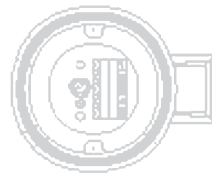


## Capacitance level switches LS 210 LS 220

**Compact switches for liquids,  
solids, slurry, foam and interface;  
outstanding performance for a low price**



- Easy to install, no moving parts, no maintenance
- Extremely resistant to aggressive products and heavy vibration
- Various outputs: relay contact, transistor output or 2-wire current loop

Variable area flowmeters

Vortex flowmeters

Flow controllers

Electromagnetic flowmeters

Ultrasonic flowmeters

Mass flowmeters

**Level measuring instruments**

Communications engineering

Engineering systems & solutions



## Capacitance level switches

### LS 210

### LS 220

**Reliable and low-cost devices for all standard applications and for bulk materials in particular**

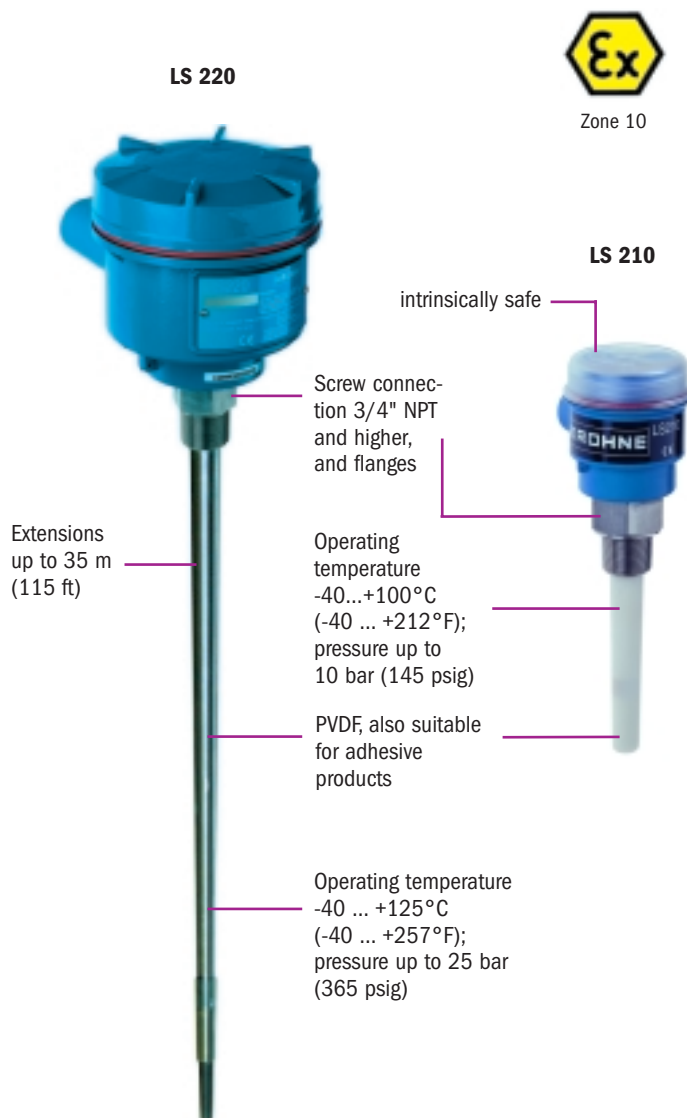
- Offers substantially more performance than mechanical devices, such as paddle switches and conventional capacitance switches
- No reference electrode necessary
- Vessel wall, varying product properties, vapour and foam have no effect on measuring accuracy
- Ideal for use on small storage tanks, pipelines and tank trucks

#### Operating principle

The measuring system consists of a probe mounted on the top or side of a vessel or pipe. The probe consists of an oscillator with a maximum measuring frequency of approx. 5.5 MHz. The frequency drops as soon as the probe comes into contact with the product. The device operates when the frequency drops below the threshold value. Since only the tip of the probe is active, the capacitance level switch has a very accurate and repeatable switching point. The level of sensitivity can be set at the probe.

