

## Installation and Operating Instructions

# LS 7200 – LS 7241



Variable area flowmeters

Vortex flowmeters

Flow controllers

Electromagnetic flowmeters

Ultrasonic flowmeters

Mass flowmeters

**Level measuring instruments**

Communications technology

Engineering systems & solutions

Switches, counters, displays and recorders

Heat metering

Pressure and temperature

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## Safety information

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Please read this manual carefully, and also take note of country-specific installation standards (e.g. the VDE regulations in Germany) as well as prevailing safety regulations and accidents prevention rules. For safety and warranty reasons, any internal work on the instruments, apart from that involved in normal installation and electrical connection, must be carried out only by qualified KROHNE personnel.

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## Items included with supply

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- Measuring instrument
- Hygienic adapter
- Installation and operating instructions

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## Product liability and warranty

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Responsibility for suitability and intended use of these instruments rests solely with the operator. Improper installation and operation of the instruments may lead to loss warranty.

In addition, the “General conditions of sale” forming the basis of the purchase contract are applicable.

If instruments need 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.

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## CE / EMC / Standards / Approvals

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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 HF 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 HF cable 10 V

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## 1 Installation

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### 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 1/2" or 1" process sleeve is easy to weld into tanks or pipes. The mark points to the centre of the future position of the cable gland or M12 plug. This form of assembly allows installation in conformity with hygiene standards (EHEDG, FDA). Various hygienic adapter sleeves are available for fitting to other process connections (see Accessories). Rod electrodes are normally installed from above, stub electrodes in any position and in pipes. Thanks to their high thermal stability of up to 140°C, the level probes are ideally suited for CIP cleaning and sterilising processes.



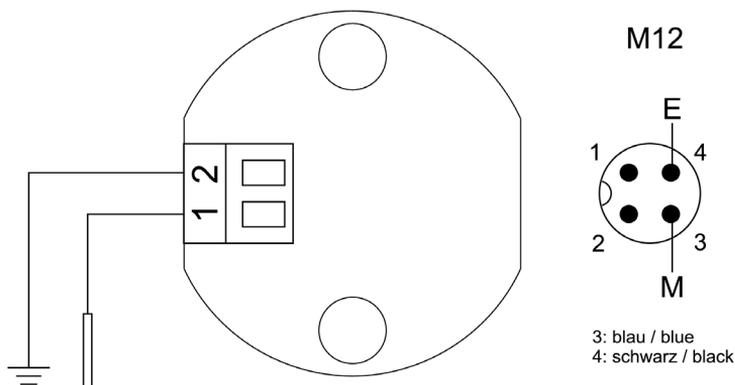
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## 2 Electrical connection

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### External level converter module (1 rod electrode)

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.

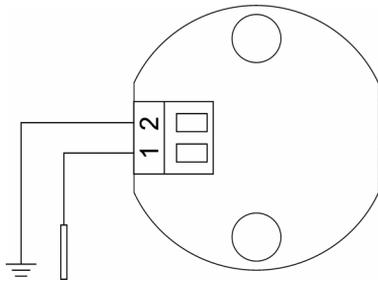


### With integrated level converter module (only for 1 rod electrode)

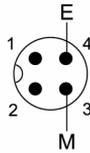
Terminals 1 and 2 are used for supplying a DC voltage of 18...36 V. According to polarity, the output switches to active or inactive when the electrode is immersed (see connection diagram). The terminal wired to the negative pole is connected to the housing via an internal protective diode. The maximum 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 $\Omega$	acids, alkalis
open	2 $\Omega$	beer, juice, yoghurt
L+	20 $\Omega$	(pure) water

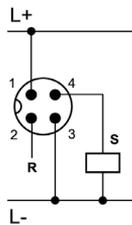
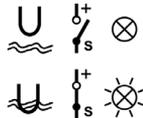
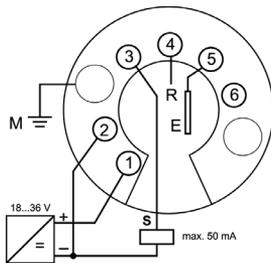
## 2.1 Connection plan



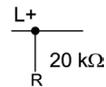
M12



3: blue  
4: black

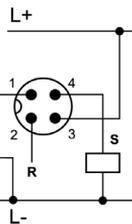
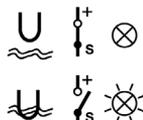
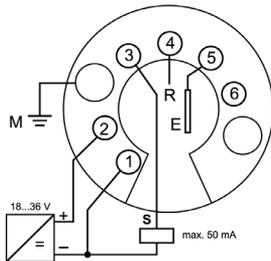


