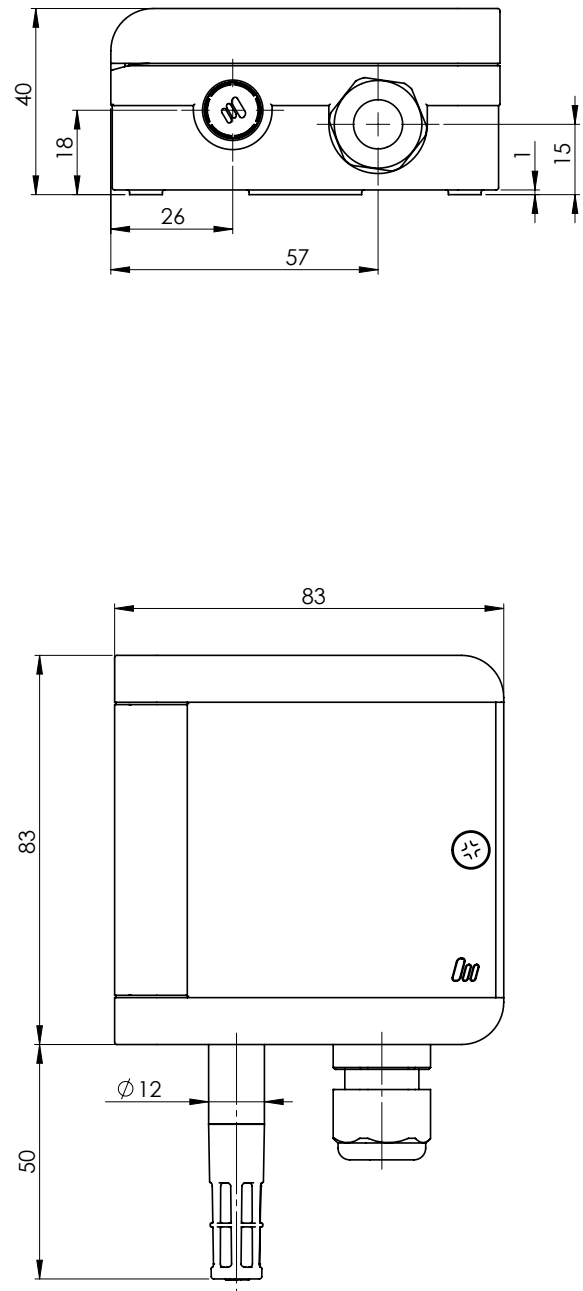
### Pin assignment of accessory cable LPC2.02.67... (0...1/5/10 V and temperature passive, 3-wire)



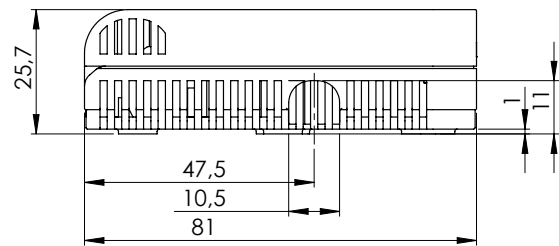
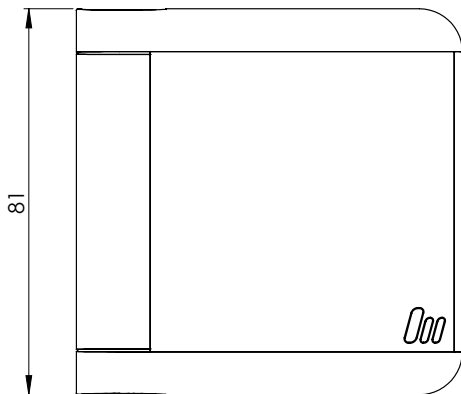
### Dimensional drawing series LK



