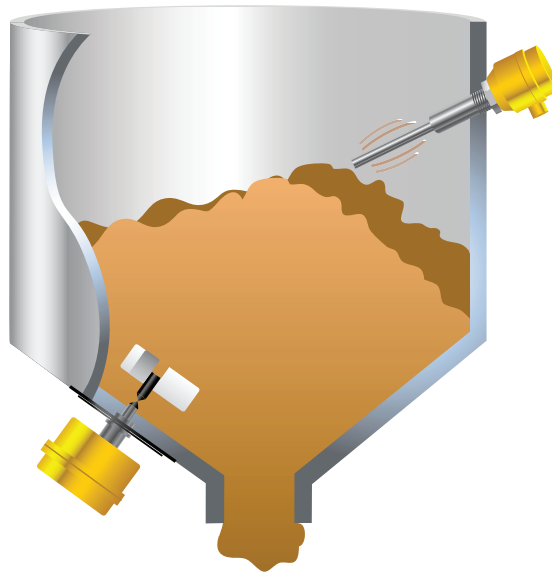


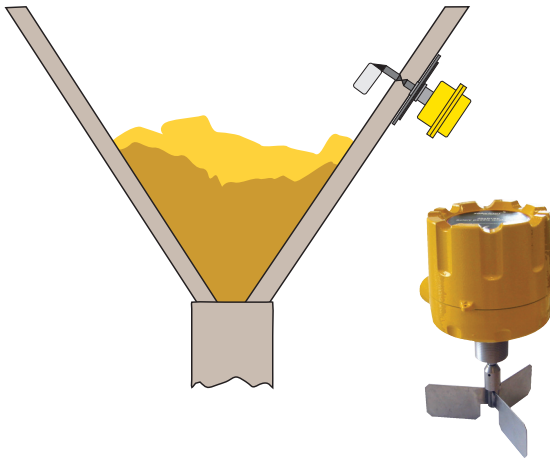
Mobrey™ Dry Products

Level Measurement and Control

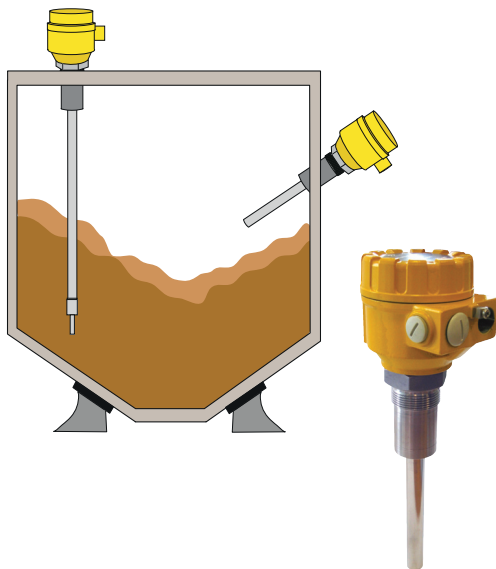


- The Mobrey product range provides reliable point level detection in a variety of dry solid applications
- The Mobrey Series PLS is a paddle rotating level switch that detects high or low levels of most free-flowing bulk solids and powders
- The Mobrey Series VLS vibrating rod level switch has a single probe design that eliminates the clogging and ridging problems associated with forks

Overview of the Dry Products Level Switches



Series PLS paddle level switch



Series VLS vibrating rod level switch

Measurement principle

The measurement and control of dry products is important in all industries, from mining through to fine chemicals. Such is the diversity of product to be measured, that no single instrument is capable of reliable operation in all materials.

Mobrey products offer a range of technologies to ensure that users are able to select the most appropriate instrument for the application. [Table 1 on page 3](#) is a guide to selecting a proven and reliable Mobrey product for your application.

Series PLS paddle level switch

The paddle switch may be used as either a high or low level limit switch. It is easily mounted through a vessel wall. A small electric motor drives a paddle which rotates freely in the absence of material.

When the paddle is impeded by the presence of material, a microswitch actuates an alarm signal. As soon as the paddle is completely stopped from rotating, power to the motor is cut, thus extending motor life. After the material level falls, the motor is returned to its normal position and the paddle begins to rotate again.

Series PLS switches can be used with granular, pelletized, and powdered dry products. They may be used in high level applications with materials over 160 kg/m³ and low or intermediate applications with materials over 80 kg/m³.

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

The vibration rod is energized and kept in resonance by an electronic circuit. When covered by material, the damping of the vibration is detected by the electronics which initiate the switching of the output relay after a built-in programmable time delay.

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Table 1. Product Selection Guide

	Point level switches			
	Paddle PLSK	Paddle PLSH	Vibrating rod VLSK	Vibrating rod VLSH
Duty				
High level alarm	■	■	■	■
Low level alarm	■	■	□	□
Material				
Powder	■	■	■	■
Granular	■	■	■	■
Pellets	■	■	■	■
Aggregate	■	■		
Material density				
Very low ⁽¹⁾	■	■	□	□
Low ⁽²⁾	■	■	■	■
Medium ⁽³⁾	■	■	■	■
High ⁽⁴⁾	■	■	■	■
Very high ⁽⁵⁾	■	■		
Material moisture				
Low	■	■	■	■
High				
Material coating				
Minimal	■	■		
Heavy build-up				
Corrosive				
Low	■	■	■	■
High			■	■
Installation				
Vertical (top)	■	■	■	■
Horizontal (side)	■	■	■	■
Temperature				
Ambient	■		■	■
Low (to -20 °C)	■		■	■
High (to +110 °C)		■	■	
Pressure				
Atmospheric	■	■	■	■
Low 2 bar	■	■	■	■
Medium 10 bar			■	■
Atmosphere				
Dusty	■	■	■	■
Steamy			□	□
Vibration				
Low	■	■	■	■
High	■	■		

Recommended ■ Possible □ Not recommended □




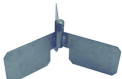




1. Very low density examples (up to 100 kg/m³) include powdered carbon (80), bread crumbs (96), and polythene flakes (95).
2. Low density examples (100 to 250 kg/m³) include soap flakes (160), ground cork (160), charcoal (208), and sawdust (210).
3. Medium density examples (250 to 1000 kg/m³) include bran (256), rolled oats (304), powdered milk (450), flour (596), grain (600 to 800), and granulated sugar (849).
4. High density examples (1000 to 2000 kg/m³) include soot (1024), coal (1100), fine salt (1201), cement (1506) and dry sand (1602).
5. Very high density examples include gravels (2000 to 2500), aggregates (2000 to 2500), earth (2000), and slag (2100).

Mobrey Series PLS Ordering Information

Table 2. Mobrey Series PLS Ordering Information

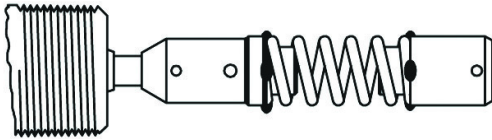
Model	Product description
PLS	Paddle Level Switch series
Model	
K	Standard model, 2 x SPDT alarm relays
H	High temperature standard model, 2 x SPDT alarm relays
P	Failsafe Safepoint model with fault relay and 1 x SPDT alarm relay
T	High temperature failsafe Safepoint model with fault relay and 1 x SPDT alarm relay
Mounting	
B1	R 1½" BSPT mounting (except high temperature)
N1	1¼" NPT mounting (all models)
Housing	
3	Aluminum alloy housing
Voltage	
0	115 Vac motor voltage
1	240 Vac motor voltage
2	24 Vdc motor voltage
Approvals	
A	ATEX Dust approval
Z	No hazardous area approvals
Typical Model Number: PLSK B1 3 1 Z (Order paddles and accessories separately)	

Table 3. Paddles and Accessories for Mobrey Series PLS

Paddle selection	Scimitar	Single vane	3 vane std	3 vane large	2 vane	4 vane	Triangular	Belt vane
								
Order part no.	P4193	P4145	P4146	P4141	P4135	P4156	P4144	P4137
Application								
Heavy material >2000 kg/m ³ >40 mm Ø	high							■ *1
	low							■ *1
Heavy material >2000 kg/m ³ <40 mm Ø	high	■ *1			■ *1	■ *1		
	low	■ *1			■ *1	■ *1		
Medium material 250 kg/m ³ to 1000 kg/m ³	high	■	■			■	■	
	low	■	■			■	■	
Light material up to 250 kg/m ³	high	■		■			■	
	low	■		■			■	
Mounting	Insertable	Insertable	Plate or flange	Plate or flange	Plate or flange	Plate or flange	Plate or flange	Plate or flange
Notes	*1 Flexible coupling required					■ = Recommended		

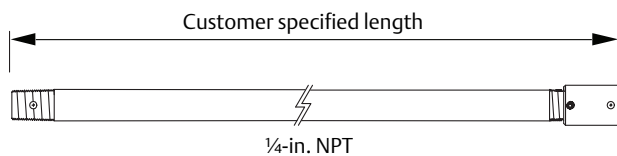
Flexible coupling (P3335)

The flexible coupling works to absorb heavy loads, side loads and loads caused by product surges. A flexible coupling should always be used in top mount installations where a solid shaft extension is used.