1: brown  
3: blue  
4: black

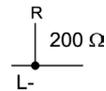


M12

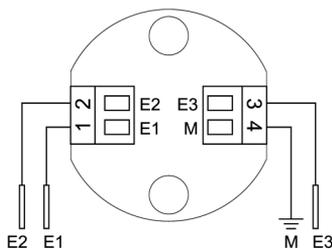
R — 2 kΩ



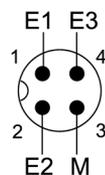
1: brown  
3: blue  
4: black



2 x E, 3 x E



M12



1: brown  
2: white  
3: blue  
4: black

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## 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 (for more than one level rod)

- 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

<b>Fault</b>	<b>Cause</b>	<b>Action/elimination</b>
No indication of level	Electrode not in product	ok
	Wire break	Measure continuity, connections
	Sensitivity too low	Select higher sensitivity
	Insufficient electrode area	Strip more insulation from electrode
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

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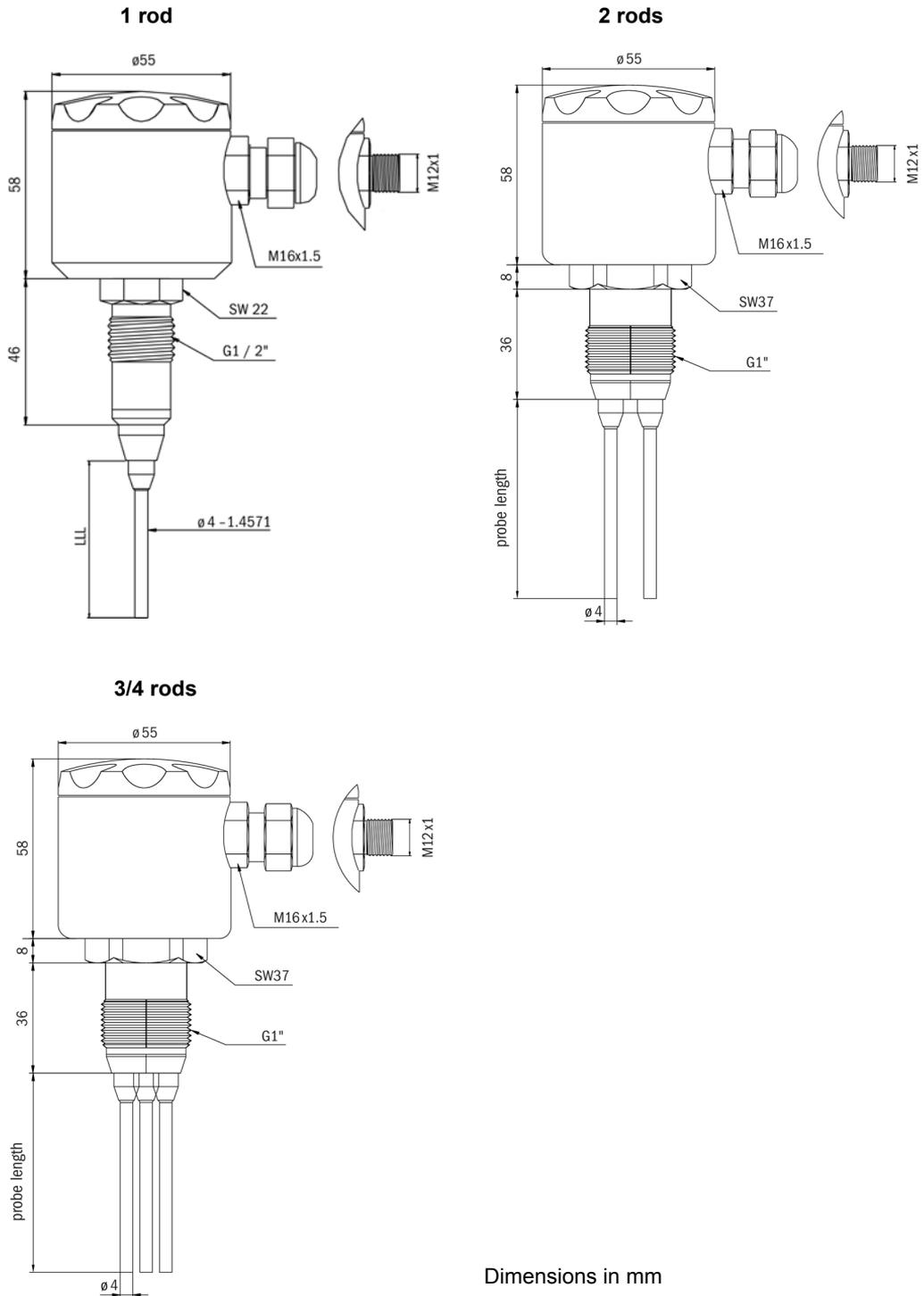
## 4 Technical data

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### 4.1 Technical data table

Number of rods	1 ... 4
Connection head	Stainless steel V2A 1.4305; 55 mm dia.
Electrical connection	Cable gland M16; M12 connector
Process connection	Threaded socket G1/2"h or G1"h; 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
<b>With integrated level converter module</b>	
Indicating elements	1 LED red (level)
Power supply	18...36 V DC; 10 mA max. (no load switched)
Output	min. $U_b - 1$ V, (50 mA max. short-circuit-proof)
Switching function	full / empty polarity of supply power
Response time	Damping 0.5 s
Sensitivity	200 $\Omega$ , 2 k $\Omega$ , 20 k $\Omega$ via control signal
<b>With electrode output for level converter module</b>	
Output	electrode connection, ground connection

