



## LS 6600 Technical Datasheet

Switch for level detection and dry-run protection

- Optimised sensor geometry, easy to clean
- Measures products with dielectric constant  $> 1.5$
- Small and compact



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## 1.1 Switch for level detection and dry-run protection

The LS 6600 is a level switch for level detection and dry-run protection for liquids and solids. Through its small and optimal sensor shape, the device is easy to clean and the risk of clogging of sticky products is minimised.

The device measures liquids such as water and beer and even viscous and sticky products such as honey or toothpaste. Solids (sugar or flour) can be also measured. The measurement is precise and not affected by the mounting position. Coating of the sensor or condensate are not detected.

The LS 6600 is resistant against CIP and SIP agents. Hygienic installation is possible with the comprehensive range of accessories. Please refer to the specific data sheet "Accessories".



- ① Standard version
- ② Hygienic version
- ③ LED for switching point indication

### Highlights

- Process temperature -40 ...+115°C / -40...+239°F
- Insensitive to build up or foam
- Measures alternating media
- LED switching point indication
- Hygienic switch completely in Stainless Steel
- Excellent for media separation
- No blockage of the pipeline

### Industries

- Food & Beverage
- Pharmaceuticals
- Cosmetics

### Typical applications

- Level detection of mustard
- Dry-run protection of cream
- Level detection of ketchup

## 1.2 Options and variants

### LED indication



The information that the switching point is triggered, is been indicated by a blue light.

### Pipe assembly



The construction with the reverse G½ connection can be mounted in a pipe.

Electrical connection is made via a 5 m / 16.4 ft long cable.

### Configuration tool

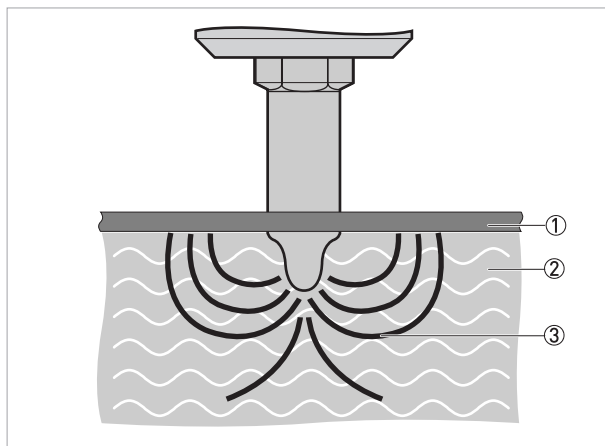


The configuration tool connects the LS 6600 with a computer. With a corresponding software, it is possible to fine tune the switching point, change the hysteresis or adjust damping.

### 1.3 Measuring principle

A high frequency signal sweep is radiated from the sensor tip into the tank / pipe. The medium will act as a virtual capacitor, which together with a coil in the sensor head, will form a circuit creating the switching point signal. This virtual capacity will depend of the dielectric value of the medium and it is well defined for most media.

The measurement is precise and unaffected by the mounting position.



- ① Tank wall / pipe wall
- ② Medium
- ③ Line of electric flux

## 2.1 Technical data

- The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local representative.
- Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Download Center).

### Measuring system

Measuring principle	Electromagnetic wave, 100..180 MHz
Application range	Level detection, dry-run protection and media separation of liquids and solids.

### Design

Construction	The measurement system consists of a measuring sensor and the electronic unit which is available in a compact version. The switching point is signalled by a blue LED indication at the neck of the M12 connector.
Options	Teach-In function for applications where the medium is hard to detect.
Accessories	Comprehensive range of adapters and process connections for hygienic installation. Please refer to the specific data sheet "Accessories".

### Measuring accuracy

Resolution	±1 mm / ±0.04"
Hysteresis	±1 mm / ±0.04"
<b>Reference conditions acc. to EN 60770</b>	
Temperature	+20°C ±5°C / +70°F ±10°F
Pressure	1013 mbar abs. ±20 mbar / 14.69 psig ±0.29 psig
Relative air humidity	60% ±15%

### Operating conditions

<b>Temperature</b>	
Ambient temperature (T <sub>amb</sub> )	-40...+85°C / -40...+185°F
Process temperature	-40...+115°C / -40...+239°F (refer to separate diagram) 130°C / 266°F < 1 hour, T <sub>amb</sub> < 40°C / 104°F
<b>Pressure</b>	
Ambient pressure	Atmosphere
Process pressure	Max. 100 bar / 1450 psi
<b>Other conditions</b>	
Ingress protection (acc. to EN 60529)	IP67 equivalent to NEMA 4X

### Installation conditions

Installation	In any position. For detailed information refer to chapter "Installation".
Dimensions and weights	For detailed information refer to chapter "Dimensions and weights".

## Materials

Sensor housing	Stainless Steel 1.4404 / 316L
Process connection	
Sensor insulation	Virgin PEEK, FDA conform
Electrical connection	Plug M12

## Process connections

Standard	Hygienic G $\frac{1}{2}$ ; standard G $\frac{1}{2}$ ; G1 and reverse G $\frac{1}{2}$
Other	For other hygienic process connections, e. g. Tri-clamp, 11851, Varivent see data sheet "Accessories".

## Electrical connections

Power supply	Non-Ex / Ex nA / Ex ta: 12...30 VDC, 35 mA max.
	Ex ia: 24...30 VDC
Power consumption	1.1 W
Power-up time	< 2 s
Reaction time	Max. 0.2 s
Damping	0...10 s
Cable entry	M12 (4 pole Lumberg)

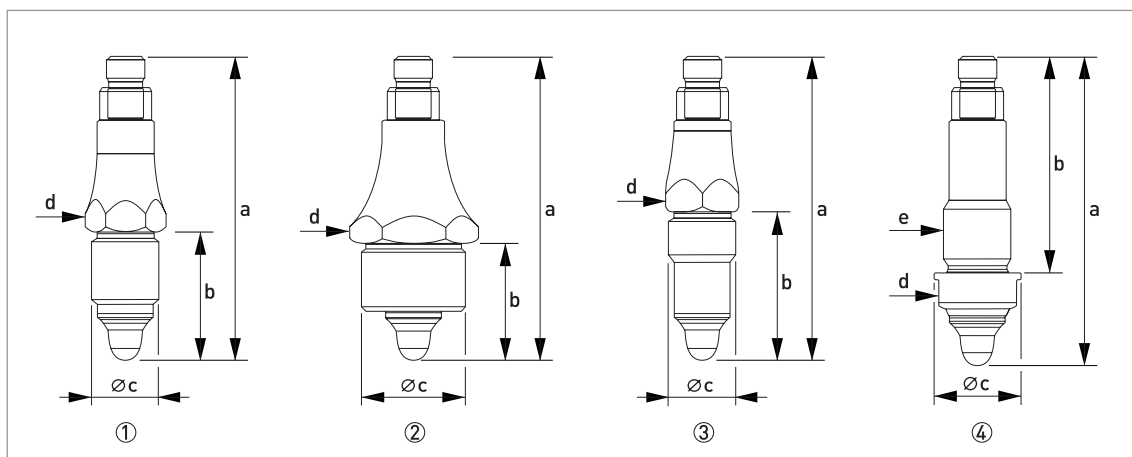
## Output

Output (active)	Max. 20 mA, short-circuit and high-temperature protected
Output type	PNP or NPN
Output polarity	See drawing in chapter "Electrical connection".
Active "Low"	NPN; $(-VDC + 1.5 V) \pm 0.5 V$ ; $R_{load} = 10 k\Omega$
Active "High"	PNP; $(VDC - 1.5 V) \pm 0.5 V$ ; $R_{load} = 10 k\Omega$
Factory settings	Measure: $\epsilon_r > 2$ ; damping: 0.1 s
Off leak current	$\pm 100 \mu A$ max.

## Approvals and certifications

CE	This device fulfils the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE marking.
ATEX	Ex ia IIC T5, ATEX II 1G (in preparation)
	Ex nA II T5, ATEX II 3G (in preparation)
	Ex ta IIIC T100 Da, ATEX II 1D (in preparation)
<b>Other standards and approvals</b>	
Electromagnetic compatibility (EMC)	EN 61326
Vibration resistance	IEC 60068-2-6, GL test 2
Hygiene	3A for hygienic G $\frac{1}{2}$ , FDA conform materials

## 2.2 Dimensions and weights



- ① Standard G½ version  
 ② G1 version  
 ③ Hygienic G½ version  
 ④ Reverse G½ version

	Dimensions		Approx. weight without adapter	
	[mm]	[inch]	[kg]	[lb]
Standard G½ version				
a	97	3.82	0.1	0.22
b	41	1.61		
c	G½ ISO 228/1			
d	WS 22	WS 0.87		
G1 version				
a	97	3.82	0.15	0.33
b	38	1.50		
c	G1 ISO 228/1			
d	WS 36	WS 1.41		
Hygienic G½ version				
a	97	3.82	0.1	0.22
b	48	1.89		
c	G½ ISO 228/1			
d	WS 22	WS 0.87		
Reverse G½ version				
a	97	3.82	0.1	0.22
b	68	2.68		
c	Ø27	Ø1.06		
d	WS 24	WS 0.94		
e	G½ A ISO 228/1			



## 2.3 Temperature limits

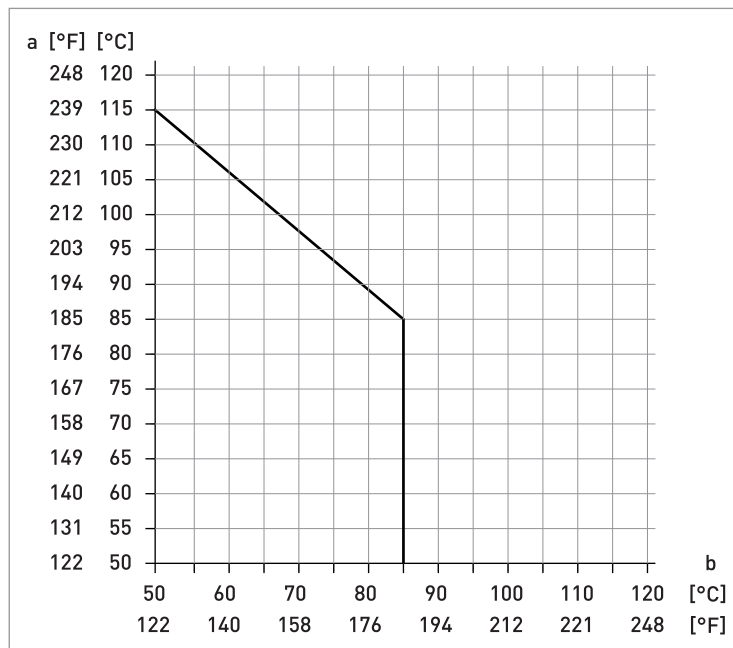


Figure 2-1: Media temperature versus ambient temperature

a: media temperature in [°C] or [°F]

b: ambient temperature in [°C] or [°F]

CIP: 130°C / 266°F < 1 hour ( $T_{amb} < 40^{\circ}\text{C} / 104^{\circ}\text{F}$ )

### 3.1 Intended use

The LS 6600 is a level switch for level detection and dry-run protection for liquids and solids. The device measures liquids such as water and beer and well as viscous and sticky products such as honey or toothpaste. Even dry medias can be measured such as sugar or flour.

The measurement is precise and not affected by the mounting position.

Coating of the sensor or condensate are not detected.

*For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.*

### 3.2 Notes on installation

*Inspect the cartons carefully for damage or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.*

*Check the packing list to check if you received completely all that you ordered.*

*Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.*

### 3.3 Installation requirements

- For the hygienic version, use only the recommended sleeves or adapters. If other systems are used, no guarantee can be given for proper functionality or leak-tightness.
- The connection thread must have direct electrical contact with the threaded sleeve and the metal tank or pipe.
- At the hygienic connection G½ do not use Teflon or paper gaskets between switch and hygienic adapter. The PEEK sensor together with the Stainless Steel adapter will perform a hygienic tightening. Assumed that the requirements have been followed.
- The tightening torque for the sleeve should be 25...30 Nm.

### 3.4 Process connection

The hygienic ½" process sleeve is easy to weld into tanks or pipes. This kind of assembly allows installation in conformity with standards of hygiene (to EHEDG, FDA). The G½ 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".

The sensor can be installed in any desired position.

## 4.1 Safety instructions

*All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!*

*Observe the national regulations for electrical installations!*

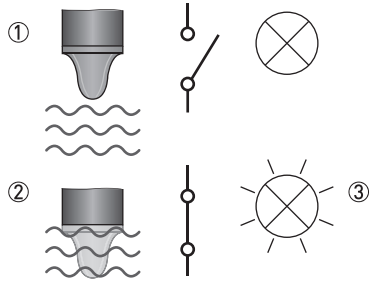
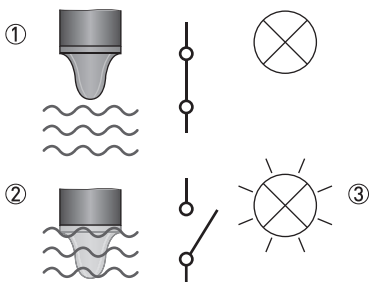
*For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.*

*Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.*

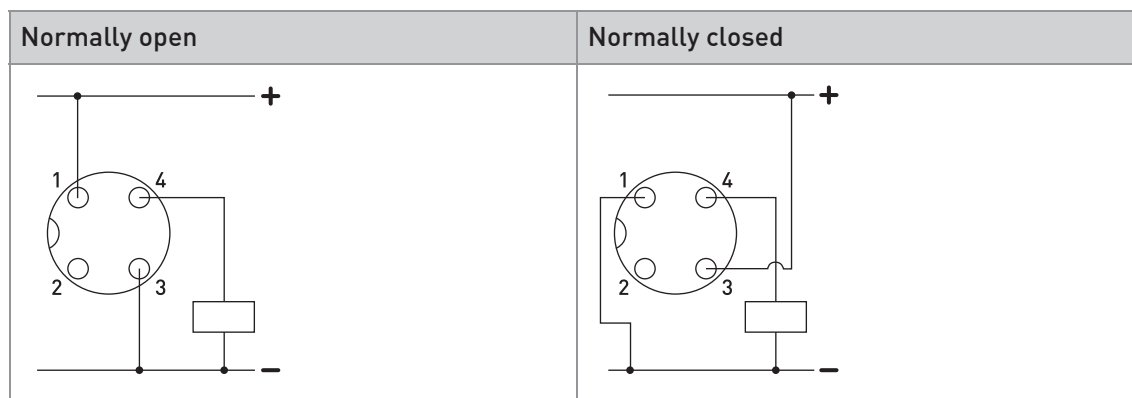
*Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.*

## 4.2 Electrical connection diagrams

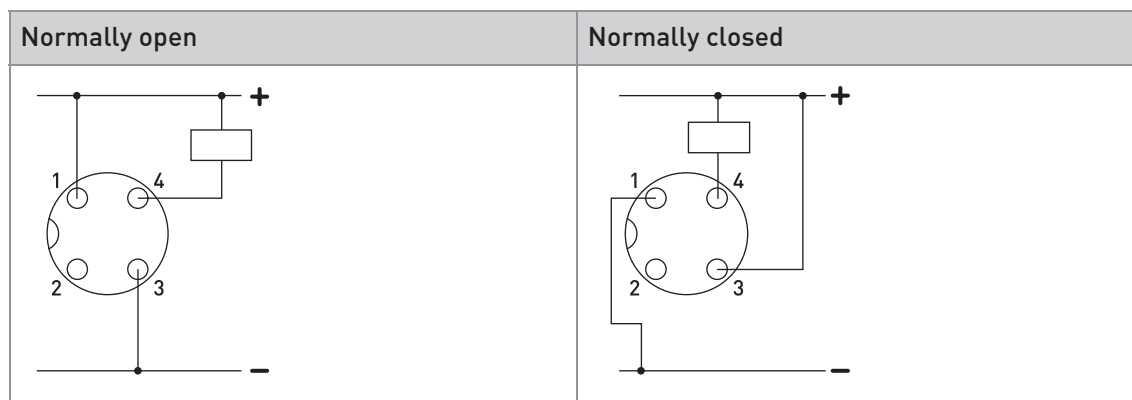
Description of normally open (NO) and normally closed (NC)

