



**Product Features**



**Vibrating fork level switches**

- With Automatic learning function, it can learn different medium density by button without any adjustment
- Metallic structure, sturdy and durable
- The amplitude is large to reach more than 10mm, able to shake off hang-ups and avoid fault
- Ultra bright red LED will provide timely warning on site.
- High range of DC and AC input will not only reduce inventory effectively, but also be used wid.
- Suitable for detect the level of liquid, solid, powder, etc.

**Applications**

Vibrating fork level switch is suitable for environmental protection, water treatment, electricity, Chemical plastic, pharmacy, fodder, cement, chemical fertilizer, food industry, etc.



**Vibrating Fork Level Switches**



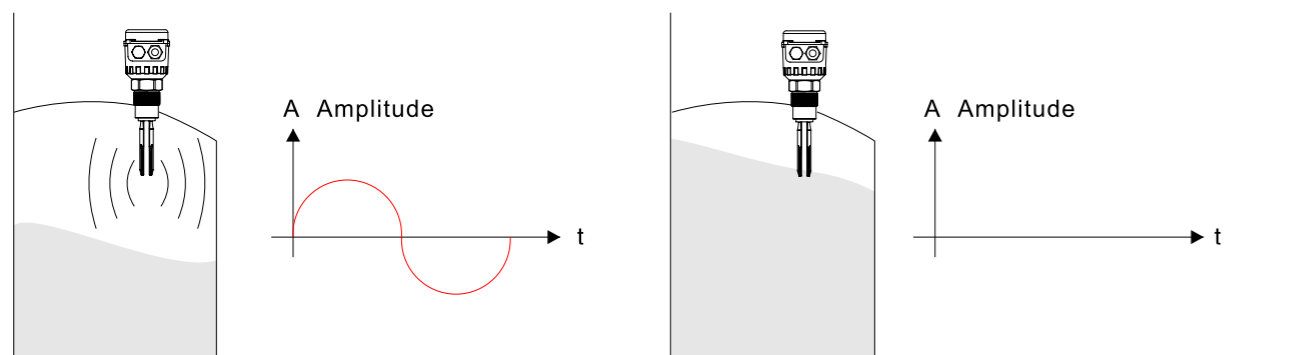
The vibrating fork level switch adopts the principle of damping effect and piezo-electric effect of vibrating fork. The sensing part of detection is composed of vibrating fork, a piezo-electric crystal oscillates the forks at their nature frequency, when the fork is effected by damping effect from medium, they will stop vibrating and the drive control circuit will send out signal. This product is suitable for harsh working conditions, they are



