

**Operating Instructions
for
Microwave Level Switch**

Model: LNM



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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:

- Microwave Level Switch model: LNM

4. Regulation Use

Any use of the Microwave Level Switch, model: LNM, 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 KOBOLD LNM Microwave Level Switch is used for detecting liquid levels. The microwave field penetrates several millimetres into the medium. Condensate or adherent remains of the medium are not detected.

By using this principle of measurement, it is also possible to detect non-conductive media. The level switch is particularly suitable for use with foaming media because the foam itself is not detected. The output of the level monitoring device only switches when the coupling section is completely covered by the medium.

This means it is possible to install it into tanks regardless of position.

In combination with the KOBOLD LZE or LZE-R weld-in sleeves, the probe provides a measuring point that has no dead space and meets hygiene standards (EHEDG-approval certificate). This level switch is therefore very well suited for CIP/SIP cleaning. Adapter sleeves are also available for different process connections so that the device can also be used in existing installations.

Because the electronics are already integrated no other evaluating instrument is necessary. The output signal can therefore be transmitted directly to a PLC for further processing.

6. Mechanical Connection

Installation: Pipe or vessel
Installation position: independent, the sensor needs to be completely wetted for switching



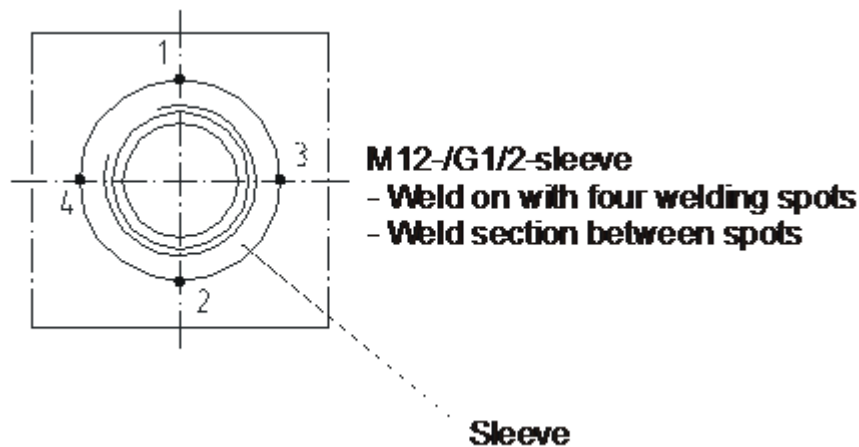
Attention! Due to the measuring method the devices are unprotected against electrostatic discharge on the measuring cone point. Do not touch the devices at the cone point during installation. Secure a potential equalisation between the device housing and the mounting place before the final mounting! A trouble-free functioning of LNM-12M3xxx is guaranteed only by using the LZE-Installation System.

6.1 Installation design “Foodstuffs” with hygienic installation system LZE

Welding and mounting details:

Welding in tanks and pipes:

1. Drill a hole with diameter equivalent to outer diameter of the sleeve; max. tolerance + 0,2 mm
2. Weld the sleeve at 4 points
3. Screw in the blind socket
4. Weld the sleeve segments between already welded 4 points.
4 sleeve segments for M12 and G 1/2“



Attention! In order to avoid deforming or red-hot turning of the sleeve during welding, pauses between individual sleeve segments should be sufficient enough to allow cooling down of the sleeve.

- Pay attention to the maximum allowable torque of 10 – 15 Nm when you screw in the sensor.
- Please avoid screwing in and unscrewing the sensor from the sleeve, because on high stress the sealing edge can distort and the process connection can get leaky.

The sealing system LZE is designed for CIP- and SIP-cleaning.

6.2 Installation design “Industry” in G 1/2 thread

If the sleeve LZE is not used for the installation of the level switch LNМ, it is possible to seal the screw thread with an adequate sealing material. Thus, an installation is possible in a pipe as well as in a vessel.

No conductive connection needs to be established to the vessel or to the pipe.

7. Electrical Connection



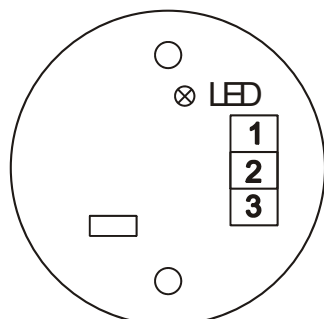
Attention! Make sure that the voltage values of your system correspond with the voltage values of the instrument.

- Make sure that the supply wires are powerless.
- Connect the power supply and the output signal according to the below PIN's of the plug or the Terminal PIN plug.
- We recommend to use wires with cross sectional area of min. 0.25 mm²



Attention! Incorrect wiring will lead to damage of the unit's electronics.

