

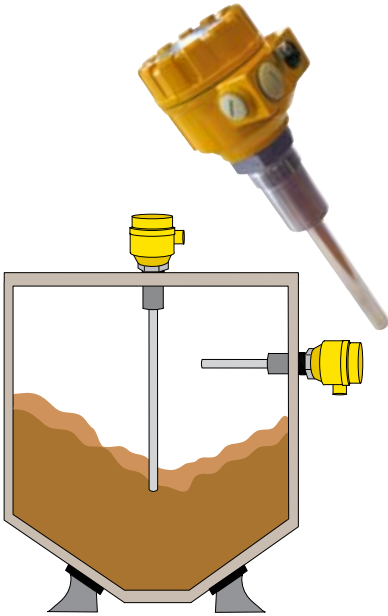
# The dry products level control catalogue



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**EMERSON**<sup>™</sup>  
Process Management

## Series VLS Vibrating rod level switch



The vibrating rod level switch is the perfect solution for single point level switching in free flowing solids across a wide density range, from fine powders to grains.

The single rod design provides the solution to tuning forks which may become blocked or bridged.

The vibration rod is energised and kept in resonance by an electronic circuit.

When covered by material the damping of the vibration will be detected by the electronics which initiate the switching of the output relay after a built-in programmable time delay.

### Application

The VLS is designed to provide high or low level switching in silos or bins containing free-flowing powders and granular materials such as carbon black, sugar, grain, cement, lime and sand with a material bulk density of 50 kg/m<sup>3</sup> or more.

Requiring only a 1½" BSP/NPT socket, either on the top or in the sidewall of the silo, the unit is easy to install and simple to commission.

### Selection

Using the ordering code below as a guide, specify the particular switch and probe style for your application.

### Ordering information

VLS Vibrating Rod Level Switch series	
Code	Model
<b>K</b>	Standard model, 1 x SPDT alarm relay
<b>H</b>	High temperature standard model
Code	Mounting
<b>B</b>	R 1 ½" BSPT mounting
<b>N</b>	1 ½" NPT mounting
Code	Insertion length
<b>1</b>	Standard rod: 235mm insertion length
<b>3</b>	Extended rod: 500 to 3000mm insertion length
<b>4</b>	Cable extended: 1000 to 20000mm insertion length
<b>8</b>	Extended rod with adjustable gland: 500 to 3000mm
Code	Housing
<b>3</b>	Aluminium alloy housing
Code	Voltage
<b>1</b>	85 - 265V ac
<b>2</b>	19 - 55V dc
Code	Approvals
<b>A</b>	ATEX Dust approval - Pending
<b>U</b>	US General Electrical and Dust approval - Pending
<b>Z</b>	No hazardous area approvals
Code	Special
<b>/****</b>	Extension length (rod, cable)

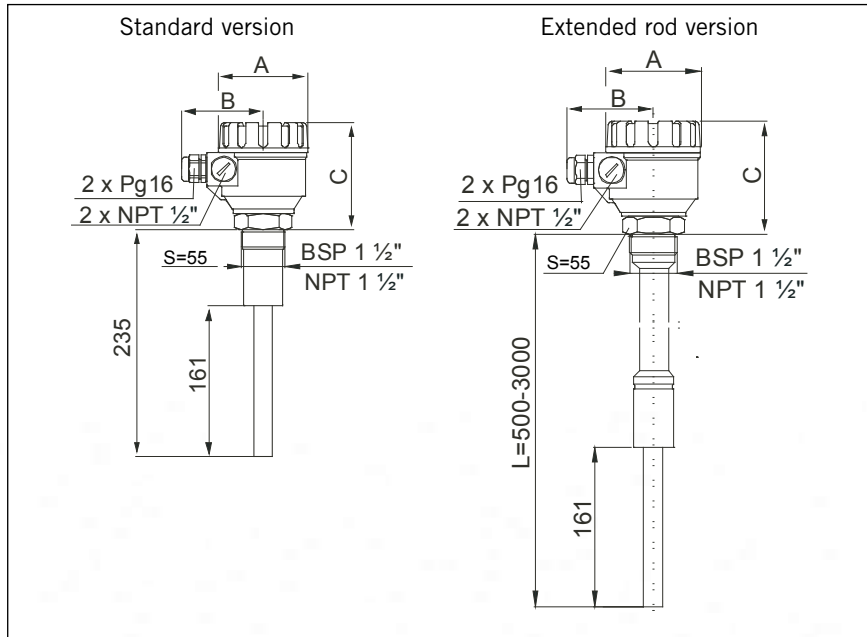
<b>VLS</b>	<b>K</b>	<b>B</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>Z</b>	Typical model number
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### Specification

Power supply	85V ac to 265V ac 50/60Hz 19 - 55V dc	Ambient temp.	-20°C to + 60°C
Output	1 x SPDT control relay, 8A at 250V ac	Operating pressure	10 bar maximum
Conduit connection	2 x ½" NPT (NPT models) or 2 x Pg16 (BSPT models)	Wetside material	Type 316 stainless steel
Response time	Selectable 2 or 5 seconds	Housing material	Aluminium alloy, powder paint coated
Operating temp.	Standard model -20°C to +110°C High temp model -20°C to +160°C	Housing rating	IP67
		Weight	Approx. 2kg
		Approvals (Pending)	ATEX II 1 D

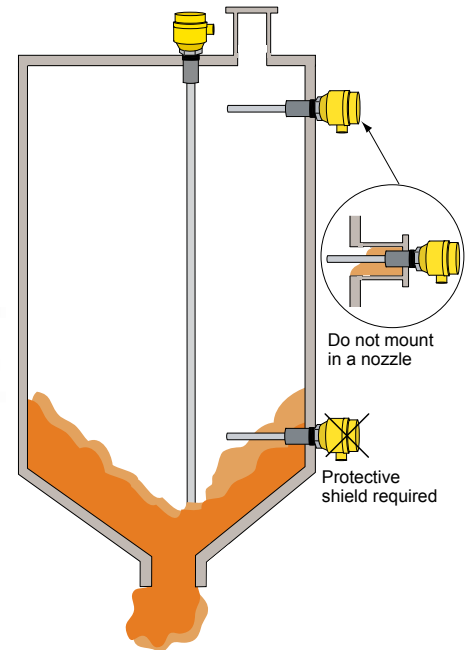
# Options

## Dimensions



## Installation examples

### Granular material



### Sensitivity selection

Bulk materials vary greatly in their characteristics.

The VLS will operate in bulk materials with density over  $50\text{kg/m}^3$  - the user must however set the sensitivity selection switch to either LOW for products with density less than  $100\text{kg/m}^3$  or to HIGH for products with density greater than  $1000\text{kg/m}^3$ .

### Failsafe operation

Each VLS may be set to either failsafe high or failsafe low using a switch in the electronics housing.

### Side mounting

Ideal for use as a failsafe high level switch. When used in a low level application, it is desirable to protect the probe from excessive pressure exerted by the medium and from direct impact when the silo is being filled. A simple shield mounted above the probe is sufficient.

### Top mounting

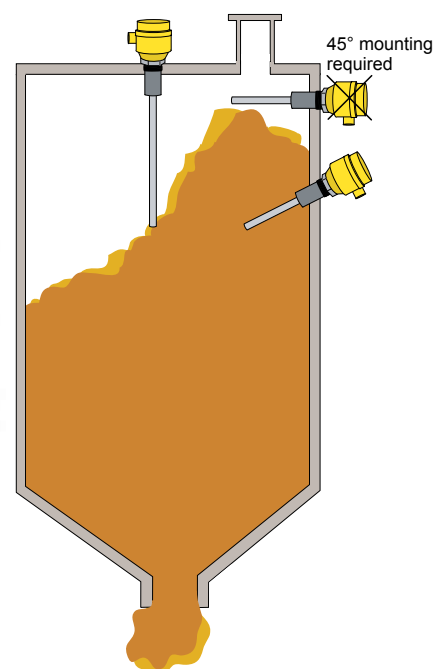
Either in standard length or extended length, mounted vertically in the silo. The cable extended probe which has a length of tough stainless steel cable between probe and mounting point, is ideal for very tall silos.

### Adjustable

A top mounting extended probe fitted with an adjustable gland which allows the user to fix the probe at the desired switching level.

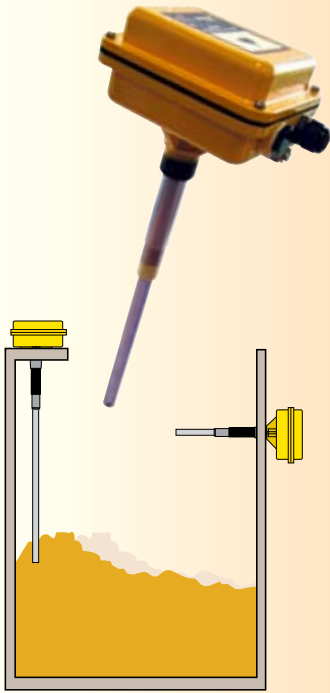
	High level	Low level
Standard	Side mount	Side or bottom mount
Pipe extended	Top mount	Side or bottom mount
Cable extended	Top mount	Top mount

### Powders





## Series CLS RF Capacitance level switch



The CLS level switch is a microprocessor based, self calibrating level control with no moving parts, operating using the RF Capacitance principle.

Used for either high or low level alarm in silos and hoppers of dry products, the CLS detects the presence or absence of products by monitoring the change in capacitance around the probe as it becomes covered or uncovered. CLS will operate reliably in metal, plastic or wooden silos.

A built-in "Power Shield" is used to overcome the effects of product build-up on the probe when used with sticky or viscous products.

A variety of probe styles are available to allow side or top mounting with the facility for users to modify the probe to suit application constraints.

### Application

Series CLS switches can be used with any free flowing granular, pelletised or powdered dry product, and also with difficult dry products which have a tendency to coat or build-up, such as animal feed and foundry sand.

### Selection

Using the ordering code below as a guide, specify the particular switch and probe style required for your application.

### Ordering information

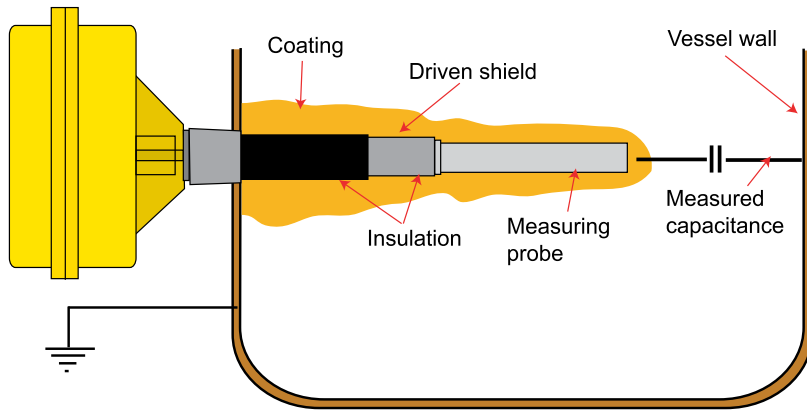
<b>CLS</b>	RF Capacitance Level Switch Series						
	Code	Model					
	<b>K</b>	Standard model, 1 x SPDT alarm relay					
	Code	Mounting					
	<b>B</b>	G 1" BSPP mounting with power shield					
	<b>N</b>	1 1/4" NPT mounting with power shield					
	Code	Insertion length					
	<b>1</b>	200mm Standard rod: 344mm insertion length					
	<b>2</b>	100mm Short rod: 244mm insertion length					
	<b>3</b>	880mm Long rod: 1024mm insertion length					
	<b>4</b>	Wire rope probe: 10000mm insertion length					
	Code	Housing					
	<b>4</b>	Glass filled nylon housing					
	<b>9</b>	Remote electronics in glass filled nylon housing					
	Code	Voltage					
	<b>1</b>	110/230V ac / 24V dc selectable					
	Code	Approvals					
	<b>A</b>	ATEX Dust approval					
	<b>U</b>	US General Electrical and Dust approval - Pending					
	Code	Special					
	<b>/****</b>	Remote electronics cable length if required					
<b>CLS</b>	<b>K</b>	<b>B</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>A</b>	Typical model number