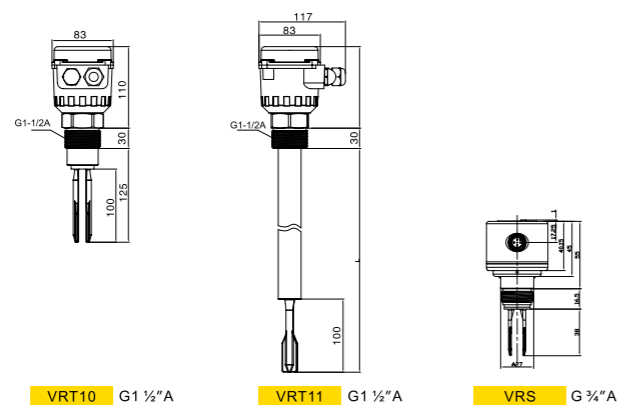
www.ema-electronic.com

**Operating Principle**

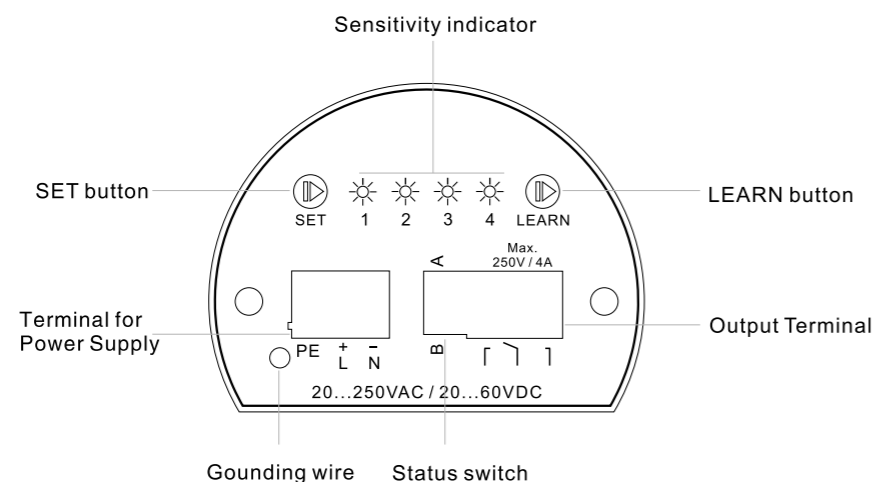
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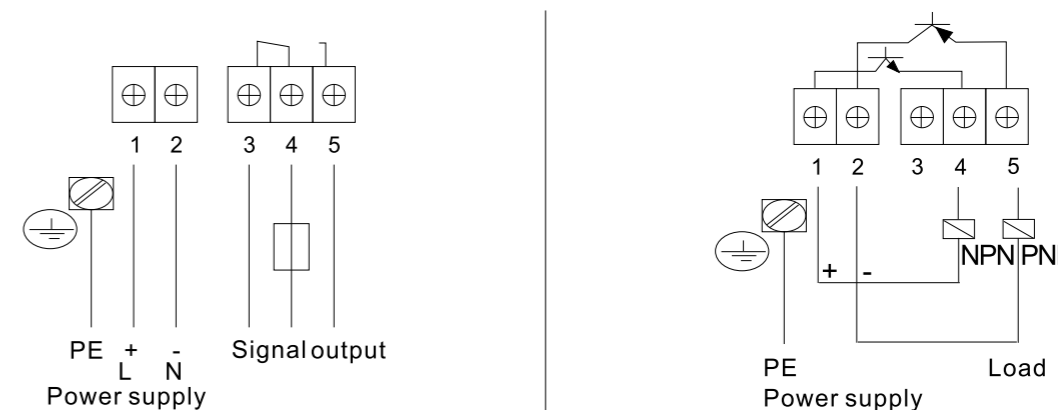
**Dimension**



**VRT Panel**



**VRT Connection**



Relay output:		NPN/PNP output:	
Power input	20~250VAC 50~60Hz 20~60VDC	Power input	20~60VDC
Signal output	4A/250VAC Max. 4A/60VDC Max.	Signal output	400mA Max.

**Manual of VRT**

Unlock:	Hold "SET" button, for 10 sec., until the four LED flash to status of unlock. After unlock, it is back to normal operating mode.
Lock	It is automatically locked if there is no button pressed in 60 sec.
NO/NC Setting	Press DIP switch to set NO or NC.
Learn Mode	Put fork part into the detected medium for 5 sec. and then operate "Unlock". After unlock, hold "LEARN" button for 5 sec., the LED1 ~ LED4 will flash orderly with frequency which is 1 time per sec. to start learning. If the four LEDs are all flash together, this learning is successful; if only the central two LEDs shine, this learning is failed and it is required to learn again.
Sensitivity Setting	Under status of unlock, press "SET" button to set sensitivity with checking the flash of LED1 to LED4. Sensitivity is from high to low by LED1 to LED4.

**Notice:**

1. The learning function of this type is not only to overcome the condition of the vibration absorption after the installation on the wall of tank but also to avoid of false operation caused by noise interference.
2. factory setting is based on the density of water (1g/cm<sup>3</sup>). When the density of detected object is higher than or equal to 1g/cm<sup>3</sup>, it can be used normally without setting learning function. Otherwise it needs to reset learning function when the density of detected object is lower than 1g/cm<sup>3</sup>.
3. Sensitivity is set as the highest value in the factory and suitable to be used under the stable wave of medium. If the wave of medium fluctuates bigger, it is required to lower the sensitivity to avoid any error in warning.
4. During installation, please try to avoid a significant shock position to prevent false alarm, if this can not be avoided, please re-learning at the installed location, or reset to the factory settings

Radar Wave Level Sensors  
 Guided Radar (TDR)  
 Ultrasonic Level Sensors  
 Rotating Paddle Level Sensors  
 Vibrating Fork Level Switches  
 Float Level Switches  
 Capacitive Level Switches

Output of VRT Switch2

Switch2	A	B
Relay OUT		
NPN OUT		
PNP OUT		
Indicator		

VRS

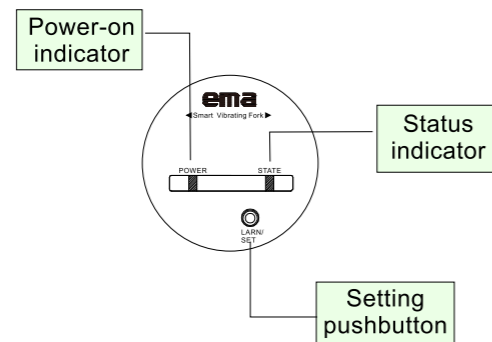


Figure. A

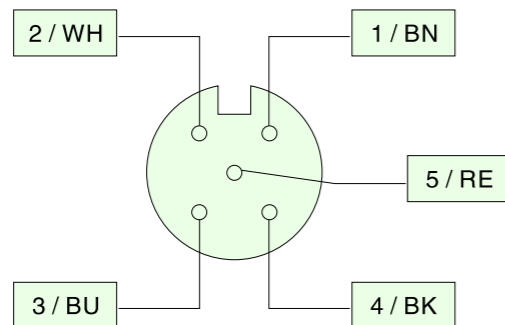


Figure. B

Manual of VRS

<b>Unlock</b>	"SET" button for 10 secs until alternate red and green lights flash. The unit unlocks and returns to the operation mode. The red and green light stop
<b>Lock</b>	It is automatically locked when there is no operation within 60 secs.
<b>NO / NC setting</b>	Under the unlock condition, hold "SET" button for 3 secs and then the alternate red and green lights flash. When the green LED flashes, release the button to enter NO / NC setting mode and then press "SET" button once to adjust the required status.
<b>Learning mode</b>	Put the fork part into the detected medium with stability for 5 secs. Under the unlock condition, hold "SET" button for 3 secs and then the alternate red and green lights flash. When the red LED flashes, release the button. The red LED flashes once in a second orderly to express the status of waiting for learning. The red LED flashes and goes out twice to express the status of learning. The learning setting is successfully finished when the alternate red and green lights flash quickly. Otherwise, the red and green light flashes together and the user has to set the learning function again. To reset the learning, just press "SET" button again to enter second learning mode. <b>Notice:</b> To enter the second learning mode, please press "SET" button in 3 sec. after first learning finished. Otherwise the user shall be required to process the whole learning mode again to reset the setting. This function is to avoid of the false operation.

Notice:

1. The learning function of this type is not only to overcome the condition of the vibration absorption after the installation on the wall of tank but also to avoid of false operation caused by noise interference.
2. factory setting is based on the density of water (1g/cm3). When the density of detected object is higher than or equal to 1g/cm3, it can be used normally without setting learning function. Otherwise it needs to reset learning function when the density of detected object is lower than 1g/cm3.

Status Indicators of VRS

		Maximum		Minimum	
U~(AC)	U~(DC)				
		Green LED: Power on/off			
		Red LED: Operation			
		Setting pushbutton			