The device is independent of the vessel wall: it does not require any external reference electrode to measure the level in non-conducting vessels (e.g. plastic tank or concrete silo). Varying product quality, vapour and/or dust have practically no effect on device reliability.

The alarm is programmable: either open-circuit or closed-circuit working is signalled. LEDs are provided to check whether the setting and installation have been correctly carried out. An LED is activated when the sensor switches, a second provides the output status, and a third indicates that the supply voltage is applied.



**Device versions**

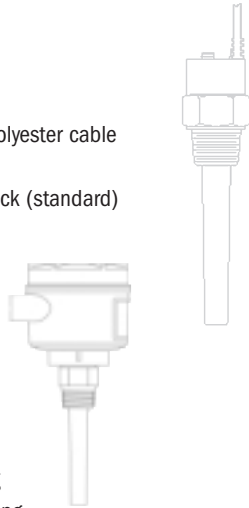
Our range of capacitance level switches:

**LS 210 - Cable version**

- Housing of stainless steel
- Power supply via 4-core shielded polyester cable
- Depending on the device version, the 1-metre long cable is either black (standard) or blue (intrinsically safe)
- Probe length: 100 mm (3.9")

**LS 220**

- Housing of epoxy coated stainless steel
- 2 x 1/2" NPT cable entry
- Various outputs
- Rod probe up to 5.5 m (18 ft) long
- Cable probe up to 35 m (115 ft) long



**LS 210 - housing version**

- Housing of impact-resistant ABS
- 1/2" NPT cable entry
- Integrated terminal strip with 5 terminals
- Probe length 100 mm (3.9")

**Option: probe protection**

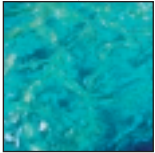
for probe protection in arduous conditions:

- heavy mechanical loading
- in chemically aggressive products
- when only non-metallic materials of construction are allowed
- very short immersion depths
- when speedy insertion and removal of the level switch is necessary

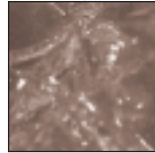


**Range of application**

Level measurement of:




**Liquids:**  
Water, oil, liquefied gases, chemicals, milk, acids, alkalis, foam, etc.

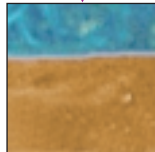


**Slurries:**  
Size, paper pulp, glucose, drilling mud, etc.

**Particulate material:**  
Granulates, flour, maize, cereals, sugar, milk powder, coal, sand, plastic granules, cement, etc.



**Interfaces:**  
Gas, vapour/liquid oil, water/oil, liquid/foam.

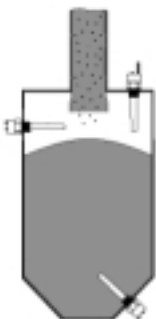


**Installation**

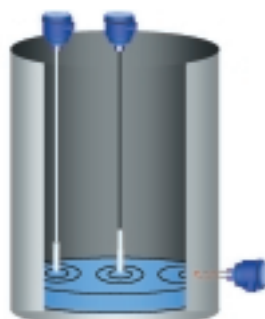
- No special tools required.
- For many applications, no need for a process shutdown to install and start up.

Simply screw into place:  
fit on the top or side of the vessel.

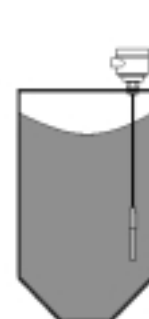
Versions with extensions are always mounted on the top of the vessel: position the probe so that it makes contact with the product at the required level (min. or max. alarm).



**LS 210:**  
Min. and max. measurement of particulates



**LS 220:**  
Min. measurement of a liquid



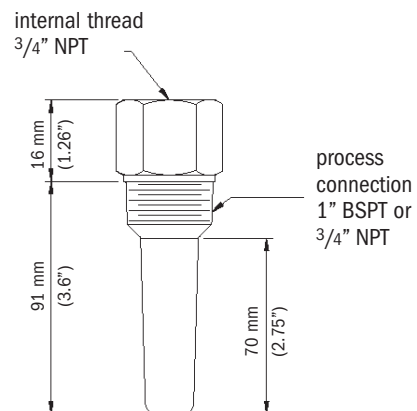
**LS 220:**  
Min. measurement of particulates