Normally open	Normally closed
 <p>① 0 mA ② 20 mA ③ LED</p>	 <p>① 20 mA ② 0 mA ③ LED</p>

## PNP



## NPN



## M12 plug

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

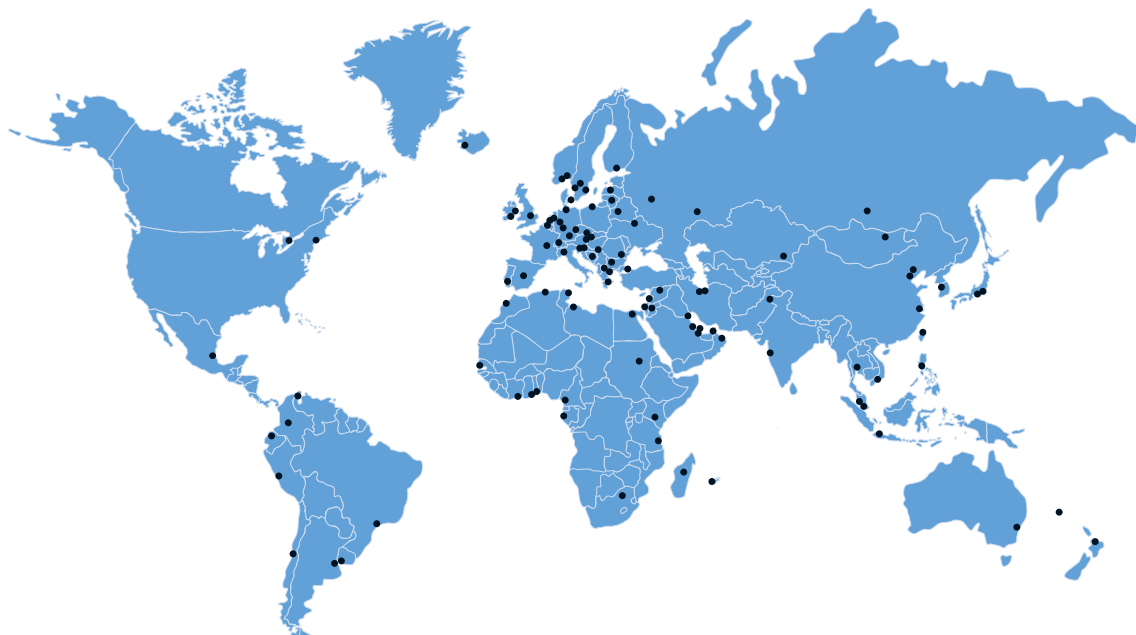
## 5.1 Order code

The characters of the order code highlighted in light grey describe the standard.

VGPA	1	LS 6600									
	<b>Process connection</b>										
	1	G½ hygienic, 18 mm / 0.7"									
	2	G1, 18 mm / 0.7" (standard, not hygienic)									
	3	G½, 18 mm / 0.7" (standard, not hygienic)									
	4	G½ for pipe mounting									
	<b>Electrical connection</b>										
	1	M12 plug									
	<b>Approvals</b>										
	0	Without									
	1	Certified acc. to 3A, G½ in combination with hygienic adapter VGP 7 (in preparation)									
	2	Ex nA II T5, ATEX II 3G (in preparation)									
	3	Ex ia IIC T5, ATEX II 1G (in preparation)									
	4	Ex ta IIIC T100 Da, ATEX II 1D (in preparation)									
	<b>Surface roughness</b>										
	0	Standard									
	1	Surface roughness Ra < 0.5 µm									
	<b>Material certification</b>										
	0	Without									
	1	Confirmation on wetted, pressure exposed material APZ 3.1. - EN 10204									
	<b>Surface inspection</b>										
	0	Without									
	1	Surface roughness inspection									
<b>Reserve</b>											
0	Without										
VGPA	4	1									Order code







### KROHNE product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature meters
- Pressure meters
- Analysis products
- Measuring systems for the oil and gas industry
- Measuring systems for sea-going tankers

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