### Specification

Power supply	104V ac to 245V ac 50/60Hz 21.6 to 25.2V dc	Ambient temperature	-10°C to + 50°C
Minimum DK	2	Operating pressure	7 bar maximum
Output	1 x SPDT control relay, 2.5A at 250V ac	Wetside material	Type 304 stainless steel probe
Conduit connection	2 x 3/4" NPT (NPT models) or 2 x M20 (BSPP models)	Housing material	Polypropylene powershield
Response time	Adjustable 1 to 128 seconds	Housing rating	Glass filled nylon, paint coated IP65
Operating temperature	-20°C to +70°C *	Weight	Approx. 2.3kg with standard rod
		Approvals	ATEX II 1 D

\* Operating temperatures up to 100°C are possible with remote electronics, higher on request.

## The Power Shield product build-up compensator



Simple capacitance probes operate by driving the probe to apply an RF signal between the stainless steel probe and the vessel wall. With the probe in free air, which has a dielectric value of 1.0, electronic circuitry measures the standing capacitance around the probe. When the air is displaced by material with a higher dielectric value the capacitance measured increases and an alarm can be triggered.

In free flowing materials of sufficient dielectric value this type of probe is generally acceptable. However, any material build-up on the probe will quickly change the capacitance and be seen as a false level.

The CLS switch solves this problem by the inclusion of a Power Shield. This is a second active section of the probe, termed the driven shield, which is insulated from the measuring probe. See illustration above.

The Power Shield is energised with the same voltage frequency and phase as the measuring probe and therefore no potential can be measured between the power shield and probe. This effectively creates a barrier or shield and prevents the probe from monitoring capacitance to the adjacent sidewall, substantially minimising the effect of build-up in the majority of cases.

## Calibration

Having set the site adjustable High \ Low switch to the desired position for failsafe high of low level duty, the CLS must then be calibrated for the product in the silo. Automatic calibration is simply achieved by pressing one button when the probe is uncovered and then a second when the probe is covered by the product.

Sometimes it is not possible to fill the silo so a manual calibration facility is provided where the user manually enters a value of capacitance equivalent to a covered probe. The manual gives full guidance and a table of typical capacitance values.

## Time delay

The CLS has a user adjustable time delay facility from instant to 128 seconds, which may be set to delay switching from covered to uncovered or vice versa.

## Probe modification on site

It may be that application constraints prevent the use of the standard probe supplied. In such cases, local modification is permissible within limits. As the sensitivity of the CLS is proportional to the surface area of the sensing probe, any modification should maintain the surface area presented to the product in the silo unless the product has high density and dielectric properties.

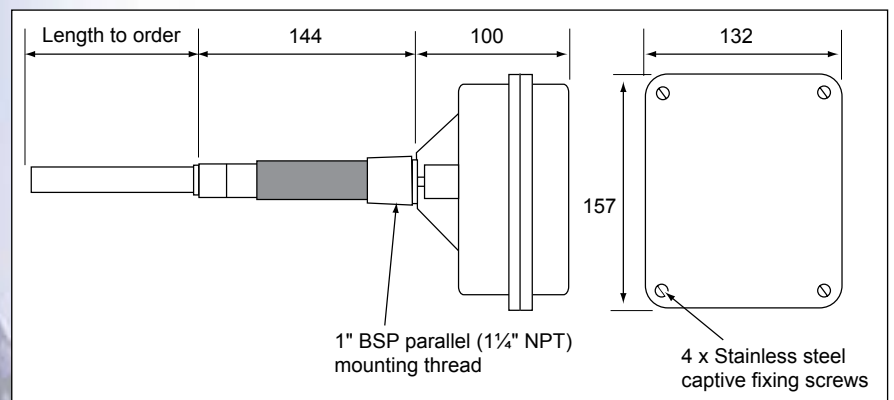
## Remote electronics model

For applications where it is desirable to have access to the calibration function, the electronics can be specified remote from the probe up to a distance of 8m.

Remote mounting of the electronics also allows use of the probe element up to temperatures of 100°C.

Higher temperature versions are possible - consult factory for details.

## Dimensions



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