**Technical data**

	LS 210	LS 220
<b>Function</b>	Measurement of liquids, particulates, slurries, foam and interfaces	
<b>Probe length</b>		
Standard	100 mm (3.9")	100 mm (3.9")
Option	-	Rod: ≤ 5 500 mm (18 ft) Cable: ≤ 35 000 mm (115 ft) (max. 180 kg (40 lb) tensile strength)
<b>Process conditions</b>		
Pressure	≤ 10 bar (145 psig)	Rod: ≤ 25 bar (363 psig) Cable: ≤ 10 bar (145 psig)
Temperature		
Ambient temperature	-40 ... +85°C (-40...+185°F)	-40 ... +85°C (-40...+185°F)
Process temperature	-40 ... +100°C (-40...+212°F)	-40 ... +125°C (-40...+257°F)
Storage temperature	-40 ... +85°C (-40...+185°F)	-40 ... +85°C (-40...+185°F)
Permittivity $\epsilon_r$	≤ 1.5	≤ 1.5
<b>Material</b>		
Probe	PVDF (Kynar®)	PVDF (Kynar®)
Probe extension	-	Cable: PVDF coating (Kynar®) Rod: AISI 316L
Process connection	AISI 316 L	AISI 316 L
Housing	Cable version: AISI 316L Housing version: ABS	epoxy coated aluminium
<b>Process connection</b>		
Standard	3/4" NPT	≥ 3/4" NPT
Option	1" BSPT	Tri-Clamp 1", 1 1/2", 2"; ≥ 3/4" BSPT
Flanges	see "Ordering code"	see "Ordering code"
<b>Protection category</b>	IP 65	IP 65
<b>Operation</b>		
Operating modes	High/Low	High/Low
Repeatability of switching point	2 mm (0.08")	2 mm (0.08")
<b>Local indication</b>	3 LEDs (sensor status, output status and voltage)	3 LEDs (sensor status, output status and voltage)
<b>Potentiometers</b>	1 potentiometer for sensitivity setting	2 potentiometers for On/Off delay and sensitivity setting

**Technical data - probe protection**

<b>Pressure</b>	0 - 25 bar (0 - 363 psig)
<b>Process temperature</b>	-40...+125°C (-40...+257°F)
<b>Material</b>	Polyphenylene sulphide (PPS), glass-fibre reinforced
<b>Process connection</b>	
External	3/4" NPT and 1" BSPT
Internal (internal thread)	3/4" NPT
<b>Length of engagement</b>	70 mm (2.76")
<b>Flexural strength</b>	1400 N
<b>Weight</b>	60 g (0,16 lb)

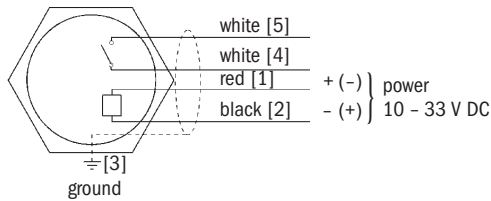


**Electrical connection**

**LS 210**

**Solid-state switch** (galvanically isolated)

Protection	against polarity reversal (no wiring errors)
Max. load impedance	2 VA (intrinsically safe: 1.3 VA)
Max. switching voltage	28 V AC/40V DC; intrinsically safe: 18V AC/26V DC
Max. on-load current	100 mA
Loss of voltage	≥ 1 V
Time delay	1 s

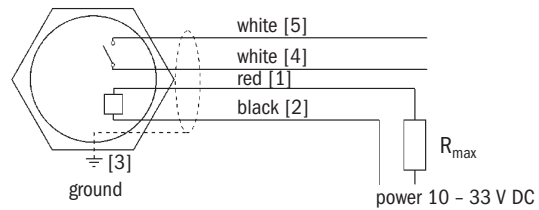


Depending on the polarity of the supply voltage, the switch operates as a normally closed (NC) or normally open (NO) contact.

**Level detection by way of the 2-wire current loop**

Measuring current 4/20 or 20/4 mA from the current loop; inverted mA signal due to polarity reversal of the interference voltage

Max. load impedance  $R_{max} = U_{power}$

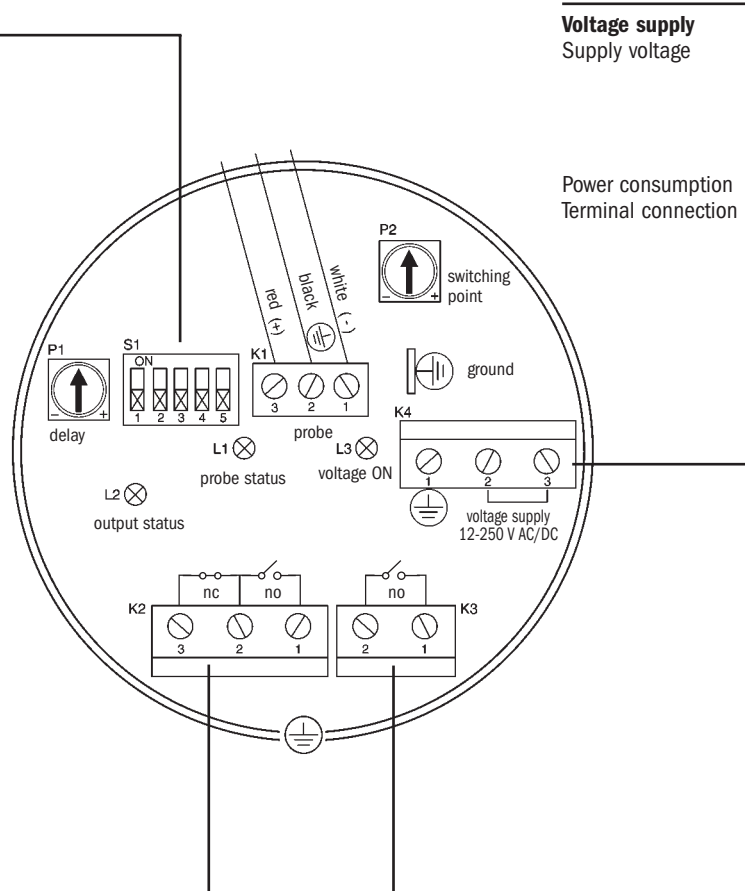


The colours correspond to the cable colours in the cable version. The figures in brackets correspond to the figures on the terminal strip used for the housing version.

**LS 220**

**Setting switches**

- 5 DIP switches for:
  - 1 switching delay "alarm off"
  - 2 switching delay "alarm on"
  - 3 failsafe function
  - 4 to test time delay
  - 5 to set sensitivity level



**Voltage supply**

Supply voltage	12 - 250 V AC/DC not polarity sensitive, galvanically isolated (without changing plug-in jumpers)
Power consumption	2 VA / 2 W
Terminal connection	max. 2.5 mm <sup>2</sup> (0.004"²)

nc = normally closed  
no = normally open

**Relay contact** (shown in off-voltage condition)

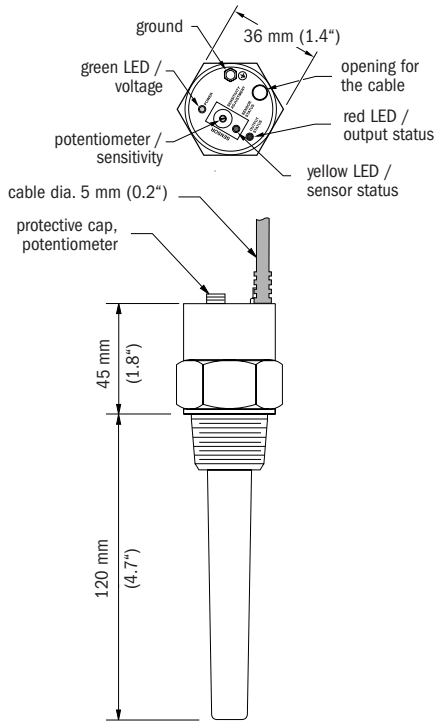
Contact	changeover contact SPDT (NO or NC contact, selectable)
Max. contact rating (DC)	5A / 30V DC
Max. contact rating (AC)	8A / 250V AC (cos φ = 1)
Max. switching capacity	2000 VA / 150 W
Min. contact rating (DC)	10 mA / 5V DC
Time delay	1 - 60 s

**Solid-state switch** (galvanically isolated)

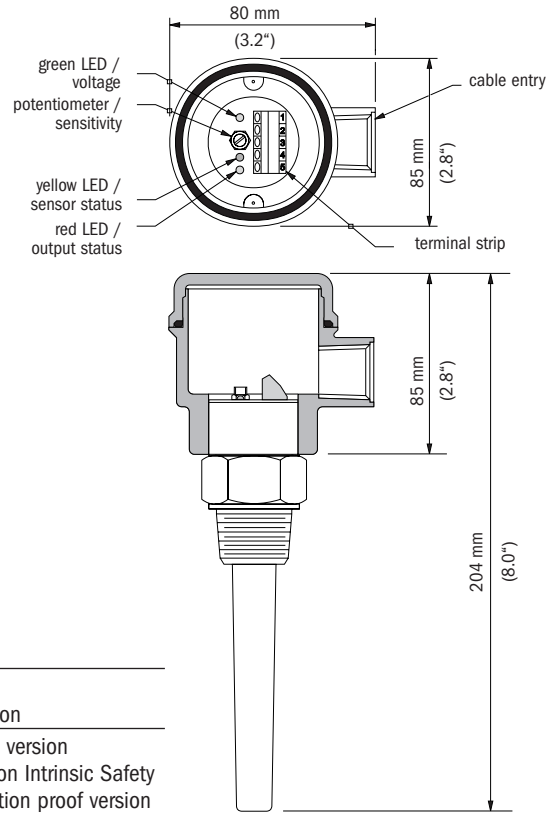
Protection	against polarity reversal (no wiring errors)
Max. switching capacity	2 VA / 2W
Maxy. switching voltage	250 V AC, 300 V DC
Max. load current	100 mA
Voltage loss	≤ 1 V
Time delay	1 - 60 s

**Dimensions and weights**

**LS 210 - cable version**  
330 g (0.73 lb)



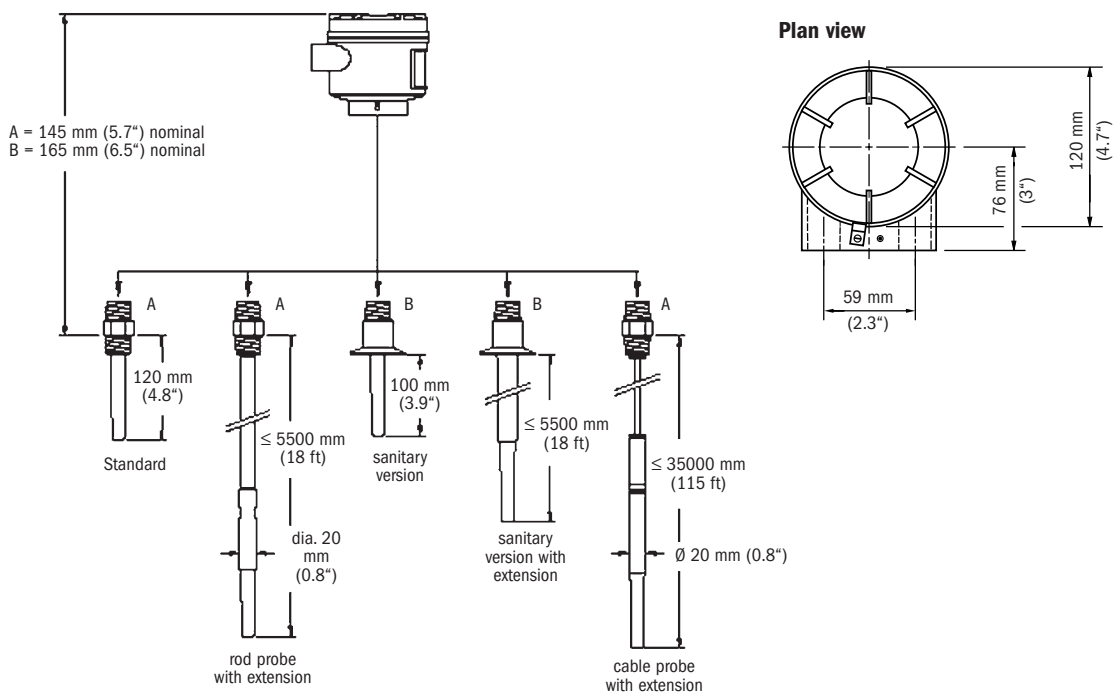
**LS 210 - housing version**  
320 g (0.71 lb)