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Dimensions(mm)		
<b>Model</b>	<b>VRT10</b>	<b>VRT11</b>
<b>Type</b>	Standard	Extension
<b>Connection</b>	G1 1/2" A	G1 1/2" A
<b>Cable entrance</b>	M20 x P1.5	
<b>Detecting medium</b>	Liquid/Powder/Solid	
<b>Applications</b>	Suitable for all powder, solid and liquid through learning function	
<b>Voltage</b>	20~60VDC 20~250VAC 50/60Hz	
<b>Response Time(s)</b>	< 3	
<b>Ambient temperature(°C)</b>	-40...+70	
<b>Storage temperature(°C)</b>	-40...+85	
<b>Medium temperature(°C)</b>	-40...+150	
<b>Operating pressure(bar)</b>	-1...+40	
<b>House material</b>	Aluminium alloy	
<b>Fork material</b>	Stainless steel 316L	
<b>Output</b>	PNP/NPN 400mA Max.	
<b>Consumption</b>	DC 3W Max AC 15W Max	
<b>Standard Length(mm)</b>	125	1200MAX
<b>Protection classification</b>	IP67	

Dimensions(mm)		
<b>Model</b>	<b>VRS</b>	
<b>Type</b>	Small	
<b>Connection</b>	G3/4" A	
<b>Cable entrance</b>	M12x1.5	
<b>Detecting medium</b>	Liquid/Powder/Solid	
<b>Applications</b>	Suitable for all powder, solid and liquid through learning function	
<b>Voltage</b>	18~36VDC	
<b>Response Time(s)</b>	< 3	
<b>Ambient temperature(°C)</b>	-40...+70	
<b>Storage temperature(°C)</b>	-40...+85	
<b>Medium temperature(°C)</b>	-40...+120	
<b>Operating pressure(bar)</b>	-1...+40	
<b>House material</b>	Stainless Steel 316L	
<b>Fork material</b>	Stainless steel 316L	
<b>Output</b>	PNP/NPN 200mA Max.	
<b>Consumption</b>	<1W Max	
<b>Standard Length(mm)</b>	45	
<b>Protection classification</b>	IP68	

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Dimensions(mm)		
<b>Model</b>	<b>VRE10</b>	<b>VRE11</b>
<b>Type</b>	EX Standard	EX Extension
<b>Connection</b>	G1 1/2" A	
<b>Cable entrance</b>	G1 1/2" A	
<b>Detecting medium</b>	Liquid/Powder/Solid	
<b>Applications</b>	Suitable for all powder, solid and liquid through learning function	
<b>Voltage</b>	A: 20~60VDC & 20~250VAC, 50~60Hz (Relay output SPDT 4A/250VAC 4A/60VAC) B: 20~60VDC (NPN/PNP)	
<b>Response Time(s)</b>	< 3	
<b>Medium density</b>	Auto-learning setting by pushbuttons	
<b>Consumption</b>	DC 3W Max AC 15W Max	
<b>Sensitivity</b>	4 levels adjustable	
<b>Operating pressure(bar)</b>	-1...+40	
<b>House material</b>	Aluminium alloy	
<b>Fork material</b>	Stainless steel 316L	
<b>Output</b>	PNP/NPN 400mA Max.	
<b>Standard Length(mm)</b>	105	1200MAX
<b>Protection classification</b>	IP54	
<b>Protection classification</b>	EXd II CT6	

**Order Information**

VR	T	10	A	A	0125	6
Series	Housing material	Type	Connection	Power Supply	Length of fork	Fork Material

<b>VR</b>	Smart Vibrating Level Switches Series					
<b>T</b>	Housing material T: Aluminum					
<b>10</b>	Type 10: Standard VRT10			<b>11</b>	Type 11: Extension VRT11	
<b>A</b>	Process connection A: G1 1/2" A					
<b>A</b>	Power supply / Output A: 20-60VDC & 20-250VAC, Relay output SPDT 4A/250VAC or 4A/60VAC, 50/60Hz B: 20-60VDC, NPN & PNP output, 50/60Hz					
<b>0125</b>	Fork Length (mm) 0125: L = 125 mm			<b>0200</b>	Extension Length (mm) 0200: L = 200 mm 0400: L = 400 mm 0600: L = 600 mm 0800: L = 800 mm 1000: L = 1000 mm 1200: L = 1200 mm	
<b>6</b>	Fork material 6: Stainless Steel 316L					

Notice:  
The total length tolerance is within ±5mm

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Order Information


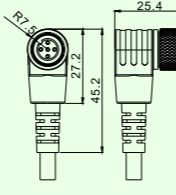
VR	S	10	A	A	0045	6
Series	Housing material	Type	Connection	Power Supply	Length of main shaft	Shaft Material
<b>VR</b>	Smart Vibrating Level Switches					
S	Housing material S: Stainless steel 316L					
10	Type 10: Small fork VRS10	20	Type 20: Sanitary VRS20			
A	Process connection A: G 3/4 "A					
A	Power supply / Output A: 18-36VDC Relay output B: 18-36VDC, NPN & PNP					
0045	Fork Length (mm) 0045: Small fork L = 45 mm					
6	Fork material 6: Stainless Steel 316L					

Order Information


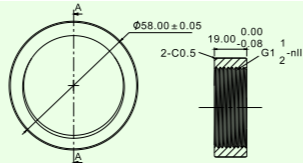
VR	E	10	A	A	0105	6
Series	Housing material	Type	Connection	Power Supply	Length of fork	Fork Material
<b>VR</b>	Smart Vibrating Level Switches Series					
E	Housing materia E: EX proof					
10	Type 10: Standard VRE10	11	Type 11: Extension VRE11			
A	Process connection A: G1½"A					
A	Power supply / Output A: 20-60VDC & 20-250VAC, Relay output SPDT 4A/250VAC or 4A/60VAC, 50/60Hz B: 20-60VDC, NPN & PNP output, 50/60Hz					
0105	Fork Length (mm) 0105: L = 105 mm	0200	Extension Length (mm) 0200: L = 200 mm 0400: L = 400 mm 0600: L = 600 mm 0800: L = 800 mm 1000: L = 1000 mm 1200: L = 1200 mm			
6	Fork material 6: Stainless Steel 316L					

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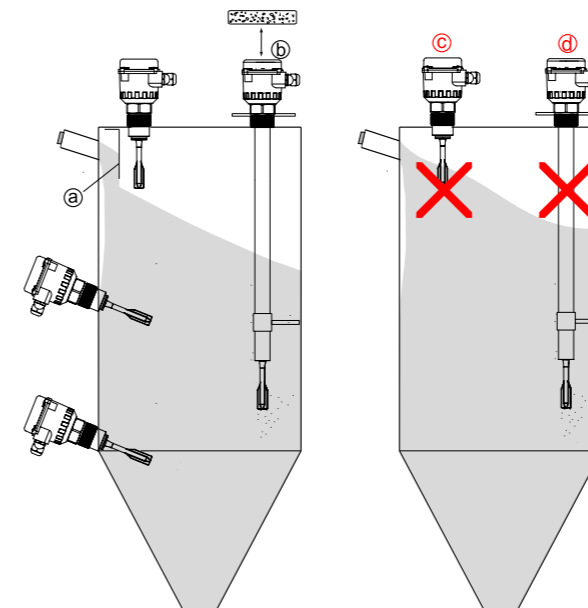
Accessories

Cable	Connector Order NO. (Only for VRS)						Drawing
	C	02	L	5	C	12	
	C: Cable	Length 02: 2M 05: 5M 10: 10M	Connector L: Angled	Pole 5: 5	Material R: PUR C: PVC S: PVC Shielded wire	Size 12: M12	

Type	Flange	Order No.	Drawing
VRT		S4F0	

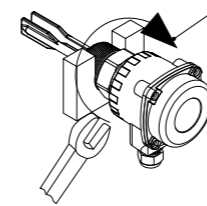
Type	Fixture	Order No.	Drawing
VRT		S0C0	


Installation Of VRT



**Correct mounting:**  
 ⓐ Next to the silo wall, but with enough distance from it and from material build-up, or shield to protect against flowing material.  
 ⓑ Sufficient space for mounting and for adjusting. Avoid of the false warning from material flow. Protective hood against condensation in the housing.

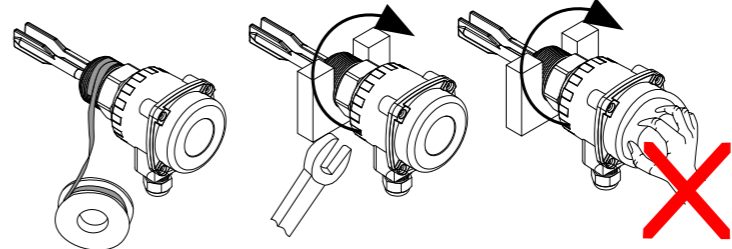
**Incorrect mounting:**  
 Ⓒ Too close to the wall and material build-up.  
 Ⓓ In filling curtain.



Mark on the hex nut. 

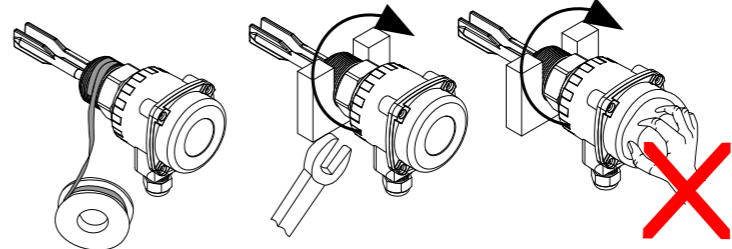
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The top of the fork is marked.



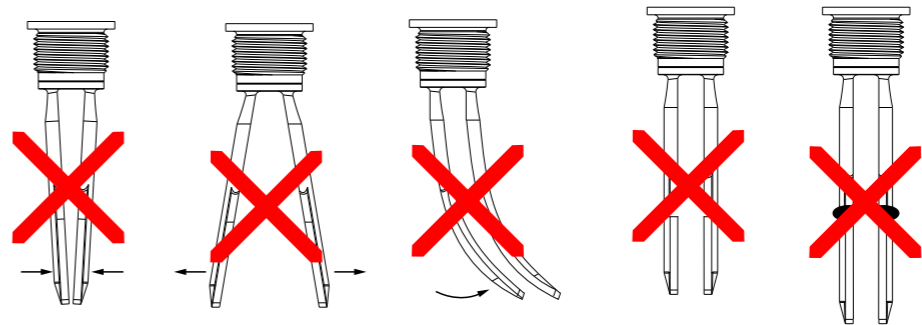
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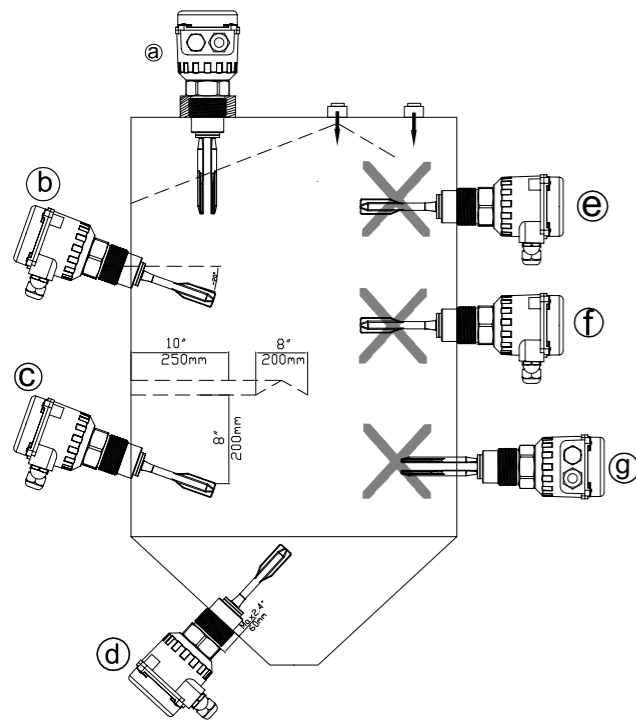
Enclosed by PTFE thread seal tape.  
Tightened by a wrench.  
**Not wrested by hands.**



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**Do not:**  
 damage the fork;  
 bend the fork;  
 shorten the fork;  
 and lengthen the fork.





1. The ideal installation for reducing the shock to materials and the hanging of materials is to make the switch horizontal at an angle of 15-20.
2. Keep the switches away from the feed opening of the barrel to reduce the shock to materials, if unavoidable, a protection plate is necessary.
3. The inlet of the connection box should be downward and the fixing nuts of power line must be tightened.
4. The operators cannot use vibration rod to climb or hook any object when working within the barrel.

■ Correct mounting:

- Ⓐ Top-mounted, Fork is vertical towards bottom and mounted in any position far away from the feed opening of top side.
- Ⓑ Laterally mounted, Fork angled slightly downwards by 15~20 degree so as to reduce the shock and the hanging of the flowing materials.
- Ⓒ Laterally mounted with shield, With a shield, length approx. 10 in(250mm), width approx. 8 in(200m), fork angled slightly downwards by 15~20 degree so as to reduce the shock of the flowing materials and prevent the improper stock from itself.

■ Incorrect mounting:

- Ⓓ In discharge hopper, Max. nozzle length 2.4 in (60mm), so that no build-up occurs which prevents the fork from oscillating. Laterally mounted in filling curtain or under the feed opening. Incorrect fork orientation
- Ⓔ The surface of fork is subjected to high load caused by discharging material;
- Ⓜ It may cause false function due to residual material.
- Ⓝ The switch will not work normally when the distance of mounting nozzle and barrel is over 2.4"(60mm).

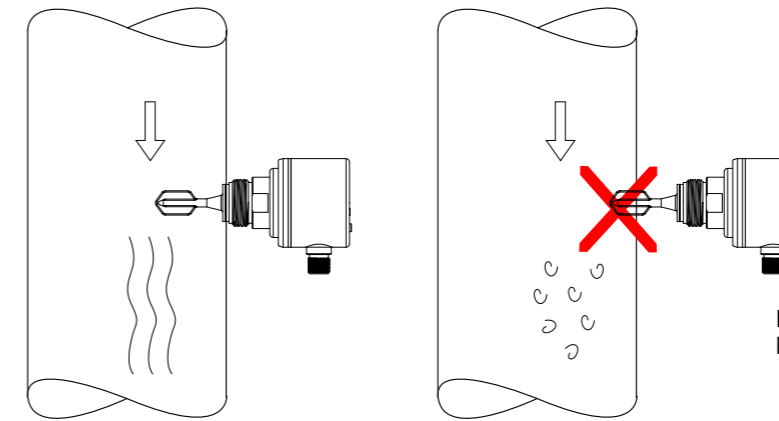
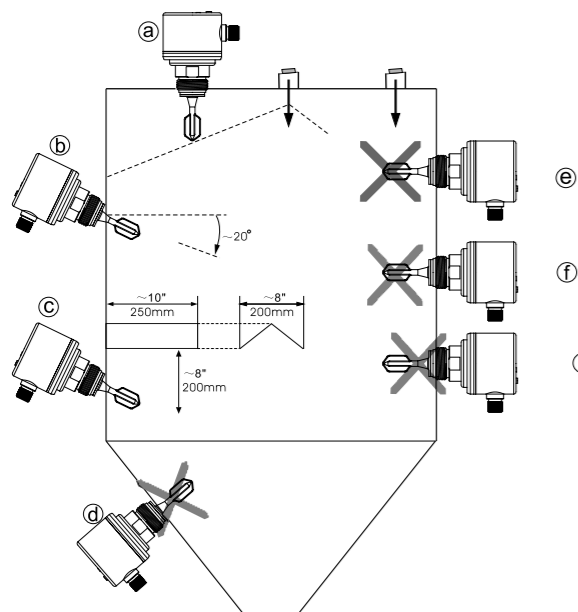


Figure: Mounting of VRS into the pipe. Left one is correct, but Right one is incorret.

VRS Installation



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Do not:  
damage the fork; bend the fork; shorten the fork; and lengthen the fork.

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Enclosed by PTFE thread seal tape.      Tightened by a wrench.      Not wrenched by hands.