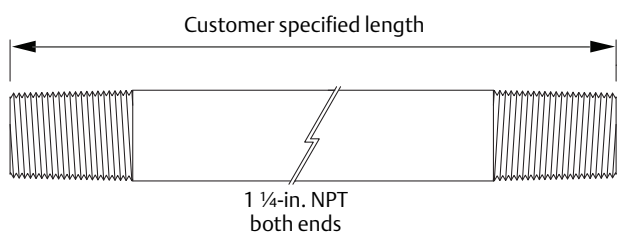
Solid (rigid) shaft extensions (P1175-2/****mm)

Many top mount installations require that the paddle extends into the vessel to a pre-determined level. Solid shaft extensions in stainless steel are available to customer order up to 1800 mm in length. Multiple sections can be supplied to achieve lengths of up to 3600 mm. Always specify a flexible coupling and a shaft guard with a solid shaft extension.



Shaft guard (P1174-2/****mm)

A stainless steel shaft guard should be specified when a solid shaft extension is required. The shaft guard should be ordered as the same length as the shaft extension. Maximum length is 1800 mm for lengths of up to 3600 mm, and multiple sections can be supplied complete with assembly coupling. Contact sales office for details.

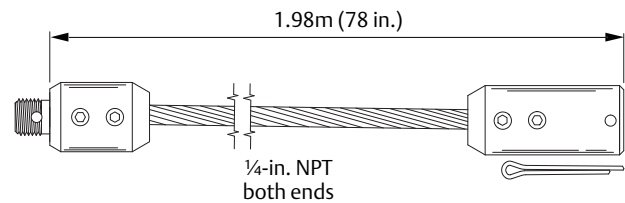


Shaft-guard coupling (P0038)

If it is necessary to use more than one shaft-guard in a single installation, they can be screwed together using shaft-guard couplings.

Flexible shaft extension (P1176-2)

Alternatively, a 2000 mm stainless steel flexible cable extension is available which may be cut to length on site and eliminates the need for the flexible coupling and shaft guard.



Mounting plate (see below for detail)

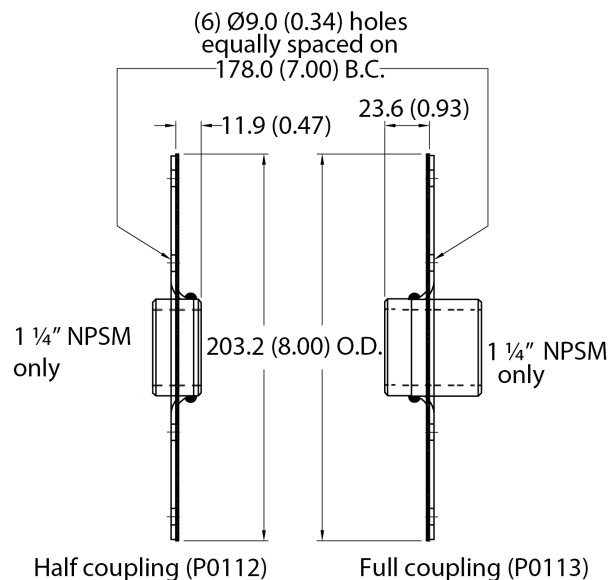
Half coupling: P0112; Full coupling: P0113

A mounting plate allows mounting to a curved or flat surface and is particularly advantageous if the paddle to be used is not an insertion type.

Two types are available: (Note: use only with NPT thread mounting paddle switches)

Full coupling (P0113) in stainless steel is necessary for use in top-mount applications where a shaft extension and shaft guard is specified. (Included as standard on high temperature option.)

Half coupling (P0112) in stainless steel for use in side-mount applications.



Mobrey Series VLS Ordering Information

Table 4. Mobrey Series VLS Ordering Information

Model	Product description
VLS	Vibrating Rod Level Switch series
Model	
K	Standard model with 1 x SPDT alarm relay
H	High temperature model with 1 x SPDT relay (not available with Extended Cable option)
Mounting	
B	R 1½-in. BSPT mounting
N	N1½-in. NPT mounting
Insertion length	
1	Standard length rod, 207 mm insertion length
3	Extended rod, 300 to 3000 mm insertion length
4	Cable extended, 1000 to 20000 mm insertion length
Housing	
3	Aluminum Alloy housing, powder coated
9	As code 3, but with Remote Electronics
Voltage	
1Z	20 - 255V ac / 20 - 255V dc, no hazardous area approval
5A	20 - 250V ac / 20 - 50V dc, ATEX Dust Certification II 1/2 D
Special	
/ ***	Extension length (rod, cable) * see note
Typical Model Number: VLSK B1 3 1Z	

VLS Series options

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.

Table 5. Correct Mounting Orientations

Insert ion length	High level	Low level
Standard	Side mounting	Side mounting
Extended rod	Top mounting	Side mounting
Cable extended	Top mounting	Top mounting

Sensitivity selection

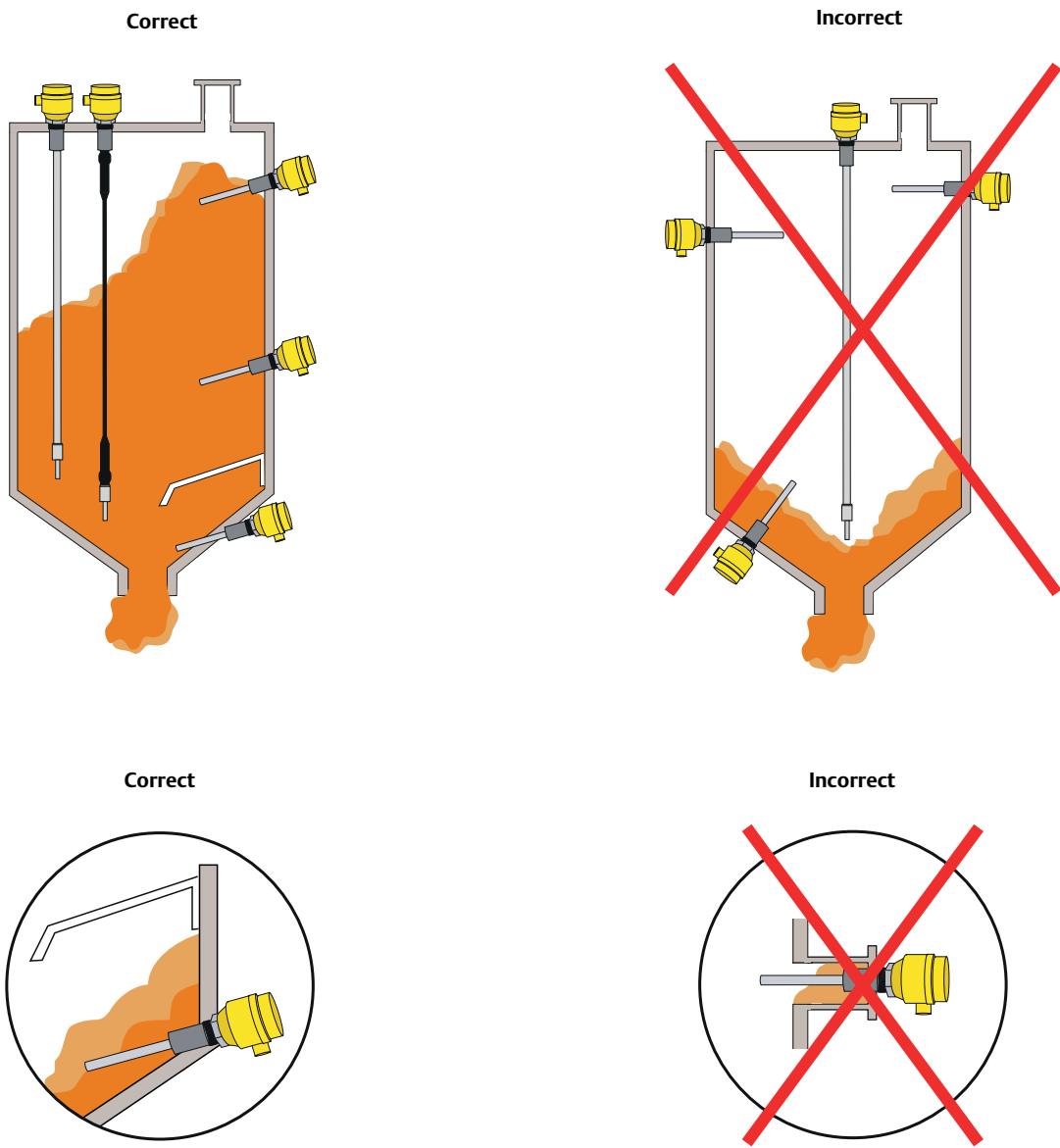
Bulk materials vary greatly in their characteristics. The VLS will operate in bulk materials with density over 50 kg/m³ - the user must however set the sensitivity selection switch to either LOW for products with density less than 100 kg/m³ or to HIGH for products with density greater than 1000 kg/m³.

Failsafe operation

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

Installation examples

Figure 1. Examples of Correct and Incorrect Installations



Technical Specifications

Specifications for Mobrey Series PLS

Applications

- Free flowing dry products, very low to very high density

Power supply

- Voltage order code **0**: 115 Vac $\pm 15\%$, 50/60 Hz
- Voltage order code **1**: 230 Vac $\pm 15\%$, 50/60 Hz
- Voltage order code **2**: 24 Vdc $\pm 15\%$

Power consumption

- 4 W maximum

Output

- Standard models: 2 x SPDT control relays, 15A at 250 Vac
- Safepoint models:
 - 1 x SPDT control relay, 5A at 250 Vac
 - 1 x SPDT fault relay, 5A at 250 Vac

Conduit connection

- 2 x $\frac{3}{4}$ -in. NPT (NPT models) or 2 x M20 (BSPT models)

Process temperatures

- -40 to 149 °C (Standard models)
- -40 to 121 °C (Safepoint models)
- -40 to 399 °C (High temperature models)

Ambient temperatures

- -40 to 93 °C (Standard models)
- -40 to 65 °C (Safepoint models)

Operating pressures

- 2 bar maximum

Materials

- Process-wetted material: 304 stainless steel
- Housing material: Aluminum alloy, powder paint coated

Housing rating

- IP66

Weight

- Typical Standard model: approximately 4 Kg

Approvals

- ATEX  II 1/2 D

Specifications for Mobrey Series VLS

Applications

- Free flowing powders and granules, $\varnothing < 10\text{mm}$, low - high density

Power supply

- Voltage order code **1Z**: 20 - 255 Vac (50/60Hz) / 20 - 255 Vdc
- Voltage order code **5A**: 20 - 250 Vac (50/60Hz) / 20 - 50 Vdc

Output

- 1 x SPDT control relay, 8A at 250 Vac

Conduit connection

- 2 x $\frac{1}{2}$ -in. NPT (NPT models) or 2 x M20x1.5 (BSPT models)

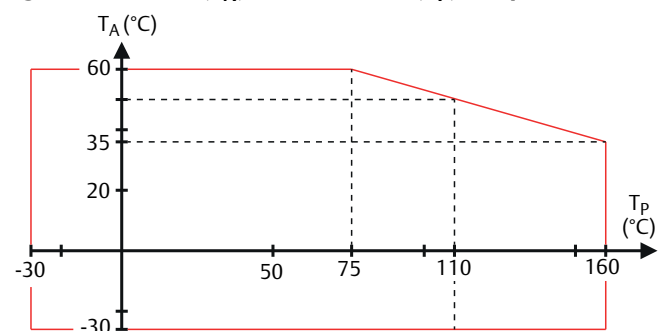
Response time

- Selectable 2 or 5 seconds

Process temperatures

- -30 °C to +110 °C (standard models)
- -30 °C to +160 °C (high temperature models without extended cable)

Figure 2. Ambient (T_A) Versus Process (T_P) Temperatures



Operating pressures

- 10 bar maximum (standard and extended rod models)
- 6 bar maximum (extended cable models)

Materials

- Process-wetted material: 316 Ti stainless steel (1.457)
- Housing material: Aluminum alloy, powder paint coated

Housing rating

- IP67

Weight

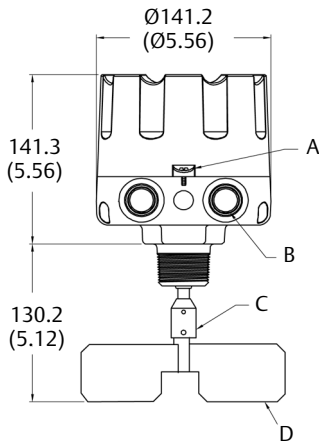
- Typical standard model: approximately 1.9 kg
- Add 1.4 kg per m (extended rod) or 0.6 kg per m (extended cable)

Approvals

- ATEX II 1/2 D

Dimensional Drawings

Figure 3. Series PLS Dimensions



A. Cover lock

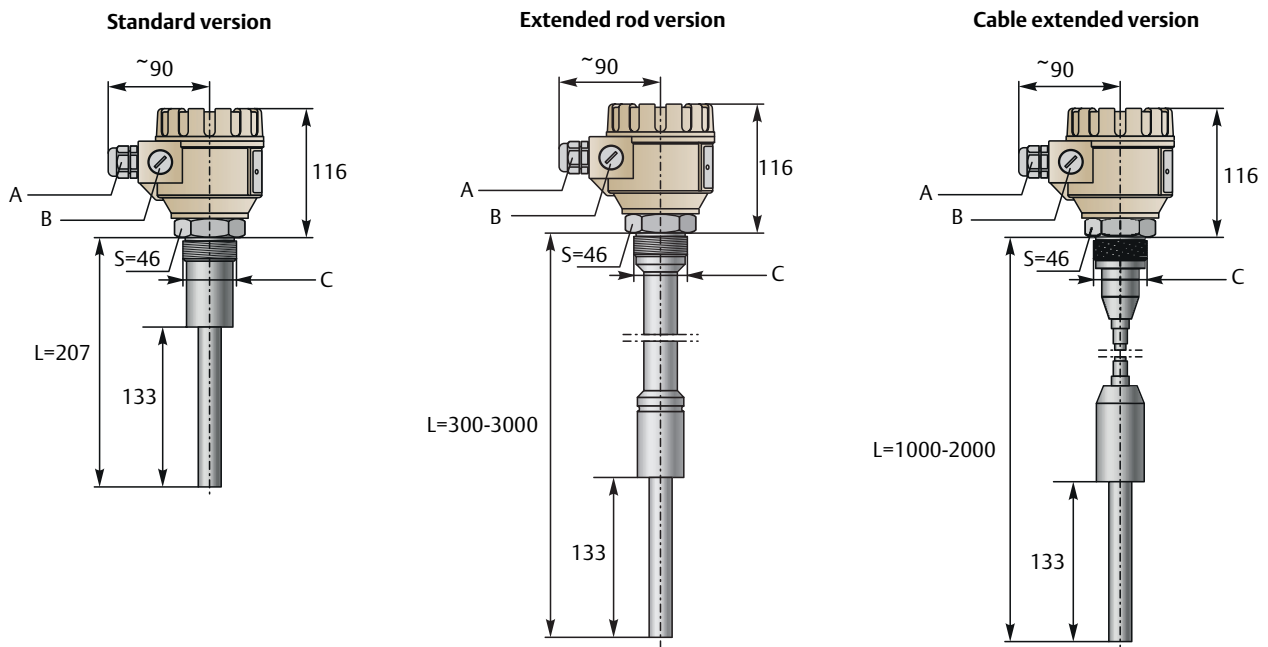
B. $\frac{3}{4}$ -in. NPT threaded conduit entry

C. Threaded entry to accept flex coupling, extension, or paddle

D. Standard 3-vane paddle

Dimensions are in inches (mm).

Figure 4. Series VLS Dimensions



A. 2 off M20x1.5 conduit entries

B. 2 off NPT $\frac{1}{2}$ -in. conduit entries


C. $1\frac{1}{2}$ -in. BSP or NPT threaded process connection


Dimensions are in mm.

Head Office (UK)

Delta Mobrey Limited

Riverside Business Park
Dogflud Way, Farnham, Surrey, GU9 7SS
United Kingdom

 +44 (0)1252 729140

 +44 (0)1252 729168

 mobrey@delta-mobrey.com



[Linkedin.com/company/delta-controls-ltd](https://www.linkedin.com/company/delta-controls-ltd)



[Twitter.com/DeltaMobrey](https://twitter.com/DeltaMobrey)



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