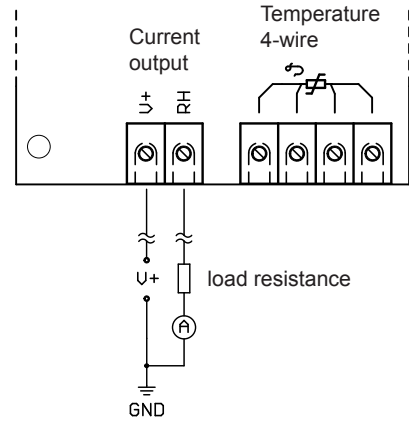
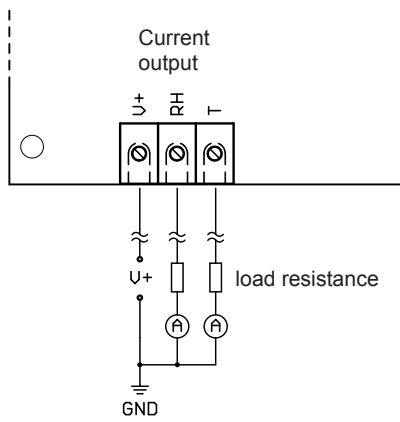
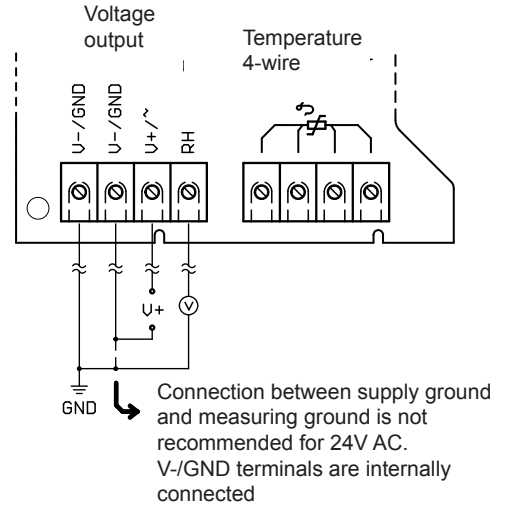
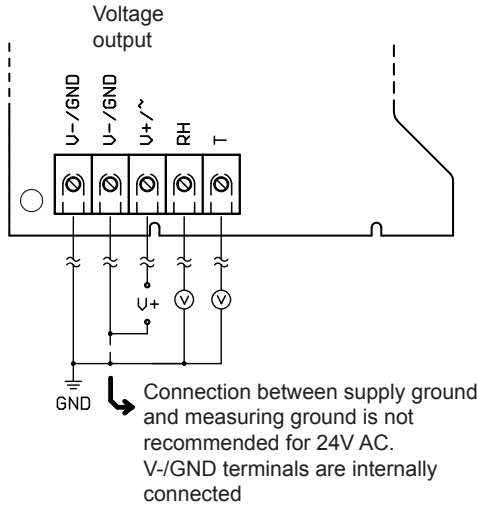
### Dimensional drawing series LW



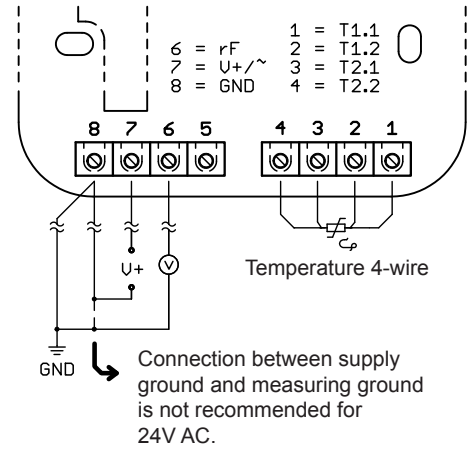
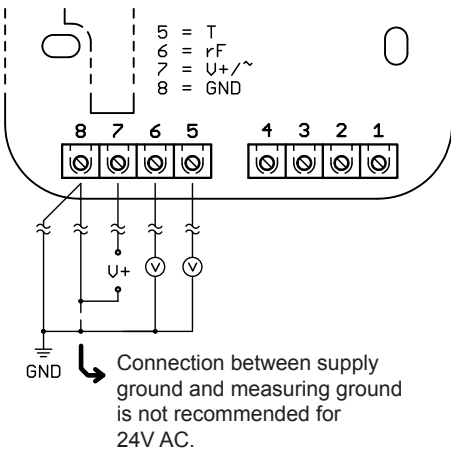
### Dimensional drawing series LI



### 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.