Operating Instructions

for

Resistive Temperature Sensor

Model: LTS

1. Contents

Manufactured and sold by:

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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.
Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:
The standard delivery includes:
- Resistive Temperature Sensor model: LTS

4. Regulation Use

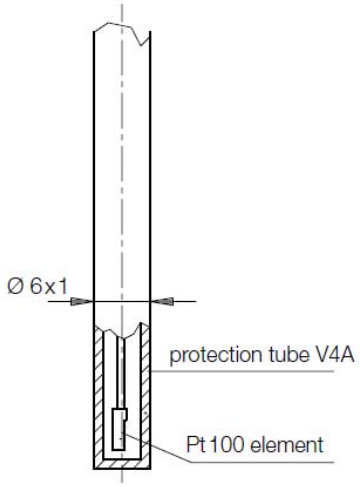
Any use of the Resistive Temperature Sensor, model: LTS, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

5. Operating Principle

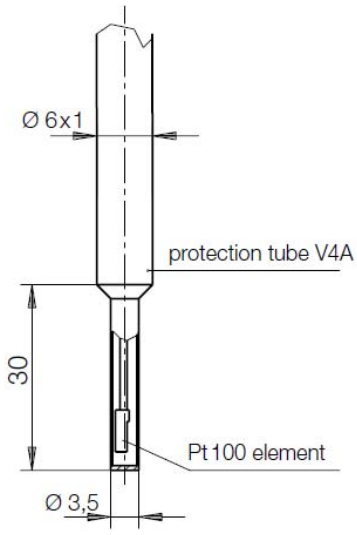
The change in resistance of platinum in relation to the temperature to be measured is used for temperature measurement with the KOBOLD Resistive Temperature Sensors LTS.
The devices are connected electrically with 2- or 3-wire technology, depending on the input of the evaluation device and the line length. Alternatively, the temperature sensor can be connected to a 4-20 mA current input (2-wire current loop) through the built-in 2-wire transmitter. The temperature sensors with a connection that is cavity free (...T, ...M) are fitted with a food-compatible metallic sealing system, that forms a hygienic measuring point in conjunction with the associated weld-in sleeve LZE (confirmed by the EHEDG).

Sensor Tips and Response Times

All temperature sensors are available with tapered tips to ensure faster response times. The times specified below refer to a resistive temperature sensor immersed in boiling water.



Sensor tip ø 6 mm
Halftime: t50 ≤3,0 s
90 %-time: t90 ≤8,0 s



Sensor tip ø 3.5 mm
Halftime: t50 ≤0,5 s
90 %-time: t90 ≤1,5 s

5.1 Special

The temperature sensors with neck well are suited for measuring permanently high temperatures (up to 250 °C).

Appropriate neck tube versions should be used at process temperatures above 70 °C if the transmitter is integrated, and above 100 °C in case of a separated transmitter.

6. Mechanical Connection

The LTS temperature sensors are available with a non-hygienic G ½ process connector (R4) or alternatively with hygienic connections for food processing.

Only with these process connection options M12x1.5 (M3) and G ½ (G4), combined with our hygienic LZE fittings, an EHEDG-certified dead space free monitoring point based on hygienic design principles is possible.
(See chapter 11. Accessories)

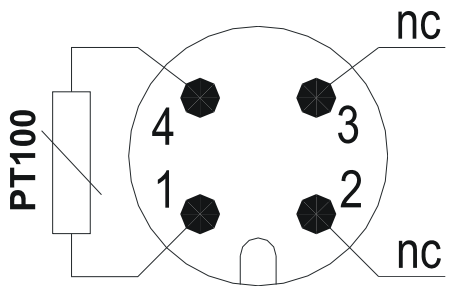
Proper torque values for these two options are:
M12x1.5 = 10 - 15 Nm
G ½ = 15 - 20 Nm

7. Electrical Connection

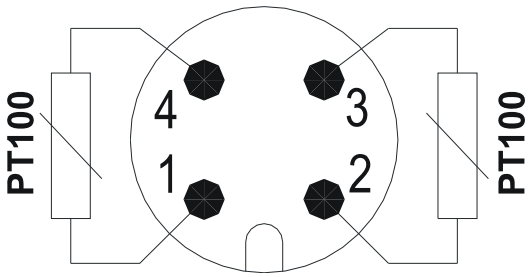
7.1 Pt 100 without transmitter

7.1.1 Plug connection at compact version (LTS-K…M0 and LTS-A…M0)

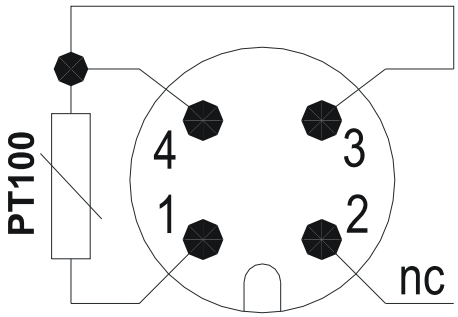
1 x Pt 100 2-wire



2 x Pt 100 2-wire



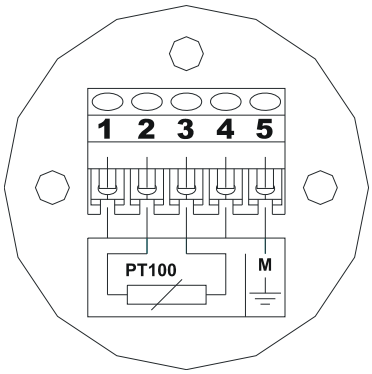
1 x Pt 100 3-wire



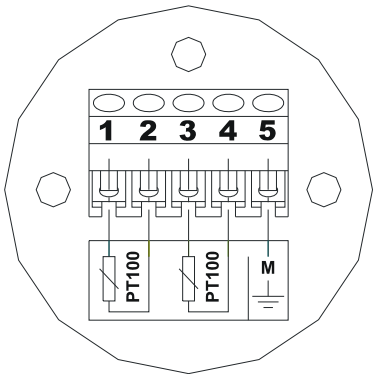
Terminal connections at version connection box (LTS-A…K0)

cable connection M16x1,5

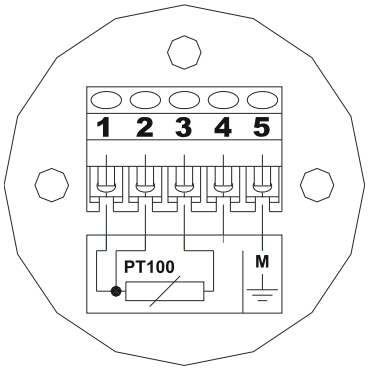
1 x Pt 100 2-wire



2 x Pt 100 2-wire



1 x Pt 100 3-wire



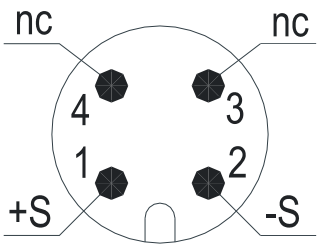
7.2 Pt 100 with transmitter

The transmitter converts the resistance of the PT100 into a temperature-proportional 4-20mA standard current signal.
Thus, the current loop carries both the supply current and the measurement signals.
The module is integrated into the head of the temperature sensor.

- Make sure the electrical power supply cables are de-energized.
- Connect the transmitter as shown in the connection schemes below.
- We recommend a minimum power supply cable cross section of 0.25 mm².

Warning! Wrong electrical connections may lead to the destruction of the electronic circuit!

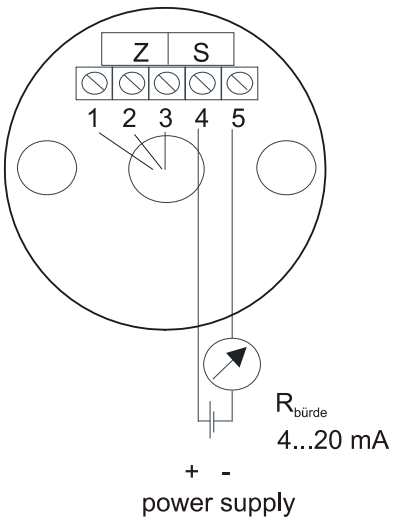
Plug connection at compact version (LTS-K…6Mx)

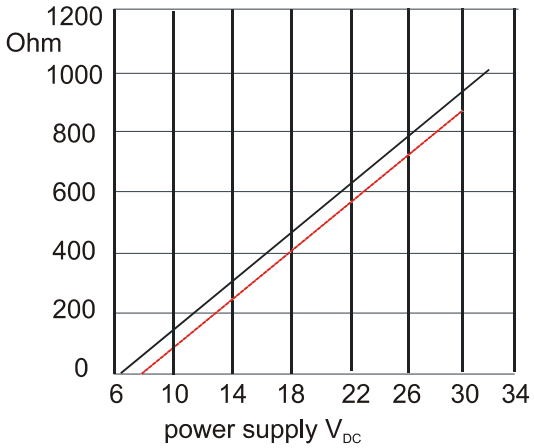


4...20 mA
(current loop)

Terminal connections at version connection box (LTS-A…6Kx)

connection plug M16x1,5





8. Technical Information

8.1 Mechanical Information

Max. pressure:	10 bar
Material:	stainless steel 1.4404
Process connection:	M 12 x 1.5 hygienic (with sleeve LZE), G 1/2 hygienic (with sleeve LZE), G 1/2 AG DIN 3852-2 without screw thread (for clamp screwing LZE-M1, LZE-S1)
Sensor length:	20, 50, 100, 150, 250 mm, special length up to max. 1000 mm
Electrical connection	
Compact device:	LTS-K: M 12 x 1-plug
Connection box:	LTS-A: cable connection M 16 x 1.5 optional: M 12 x 1-plug
Max. current:	1 mA
Protection:	IP 67
Weight:	LTS-K: 0.3 - 2 kg LTS-A: 0.5 - 2 kg

8.2 Electrical Information

8.2.1 Measuring sensor

Measuring principle:	Pt 100, Class A acc. DIN IEC 751
Sensors:	1 or 2 Pt 100 per device (2-wire)
Measuring range:	without transmitter: -50…+250 °C (from 70 °C use only with neckwell!)
Ambient temperature:	-20…+80 °C
Tolerances Class A:	0 °C: ±0.15 K, 100 °C: ±0.35 K

8.2.2 Transmitter for LTS-K (compact version)

Standard meas. range:	-10…+40 °C 0…50 °C 0…100 °C 0…150 °C 0…200 °C (from 70 °C only with neck well!)
Special meas. range:	within -50…+250 °C min. measuring range: 50 °C
Accuracy of electronics:	±0.2 % of reading ±0.2 °C
Accuracy of sensor:	DIN Class B
Output:	4-20 mA corresponds to meas. range (2-wire)
Power supply:	10…30 V_{DC}
Allowable load:	$R_A \leq (U_V - 10\ V) / 0.022\ A$
Ambient temperature:	-25…+70 °C
Humidity:	0…98 % r.H. (non-condensing)
Electrical connection:	M12x1 plug

8.3 Transmitter for LTS-A (with connection box)

Input:	3-wire, Pt 100
Standard meas. range:	-10…+40 °C 0…50 °C 0…100 °C 0…150 °C 0…200 °C (from 70 °C only with neck well!)
Special meas. range:	within -50…+250 °C min. measuring range: 10 °C
Typical accuracy:	±0.15 % of measuring range
Output:	4…20 mA, temperature linear
Function:	sensor breakage detection
Power supply:	8…32 V_{DC}
Ambient temperature:	-40…+85 °C
Galvanic isolation:	no
Electrical connection:	screw terminal

9. Order Codes

Example: **LTS- K 0 3 02 M3 1 K 0**)

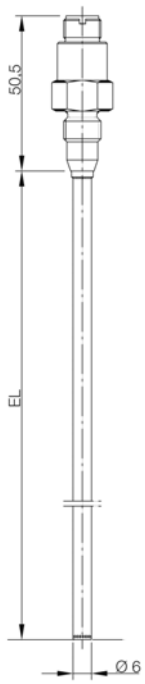
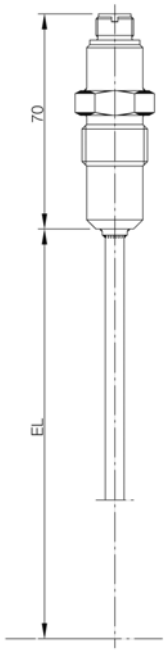
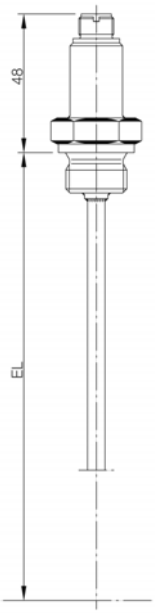
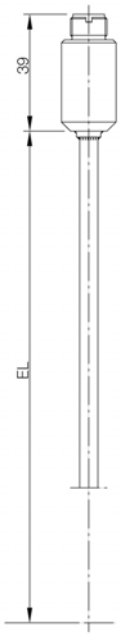
Model	Version	Screw thread	Sensor tip	Sensor length	Process connection
LTS-	**K** = compact **A** = connection box	**0** = without neck well **H** = with neck well	**3** = Ø 3.5 mm (not for 2 sensors)	**02** = 20 mm	**M3** = M 12 x 1.5 hygienic
			3 = Ø 3.5 mm (not for 2 sensors) **6** = Ø 6 mm	**05** = 50 mm **10** = 100 mm **15** = 150 mm **25** = 250 mm **YY** = special length max. 1000 mm	**M3** = M 12 x 1.5 hygienic **G4** = G ½, hygienic **R4** = G ½, standard (for threaded jacket) **K0** = without screw thread

Continued

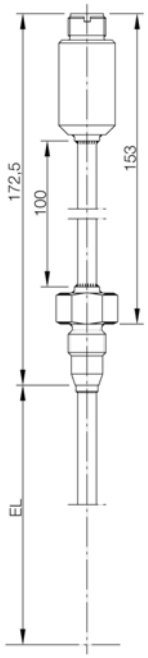
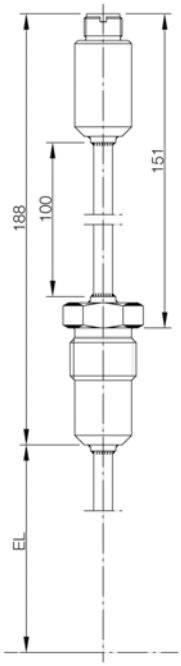
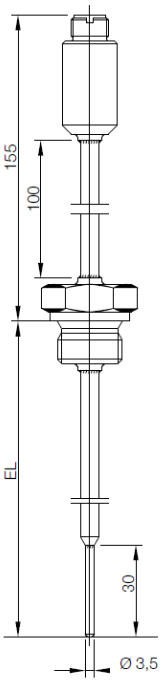
Sensor	Electrical Connection	Transmitter
1 = 1 Pt 100, class A, 2-wire (not for compact version K) **2** = 2 Pt 100, class A, 2-wire **3** = 1 Pt 100, class A, 3-wire	**K** = cable connection M16x1.5 (not for compact version) **M** = M12-plug	**0** = without transmitter
6 = with transmitter		**A** = -10...+40 °C **B** = 0...50 °C **C** = 0...100 °C **D** = 0...150 °C **E** = 0...200 °C **S** = specialr

10. Dimensions

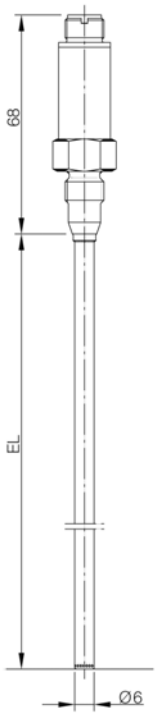
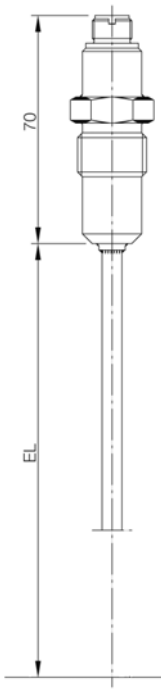
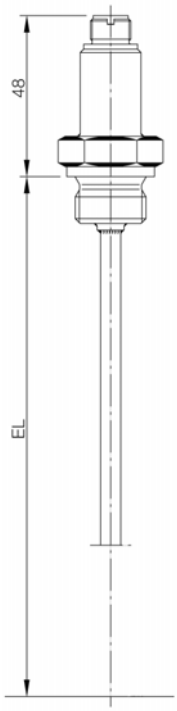
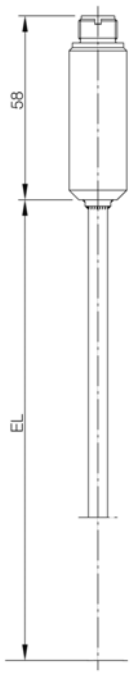
LTS-K (compact version), without transmitter
Process connection (without neck well):

M12x1.5, hygienic AF17	G ½ hygienic AF22	G ½, standard AF27	Without screw thread
			
LTS-K0xxxM3xM0	**LTS-K0xxxG4xM0**	**LTS-K0xxxR4xM0**	**LTS-K0xxxK0xM0**

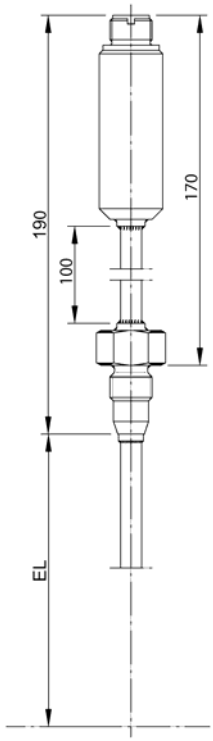
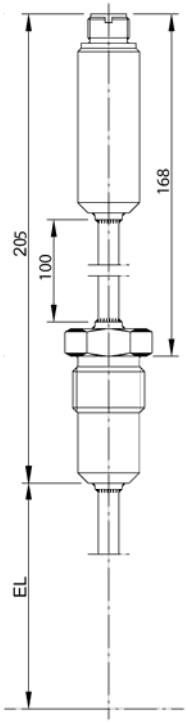
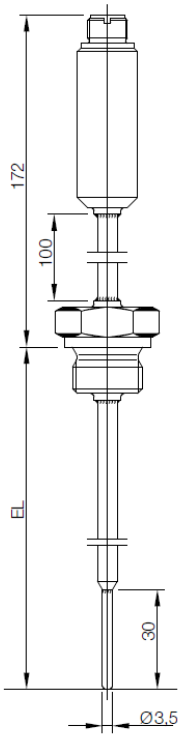
Process connection (with neck well):

M12x1.5, hygienic AF17	G ½, hygienic AF22	G ½, standard AF27
		
LTS-KHxxxM3xM0	**LTS-KHxxxG4xM0**	**LTS-KHxxxR4xM0**

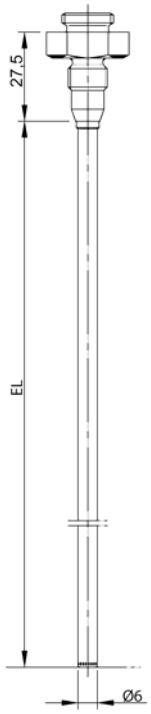
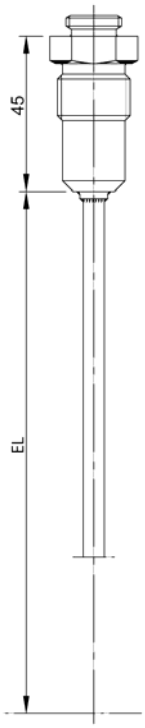
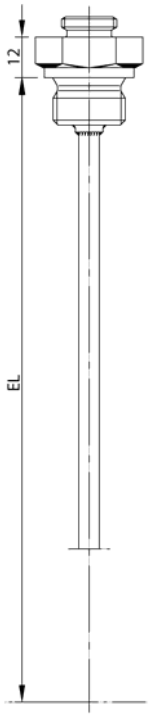
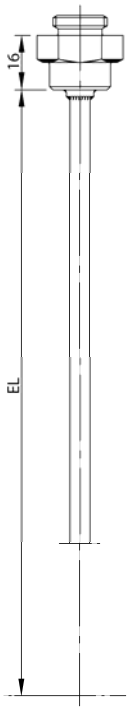
LTS-K (compact version), with transmitter
Process connection (without neck well):

M12x1.5, hygienic AF17	G ½ hygienic AF22	G ½, standard AF27	without screw thread
			
LTS-K0xxxM3xMx	**LTS-K0xxxG4xMx**	**LTS-K0xxxR4xMx**	**LTS-K0xxxK0xMx**

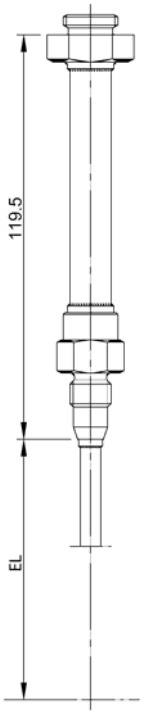
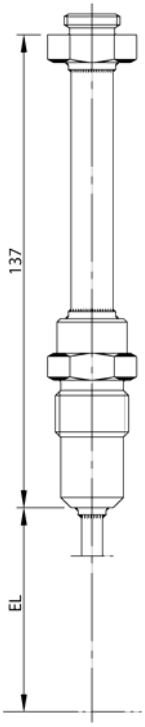
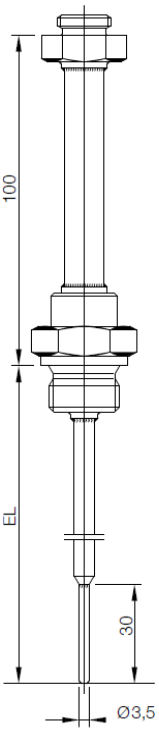
Process connection (with neck well):

M12x1,5, hygienic AF17	G ½, hygienic AF22	G ½, standard AF27
		
LTS-KHxxxM3xMx	**LTS-KHxxxG4xMx**	**LTS-KHxxxR4xMx**

LTS-A (with connection box)
Process connection (without neck well):

M12x1.5, hygienic (AF22)	G ½ hygienic (AF22)	G ½, standard (AF27)	without screw thread (AF22)
			
LTS-A0xxxM3xxx	**LTS-A0xxxG4xxx**	**LTS-A0xxxR4xxx**	**LTS-A0xxxK0xxx**

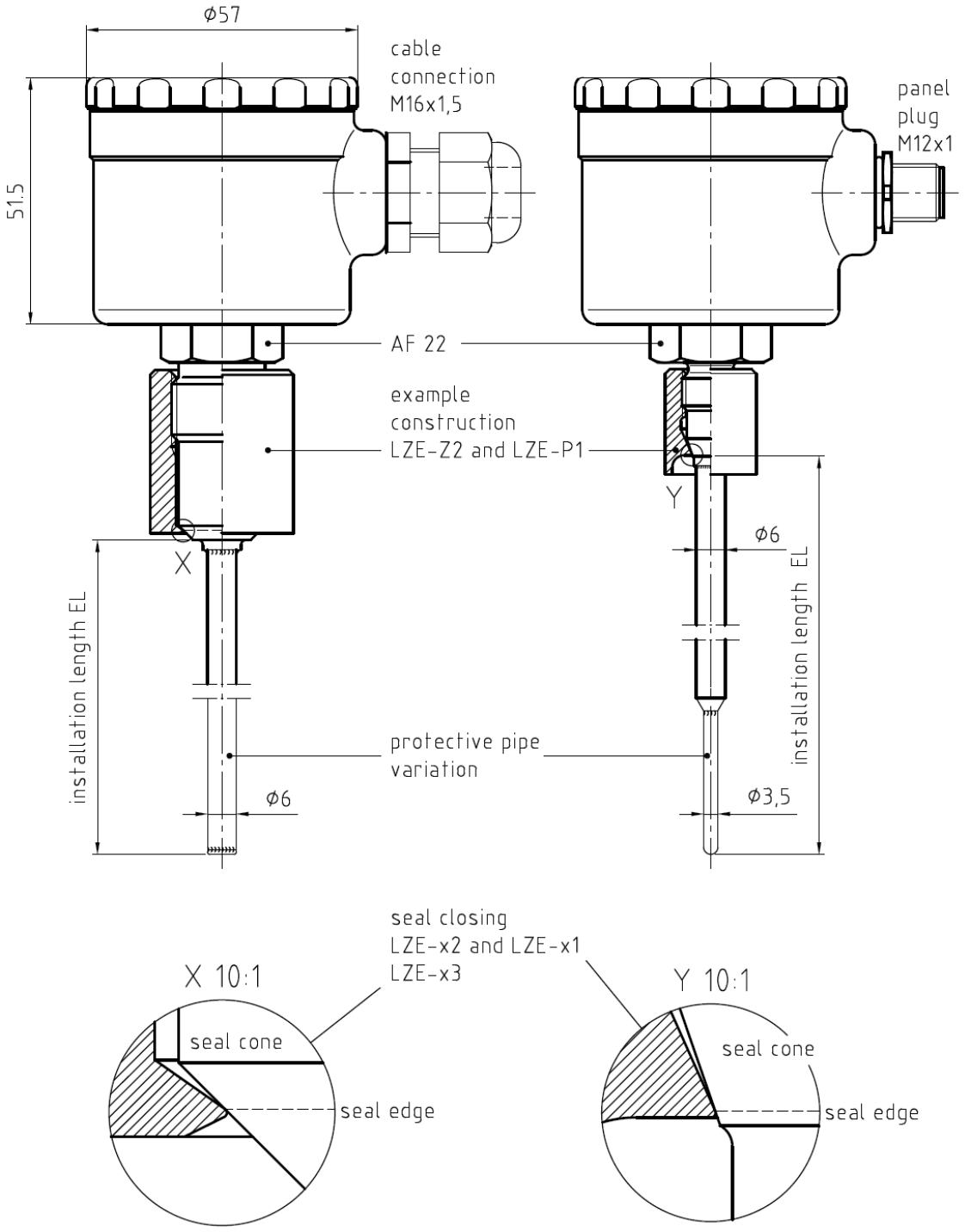
Process connection (with neck well):

M 12 x 1.5, hygienic (AF22 /AF17)	G ½, hygienic (AF22 / AF22)	G ½, standard (AF22 / AF27)
		
LTS-AHxxxM3xxx	**LTS-AHxxxG4xxx**	**LTS-AHxxxR4xxx**

11. Accessories

If you need a hygienic installation, use the sleeve system LZE (see data sheet in "Food processing catalogue" L1). The position of the Pg-conduit thread of the screwed-in device is marked on the sleeve.

Example: Installation of a temperature sensor with sleeve LZE



Hygienic Installation Systems LZE for temperature sensor LTS

Mounting sleeves, EHEDG-certified

Description	Measuring unit connection	
	M12x1.5	**G ½**
cylinder sleeve		**LZE-Z2**
cylinder sleeve with test hole		**LZE-T2**
cylinder sleeve low form		**LZE-N2**
cylinder sleeve with collar	**LZE-P1**	**LZE-P2**
collar sleeve	**LZE-K1**	**LZE-K2**
ball sleeve	**LZE-U1**	**LZE-U2**
collar compression fitting	**LZE-M1**	
ball compression fitting	**LZE-S1**	
adapter:		
conical connection DIN 11851	**LZE-L1**	**LZE-L2**
aseptic lap-joint flange DIN 11864	**LZE-A1**	**LZE-A2**
VARIVENT®	**LZE-V1**	**LZE-V2**
Tri-Clamp®	**LZE-C1**	**LZE-C2**
G 1 adapter		**LZE-D2**
capped stub*	**LZE-B1**	**LZE-B2**
Starting torque (Nm)	**10-15**	**15-20**

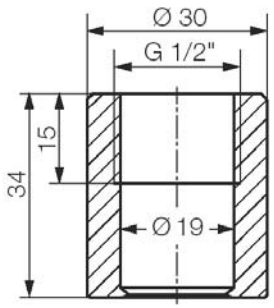
*** all sleeves must be equipped a capped stub to prevent warping during welding**

Weld-in Fittings, EHEDG certified

Description	Model	Measuring unit connection	Pipe nominal width
Weld-in fittings	**LZE-R**	**1** = M12x1.5 **2** = G ½	**15** =DN 15 (only with M12x1.5) **25** =DN 25 **40** =DN 40 **50** =DN 50 **65** =DN 65 **80** =DN 80

For example LTS-…G4..

Model: LZE-Z2 (G ½)



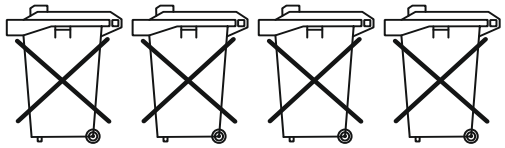
12. Disposal

Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

Batteries

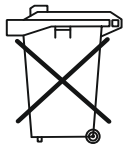
Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



Cd[1] Hg[2] Pb[3] Li[4]

1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

Electrical and electronic equipment



13. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Resistive Temperature Sensor Model: LTS

to which this declaration relates is in conformity with the standards noted below:

EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Additional for model LTS-A****6K***

EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

Additional for model LTS-K****6M***

EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
(Appendix A, Class B) additional error < 1 % FS
When using long wires, suitable external measures against transient voltages must be taken.

Also, the following EEC guidelines are fulfilled:

2014/30/EU	**EMC Directive**
2011/65/EU	**RoHS** (category 9)
2015/863/EU	Delegated Directive (RoHS III)

Hofheim, 14 Dec. 2021

H. Volz
General Manager

M. Wenzel
Proxy Holder

14. UK Declaration of Conformity

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Resistive Temperature Sensor Model: LTS

to which this declaration relates is in conformity with the standards noted below:

BS EN IEC 63000:2018
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Additional for model LTS-A****6K***

BS EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements

Additional for model LTS-K****6M***

BS EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements
(Appendix A, Class B) additional error < 1 % FS
When using long wires, suitable external measures against transient voltages must be taken.

Also, the following UK guidelines are fulfilled:

S.I. 2016/1091	**Electromagnetic Compatibility Regulations 2016**
S.I. 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Hofheim, 14 Dec. 2021

H. Volz
General Manager

M. Wenzel
Proxy Holder