## 4.2 Dimensions



## 5 Type code

### 5.1 Ordering code

VGP	1	0	1	LS 7200 with electrode-/ground connection
			2	LS 7201 with contact output
			3	LS 7210 Sensor rod with electrode-/ground connection
			4	LS 7211 Sensor rod with contact output
			5	LS 7220 Sensor rod, PTFE lined, with electrode-/ground connection
			6	LS 7221 Sensor rod, PTFE lined, with contact output
			7	LS 7230 (additional rod - stainless steel)
			8	LS 7231 (multiple rod - stainless steel)
			A	LS 7240 (additional rod - stainless steel/PTFE)
			B	LS 7241 (multiple rod - stainless steel/PTFE)
<b>Sensor Length</b>				
			0	Stump electrode
			1	200 mm (LS 7210, 7211, 7230, 7231)
			2	500 mm (LS 7210, 7211, 7230, 7231)
			3	850 mm (LS 7210, 7211, 7230, 7231)
			4	1000 mm (LS 7210, 7211, 7230, 7231)
			5	200 mm (LS 7220, 7221, 7240, 7241)
			6	500 mm (LS 7220, 7221, 7240, 7241)
			7	850 mm (LS 7220, 7221, 7240, 7241)
			8	1000 mm (LS 7220, 7221, 7240, 7241)
<b>Sensor Length (2nd rod)</b>				
			0	without additional rod
			1	200 mm (LS 7230, 7231)
			2	500 mm (LS 7230, 7231)
			3	850 mm (LS 7230, 7231)
			4	1000 mm (LS 7230, 7231)
			5	200 mm (LS 7240, 7241)
			6	500 mm (LS 7240, 7241)
			7	850 mm (LS 7240, 7241)
			8	1000 mm (LS 7240, 7241)
<b>Sensor Length (3rd rod)</b>				
			0	without additional rod
			1	200 mm (LS 7230, 7231)
			2	500 mm (LS 7230, 7231)
			3	850 mm (LS 7230, 7231)
			4	1000 mm (LS 7230, 7231)
			5	200 mm (LS 7240, 7241)
			6	500 mm (LS 7240, 7241)
			7	850 mm (LS 7240, 7241)
			8	1000 mm (LS 7240, 7241)
<b>Sensor Length (4th rod)</b>				
			0	without additional rod
			1	200 mm (LS 7230, 7231)
			2	500 mm (LS 7230, 7231)
			3	850 mm (LS 7230, 7231)
			4	1000 mm (LS 7230, 7231)
			5	200 mm (LS 7240, 7241)
			6	500 mm (LS 7240, 7241)
			7	850 mm (LS 7240, 7241)
			8	1000 mm (LS 7240, 7241)
<b>Electrical Connection</b>				
			1	Srewed cable gland M 16
			2	Plug M 12
<b>Accessories</b>				
			0	without
<b>Certificates</b>				
			0	without
<b>Order designation</b>				
VGP1	0			

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## 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.

<b>Designation</b>	<b>Type</b>
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

<b>Designation</b>	<b>Type</b>
Weld-in sleeve, HWN 200	V GP7 010000
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, LEM 202	V GP0 100090
External level converter module,4-channel, LEM 204	V GP0 100080
External level converter module, 230 V, LEM 100	V GP0 100070
Weld-in sleeve HWN 500	V GP7 000100

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## **6 Product description**

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### **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
- Precise, constant operating point
- Rejection of foam and deposits (coated electrode)
- Insensitive to vibration
- Materials in conformity with food standards
- Maintenance-free
- Direct connection to an SPC or PLC (with integrated electronics)
- Hygienic adapter sleeves for other process connections

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## Notes

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

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

Due to statutory regulations concerning protection of the environment 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 it is accompanied by a certificate in line with the following model 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 neutralizing, 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 then flushed out or neutralized are obtainable from KROHNE on request.)
- to enclose a certificate with the instrument confirming that the instrument is safe to handle and stating the liquid used.

KROHNE regret that they cannot service your instrument unless it is accompanied by such a certificate.

<b>SPECIMEN certificate</b>
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Company: ..... Address: .....

Department: ..... Name: .....

Tel. No.: .....

The enclosed instrument

Type: .....

KROHNE Order No. or Series No .....

has been operated with the following liquid: .....

Because this liquid is  
water-endangering \* / toxic \* / caustic \* / flammable \*  
we have

- checked that all cavities in the instrument are free from such substances \*
- flushed out and neutralized all cavities in the flowmeter \*

(\* delete if not applicable)

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

Date: ..... Signature: .....

Company stamp: