KROHNE

Installation and
Operating Instructions

LS 72xx

Conductive mono-rod level sensor

Variable area flowmeters
Vortex flowmeters
Flow controllers
Electromagnetic flowmeters
Ultrasonic flowmeters
Mass flowmeters
Level measuring instruments
Communications engineering
Engineering systems and solutions
Switches, counters, displays and recorders
Heat metering
Pressure and temperature

Contents

Items supplied

- Measuring instrument
- Hygienic adapter
- Installation and operating instructions

System description

Inputting physical quantities into an SPC or PLC or other computer and control systems requires accurate and reliably working sensors. The sensor is a detecting element that converts physical quantities, such as temperature, level, pressure, conductivity, turbidity and flow, into an electrical signal. Locally further processed, usually by an integrated microcontroller, the measuring signal can be transmitted by analogue (e.g. 4...20mA loop) or digital (e.g. Profibus PA) means.
The conductive mono-rod-level sensors of the **LS Series** are designed to detect the level of conductive liquids. Since the rod electrodes can be shortened to any required length, this allows flexibility in the choice of the operating point.

Product liability and warranty

The instrument is designed solely for detecting the interface between conductive liquids. Responsibility as to suitability and intended use of this instrument rests solely with the operator. Improper installation and operation of the instrument / system may lead to loss of warranty.
In addition, all claims are subject to the “General terms and conditions of sale” under which this instrument was purchased.
If a meter or instrument needs to be returned to KROHNE, please note the information given on the last-but-one page of these Instructions.
KROHNE regrets that it cannot repair or check your instruments unless accompanied by a fully completed Service and Repair sheet.

CE / EMC / Standards / Approvals

(applicable only with integrated electronic evaluator)
The product bears the CE marking on account of compliance with and application of the following standards:

EMCG (89/336/EEC)

EN 50081-1	EN 55022 Class B
EN 61000-6-2	EN 61000-4-2 ESD 4/8 kV
	EN 61000-4-3 RF radiated 10 V/m
	EN 61000-4-4 Burst 4 kV
	EN 61000-4-5 Surge 1 kV sym., 2 kV unsym.
	EN 61000-4-6 RF cable 10 V

1.1 Mechanical installation

- Use only the recommended sleeves or adapters. If other systems are used, no guarantee can be given for proper functioning or leak-tightness.
- The connection thread must have direct electrical contact with the threaded sleeve and the metal vessel.
- Do not use Teflon or paper gaskets.
- The stub electrode can be used in electrically non-conducting vessels (e.g. plastic tanks) if the screw-in sleeve has a metal surface that can be used as reference ground.
- The tightening torque for the sleeve should be between 10 and 20 Nm.
- The rod electrodes can be shortened to any required length (by clipping, sawing, etc). Make sure not to damage the coating or the insulating part.
- Insulated rods: remove about 10 mm of the coating from the end of the rod, using an abrasive disc, a sanding belt or a sharp knife.
- Make absolutely sure that the rod electrode cannot come into contact with the pipe or tank wall. Also take into consideration the fact that the rod may be deflected by movement in the liquid product. If necessary, select a more favourable mounting location.

1.2 Process connection

The hygienic ½" process sleeve is easy to weld in into tanks or pipes. The kind of assembly allows installation in conformity with standards of hygiene (to EHEDG, FDA). The G1/2" and G1" connections can be mounted in any counter thread acc. to ISO 228.

Various hygienic adapter sleeves (refer to chapter "Accessories") are available for fitting to other process connections. For more information refer to data sheet "Accessories"

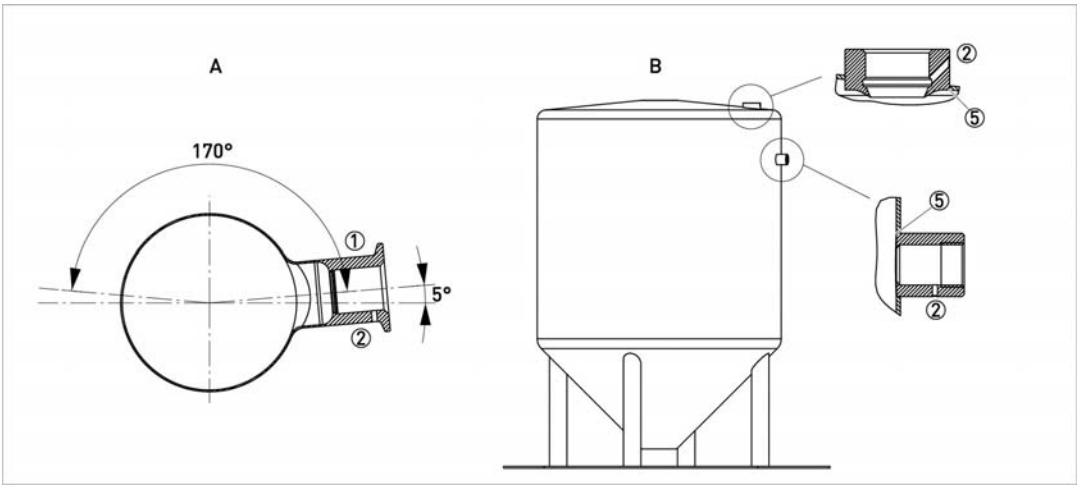
1.3 Mounting of 3A marked products

The 3A mark is valid only when the product is mounted in a 3A marked counterpart and installed acc. to the installation manual. Use also a 3A marked O-ring or gasket if relevant.

The 3A marked products conforms to the 3A sanitary standards criteria. Materials and surfaces fulfil the FDA demands and are certified by EHEDG.

EPDM O-rings supplied with 3A marked products are conform to sanitary standards class II (8% milk fat).

1) Use only 3A approved counterparts
2) The inspection hole should be visible and drained. Face it downwards that leaking can be observed.
3) Mount the device in a self-drained position.
4) Level the inner surface of the pipe with the counterpart.
5) Weld from the inside of the tank, if possible. Welds shall be free from cracks, crevices and grooves. Weldings should be grinded to Ra= 0.8

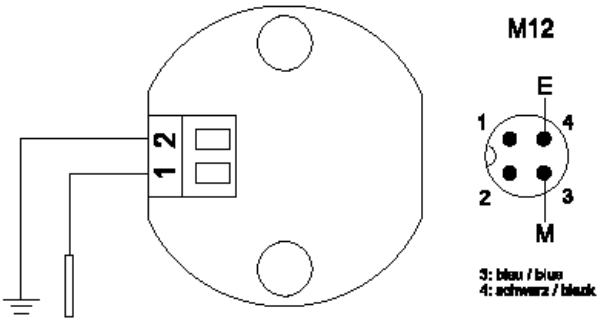


Mounting of 3A products in pipe installations (A) or tank installations (B)

2 Electrical connection

External level converter module

Terminal 1 is for the electrode potential, terminal 2 for ground (housing). Wire these two connections to the appropriate terminals of your evaluation unit (see also “Accessories“). The pin assignment for the M12 plug connection is shown in the connection diagram. Make absolutely sure that the sensor has no DC voltage, as this could damage the sensor or tank! The most suitable devices are evaluators with a frequency higher than 200 Hz. Do not use devices with an r.m.s. voltage of more than 5 V. Also pay regard to currently valid installation regulations.

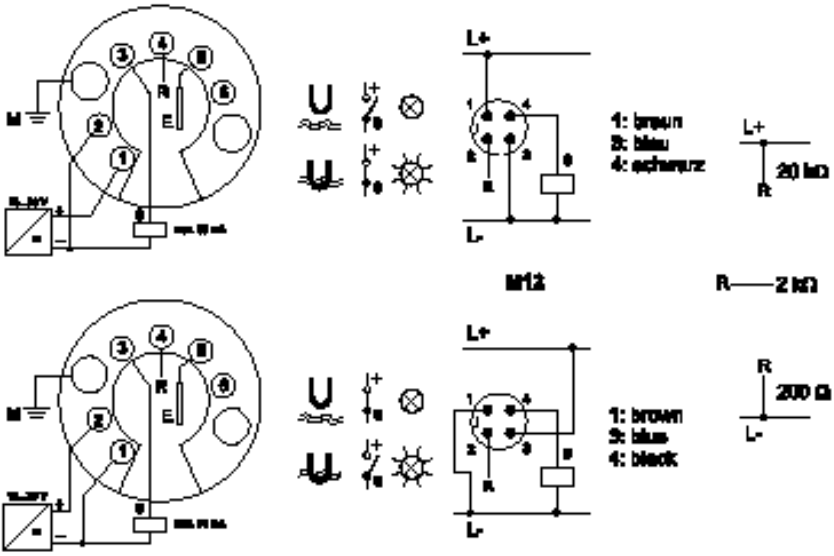


With integrated level converter module

Terminals 1 and 2 are used for supplying a DC voltage of 18...36 V. According to polarity, the output switches to active or inactive when the electrode is immersed (see connection diagram). The terminal wired to the negative pole is connected to the housing via an internal protective diode. The maximum power consumption is 10 mA (without load switched). This value should be taken into account for the recommended fuse. An active switching output (pnp) is available at terminal 3. The switching voltage is a minimum of 1 V below the supply voltage. The maximum output current is 50 mA. At higher loads, the current is limited accordingly. Damage through shorting cannot occur. At terminal 4 (connection “R“) the sensitivity can be set in three stages, either by fixed wiring or by external activation for changeover in the case of product changes (see Table). The pin assignment for the M12 plug connection is shown in the connection diagram. Please pay regard to the respectively valid installation regulations.

R	Operating point	Examples
L	200 Ω	acids, alkalis
open	2 kΩ	beer, juice, yoghurt
L+	20 kΩ	(pure) water Connection diagram

2.1 Connection plan



2.2 Initial start-up

- Check the leak-tightness at the sleeve.
- Make sure that the cable gland is tight or, as the case may be, the M12 plug is properly screwed down.
- After powering the unit, check for correct switching function.

2.3 Operator control

External level converter module

Refer to the directions for the appropriate evaluator and set the sensitivity level accordingly.

With integrated level converter module

- The red LED in the evaluator module lights up when the electrode is immersed in the liquid product of adequate conductivity.
- According to the polarity of the supply voltage (see “Electrical connection“) the output operates in the active or inactive mode.
- Should the module fail to switch, check the sensitivity setting (see “Electrical connection“).

3 Fault diagnosis and corrective actions

Fault	Cause	Action/elimination
No indication of level	Electrode not in product	o.k. Measure continuity,

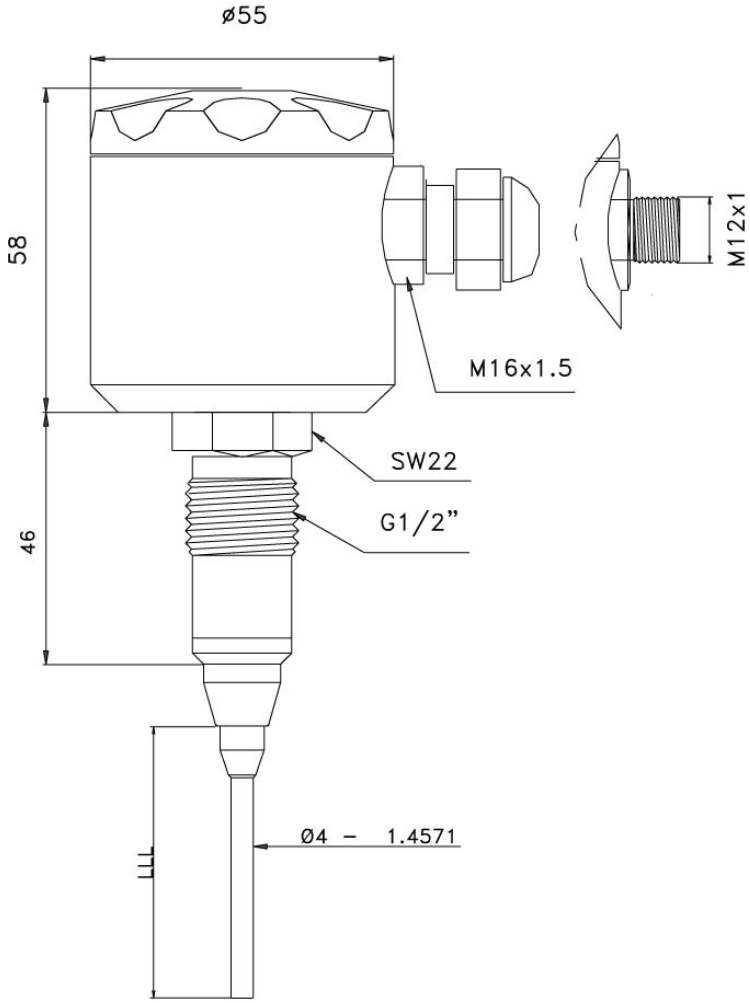
	Wire break	connections
		Select higher sensitivity
	Sensitivity too low	Strip more insulation from electrode
	Insufficient electrode area	
Constant level indication	Short-circuit to ground, sensor	Replace sensor
	Short-circuit	Check power leads, power cable
	Sensitivity too high (possibly deposits)	Select lower sensitivity
With integrated level converter module		
LED not “on”	Supply voltage < 18 V	Measure voltage at pin 1, 2
No switching output	Wire break	Check continuity of wires
	Supply polarity incorrect	Reverse terminals 1, 2
	Short-circuit	Check wiring

4 Technical data

4.1 Technical data table

Connection head	Stainless steel V2A 1.4305; 55 mm dia.
Electrical connection	Cable gland M16; M12 connector
Process connection	Threaded socket G1/2“h; V4A 1.4571
Type of protection	IP 67
Insulating part	PEEK
Electrode	4 mm dia.; V4A 1.4571 (Option: PTFE coating)
Ambient temp. range	–20...+60 °C
Process temp. range	–20...+140 °C
Operating pressure	max. 16 bar
Mounting position	Rod electrode: above; stub electrode: any
With integrated level converter module	
Indicating elements	1 LED red (level)
Power supply	18...36 V DC; 10 mA max. (no load switched)
Output	min. Ub – 1 V, (50 mA max. short-circuit-proof)
Switching function	full / empty polarity of supply power
Response time	Damping 0.5 s
Sensitivity	200 Ω, 2 kΩ, 20 kΩ via control signal
With electrode output for level converter module	
Output	electrode connection, ground connection