**Nameplate**

Colour	Description
black	standard version
blue	'Ex' version Intrinsic Safety
green	dust ignition proof version

**LS 220**



**Approvals**

Application	Device version	Approval number
<b>Dust ignition proof</b> (Kema) - Zone 10/Z (FM/CSA) Class II + III, DIV I, Gr. E, F, G	<b>LS 210</b>	EX-00.Y.1003.X
<b>Intrinsically safe</b> (CENELEC) EEx ia IIC T6-T4 (FM/CSA) Class I, DIV I, Gr. A, B, C, D	<b>LS 210</b>	EX-00.E.1002
<b>Dust ignition proof</b> (Germany) - Zone 10; (CSA/FM) Class II, DIV I, Gr. E, F, G und Class III	<b>LS 220</b>	EX-97.Y.1221-2 X
<b>Flameproof</b> (CENELEC) EExd[ia], IIC T6-T4; (FM) Class I, DIV I, Gr. A, B, C, D	<b>LS 220</b>	EX-97.Y.1201-2 X

**Ordering code**

<b>VF 05</b>	<b>LS 210/ LS 220 Capacitance level switches</b>					
	<b>Device version</b>					
	<b>1 LS 210 - cable version</b>		<b>3 LS 210 - housing version</b>			
	<b>2 LS 220</b>					
	<b>Connection</b>					
	1 3/4" NPT	B 1 1/2" flange	N DN 80 flange			
	2 1" NPT (LS 220 only)	C 2" flange	P DN 100 flange			
	3 1 1/2" NPT (LS 220 only)	D 3" flange	R 1" Tri-Clamp (LS 220 only)			
	4 3/4" BSPT (LS 220 only)	E 4" flange	S 1 1/2" Tri-Clamp (LS 220 only)			
	5 1" BSPT	K DN25 flange	T 2" Tri-Clamp (LS 220 only)			
	6 1 1/2" BSPT (LS 220 only)	L DN40 flange				
	A 1" flange	M DN50 flange				
	<b>Flange pressure rating</b>					
	A 150 lb					
	B 300 lb					
	C 600 lb					
	K PN16					
	L PN25					
	M PN40					
	<b>Approval</b>					
	0 none (threaded connection)					
	1 Zone 10 (LS 210)					
	2 EEx ia IIC T6-T4 (LS 210)					
	A EEx d [ia] IIC (LS 220)					
	B Class I, DIV I (LS 220)					
	C Zone 10 (LS 220)					
	<b>Probe length</b>					
	0 100 mm (Standard)					
	1 250 mm (rod probe - LS 220 only)					
	2 350 mm (rod probe - LS 220 only)					
	3 500 mm (rod probe - LS 220 only)					
	4 750 mm (rod probe - LS 220 only)					
	5 1000 mm (rod probe - LS 220 only)					
	A 3 m (cable probe - LS 220 only)					
	B 6 m (cable probe - LS 220 only)					
	Y customer specified length, please specify when ordering (LS 220 - cable probe)					
	Z customer specified length, please specify when ordering (LS 220 - rod probe)					
	<b>Accessories</b>					
	0 none					
	1 3/4" NPT probe protection (for 100 mm (3,9") probe length only)					
	2 1" BSPT probe protection (for 100 mm (3,9") probe length only)					
<b>VF 05</b>						

Product Overview  
Vibration  
Capacitance  
Switches  
Buoyancy  
Ultrasonic  
Radar  
Continuous, Non-contact  
Ultrasonic  
Continuous, Non-contact  
Ultrasonic  
TDR  
Buoyancy