7.1 Model with screwed cable gland Terminal pin assignment of the 3-pole clamp



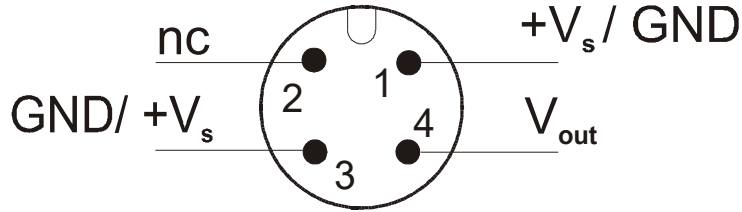
Power supply clamp 1	Power supply clamp 2	Sensor	Output clamp 3	Switching function	Function LED
+ V _s	GND	immersed	approx. V _s	N/O contact	long ON + short OUT
		dry	approx. 0 V	N/O contact	short ON + long OUT
GND	+ V _s	Immersed	approx. 0 V	N/C contact	long ON + short OUT
		dry	approx. V _s	N/C contact	short ON + long OUT

short = about 1 s.
long = about. 3 s.

The output function (N/C / N/O function) is switched by changing the polarity of the power supply.

The PNP output must be loaded with a minimum load of $\leq 50\text{k}\Omega$ so that the low potential is reached when it is switched off.

7.2 Model with round pin plug Connector assignment of the M12-plug



Power supply plug PIN 1	Power supply plug PIN 3	Sensor	Output plug PIN 4	Switching function	Function LED
+ V _s	GND	immersed	approx. V _s	N/O contact	long ON + short OUT
		dry	approx. 0 V	N/O contact	short ON + long OUT
GND	+ V _s	Immersed	approx. 0 V	N/C contact	long ON + short OUT
		dry	approx. V _s	N/C contact	short ON + long OUT

short = about 1 s.

long = about. 3 s.

The output function (N/C / N/O function) is switched by changing the polarity of the power supply.

The PNP output must be loaded with a minimum load of $\leq 50\text{k}\Omega$ so that the low potential is reached when it is switched off.

8. Technical Information

Method of measurement:	microwave technology
Process temperature:	0...100 °C 150 °C max. 30 min for CIP-Process
Ambient temperature:	0...70 °C
Operating pressure:	max. 10 bar
Materials:	
• head, screwed gland:	stainless steel 1.4404
• coupling piece:	PEEK
Process connection:	G 1/2, hygienic weld-on sleeves LZE, LZE-R
Connection:	cable gland M16x1.5
Terminal:	3-pole, (optional plug M12x1)
Function:	full/empty signal (set by polarity of supply voltage)
Output:	open collector, PNP, 50 mA
Switching delay (fixed):	0.2 s (0.3 – 1.0 s on request)
Power supply:	18...36 V _{DC} , < 50 mA without load
Protection:	IP 67
Weight:	approximately 0.5 kg
Dielectric constant of the medium:	$\epsilon_R > 20$; Option: $\epsilon_R 2-20$

9. Order Codes

Example: **LNМ-12 G4 3PK**

Design	Material	Process connection	Sensitivity	Model	Electrical connection
Foodstuffs*	Stainless steel/PEEK	G 1/2	ϵ_R : >20	LNМ-12 G4 A...	...3PK = M16x1.5 threaded cable connection
Industry	Stainless steel/PEEK	G 1/2	ϵ_R : >20	LNМ-22 G4 A...	...3PS = M12x1 plug

*Installation only possible with EHEDG sleeve

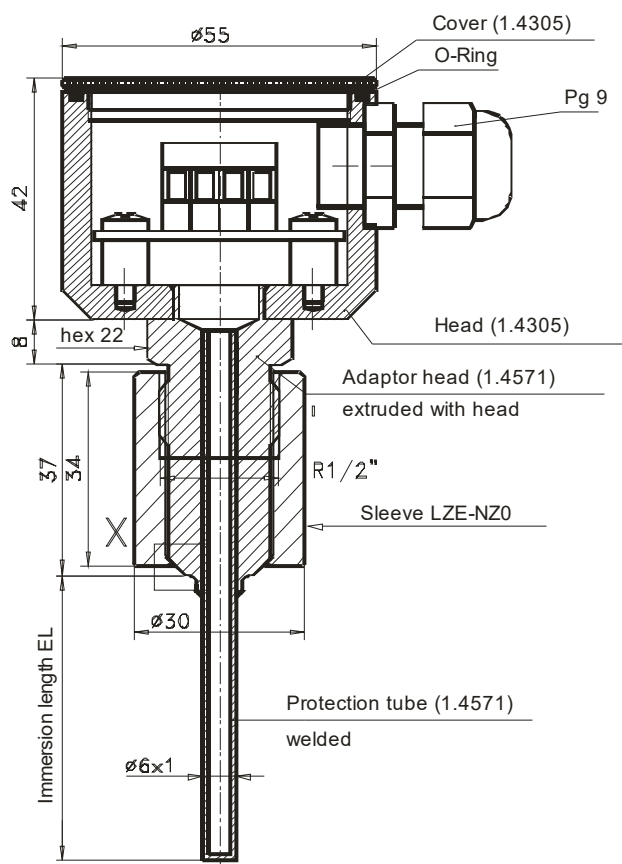
**Note: For this model, following connections adapters are available:

LZE-L1
LZE-A1
LZE-V1
LZE-C1

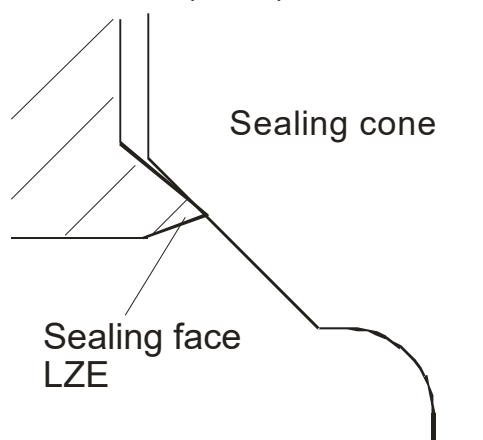
10. Accessories

In connection with the installation system LZE a hygienic installation is guaranteed.

Example: Installation of the temperature sensor with the installation system LZE.



Detail X (M5:1) Seal



Suitable sleeves for the Microwave Level Switch, model LNМ

Mounting Sleeves, EHEDG certified

	Measuring unit connection
	G 1/2
cylinder sleeve	LZE-Z2
cylinder sleeve with test hole	LZE-T2
cylinder sleeve low form	LZE-N2
cylinder sleeve with collar	LZE-P2
collar sleeve	LZE-K2
ball sleeve	LZE-U2
adapter:	
conical connection DIN 11851	LZE-L2
aseptic lap-joint flange DIN 11864	LZE-A2
VARIVENT®	LZE-V2
Tri-Clamp®	LZE-C2
G 1 adapter	LZE-D2
Capped stub*	LZE-B2

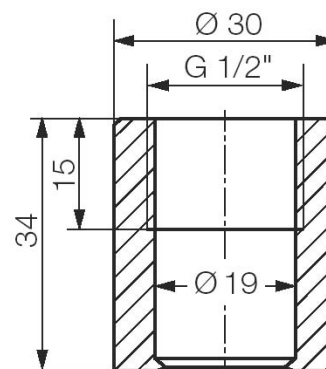
* all sleeves must be equipped a capped stub to prevent warping during welding

Weld-in Fittings, EHEDG certified

Model	Description	Measuring unit connection	Pipe nominal width
LZE-R	weld-in fittings	2 = G 1/2 3 = G1	25 =DN 25(only with 3 =G1) 40 =DN 40 50 =DN 50 65 =DN 65 80 =DN 80

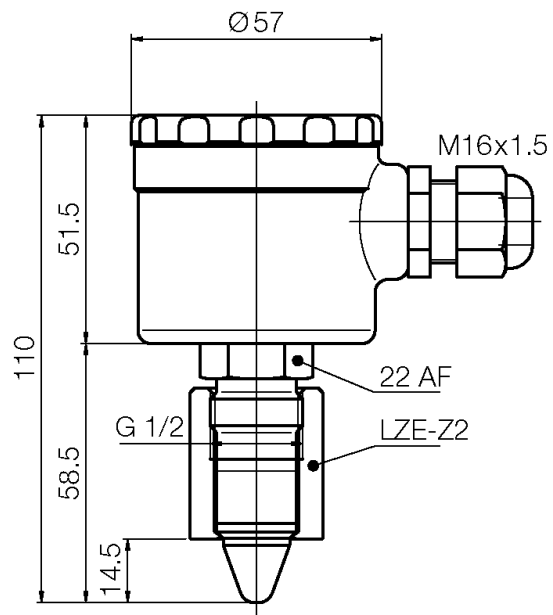
Sleeves example:

Model LZE
G 1/2



11. Dimensions

Process connection G 1/2



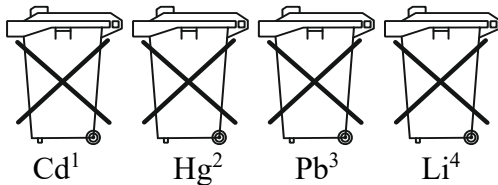
12. Disposal

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.

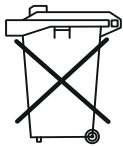
Batteries

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:



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:

Microwave Level Switch Model: LNM

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

EN 61326-1: 2013

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

EN IEC 63000:2018

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Also, the following EC guidelines are fulfilled:

2014/30/EU

EMC Directive

2011/65/EU

RoHS (category 9)

2015/863/EU

Delegated Directive (RoHS III)

We confirm that the material PEEK is approved by FDA without any limitations for direct contact with food and pharma products and fulfils the corresponding EU-regulation.

FDA Approval-No. 21 CFR 177.2415

EU Regulation 1935/2004

Hofheim, 28 April 2022



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