4.2 Dimensions



5 Type code

5.1 Ordering code

Parts code **VGP1 0 x y 000 z**

x: Type	1	Stub, electrode/ground connection
	2	Stub, integr. level converter module
	3	Rod bare, electrode/ground connection
	4	Rod bare, integr. level converter module
	5	Rod coated, electrode/ground connection
	6	Rod coated, integr. level converter module

y: Rod length	0	Stub
	1	200 mm, bare
	2	500 mm, bare
	3	850 mm, bare
	4	1000 mm, bare
	5	200 mm, coated
	6	500 mm, coated
	7	850 mm, coated
	8	1000 mm, coated

z: Electrical connection	1	Cable gland M16
	2	Plug M12

5.2 Spare parts

Should a replaceable part of the probe be lost or damaged, replacements can be ordered on the basis of the part number.

Designation	**Type**
Housing lid	KMD.008.055.100
Cable gland M16	KVV.M16.010.008
Connector insert M12 4-pin	KVV.100.004.000
Integrated level converter module	LKP.100

5.3 Accessories

Designation	**Type**
Weld-in sleeve, HWN 200	V GP7 010000
Liquiphanten adapter thread G1", HGA 200	V GP7 050000
Sanitary pipe assembly kit DN 25, HMT 225	V GP7 0A0000
Sanitary pipe assembly kit DN 50, HMT 250	V GP7 0B0000
Varivent flange version N, HVF 250	V GP7 0C0000
Tri-Clamp flange DN 32/DN 40, 2"; HTC 250	V GP7 0D0000
External level converter module,2-channel, 24VDC, LEM 202	V GP0 100090
External level converter module,24VDC, 4-channel, LEM 204	V GP0 100080
External level converter module, 230 V, LEM 100	V GP0 100070

6 Product description

6.1 Applications

The conductive mono-rod-level sensors of the **LS Series** are designed to detect the level of conductive liquids. Since the rod electrodes can be shortened to any required length, this allows flexibility in the choice of the operating point.

6.2 Functional principle

Conductive measuring sensors pick up the electrical resistance of the tank product when the electrode is immersed in the product. This causes a small alternating current to flow which is measured by the electronic unit in the converter module. The wall of the vessel or pipe acts as reverse potential. The switching position is defined by the length or mounting position of the sensor.

6.3 Construction

The weldable process sleeve is made of stainless steel and ensures installation in keeping with hygiene requirements. Various level converter modules (see Accessories) are available for evaluation purposes. The integrated evaluator module in the connection head allows direct connection to an SPC or PLC via a short-circuit-proof 24-V switching signal.

6.4 Features

- Sensor for hygienic installation, no elastomers
- Compact design
- Rod electrode can be shortened to any length
- Optimized flow geometry
- Precise, constant operating point
- Rejection of foam and deposits (coated electrode)
- Insensitive to vibration
- Materials in conformity with food standards
- Maintenance-free
- Installation in pipelines DN 25 and higher
- Direct connection to an SPC or PLC (with integrated electronics)
- Hygienic adapter sleeves for other process connections

7 Notes

If you need to return a device for testing or repair to KROHNE

Your instrument has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems. Should you nevertheless need to return an instrument for servicing or repair, please pay strict attention to the following points:

Due to statutory regulations on environmental protection and safeguarding the health and safety of our personnel, KROHNE may only handle, test and repair returned instruments that have been in contact with liquids if it is possible to do so without risk to personnel and environment.

This means that KROHNE can only service your instrument if accompanied by the following certificate confirming that the instrument is safe to handle. If the instrument has been operated with toxic, caustic, flammable or water-endangering liquids, you are kindly requested

to check and ensure, if necessary by rinsing or neutralising, that all cavities in the instrument are free from such dangerous substances.
(Directions on how you can find out whether the primary head has to be opened and flushed out or neutralised are obtainable from KROHNE on request.)
to attach a certificate to the instrument confirming that the instrument is safe to handle and stating the liquid used.

We cannot service your instrument unless accompanied by such a certificate.

Specimen certificate

Company: Address:

Department: Name:

Tel. No.: Fax No.:

The enclosed instrument

Type: .:

KROHNE Order No. or Series No

has been operated with the following process liquid

Because this process liquid is ☐ water-hazardous ☐ toxic ☐ caustic ☐ flammable *

we have
☐ checked that all cavities in the instrument are free from such substances *
☐ flushed out and neutralised all cavities in the instrument *

We confirm that there is **no** risk to humans or environment through any residual liquid contained in the instrument.

Date: Signature Signature:

Company stamp: