

# THERMAL FLOW SENSOR



## DESCRIPTION

TFS-FRC series electronic thermal flow switch, based on the thermal principle, enclosed in a closed probe contains two resistors, one of which is heated as the sense resistor and the other is not heated as the base quasi-resistance, when the medium flows, the heat on the heating resistor is taken away, and the resistance value is changed.

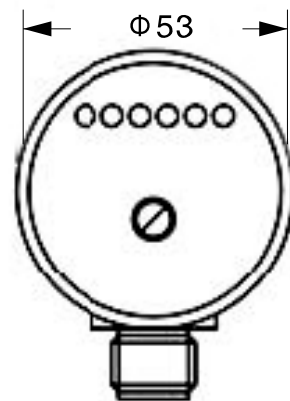
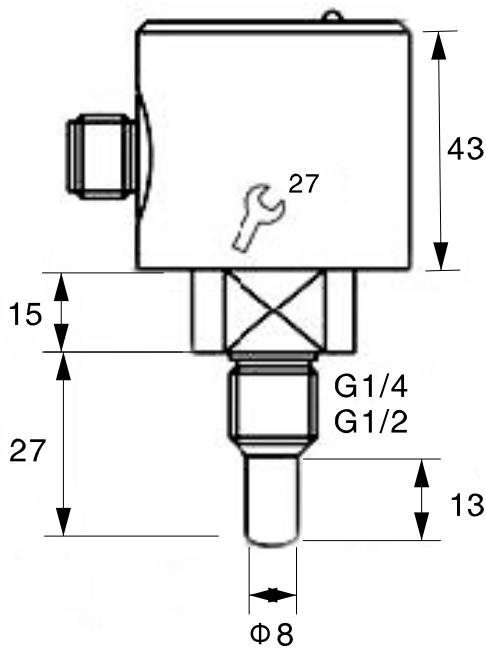
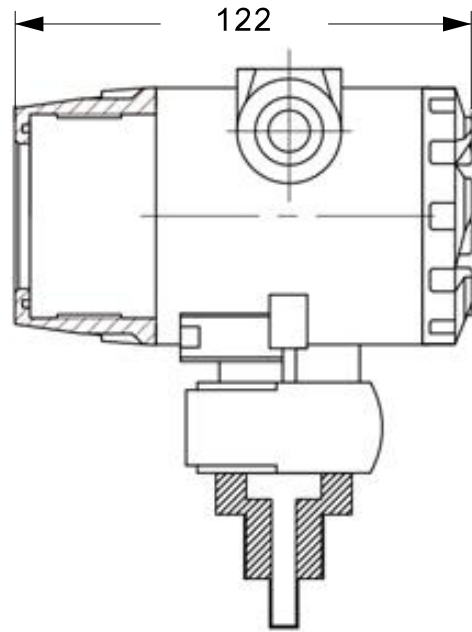
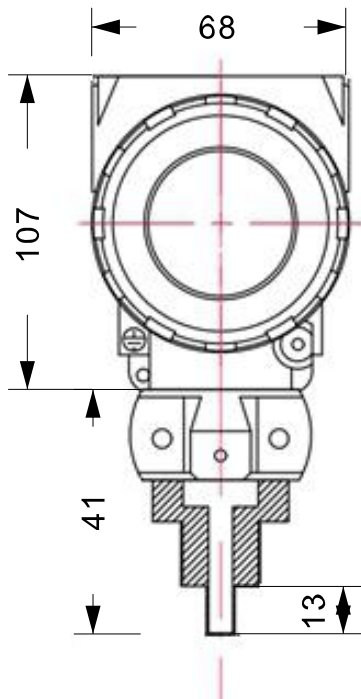
## APPLICATIONS

Primarily suitable for pneumatic and hydraulic systems, it can be used for shut-off monitoring of circulating water, cutting fluids and lubricating oils, as well as idling protection of pumps.

## FEATURES

The unique tapered probe design prevents the entanglement of the winding in the media. Full waterproof case body design, unique waterproof adjustment knob, can be adjusted without disassembling the sealing screw, it is more reliable. Applicable to a wide range of pipe diameters, free to adjust the set point, optional anti-corrosion type, withstand voltage up to 100Bar, the indicator light directly shows the flow, optional relay, analog output or analog, switch output integrated output. TFS-FRC series electronic thermal flow switch can monitor the liquid flow in the pipeline in real time, no moving parts, maintenance-free, easy to install, one model is used for a variety of pipe diameter requirements, provide switching output, and adopt 6 The LED display the fluid flow rate status in real time, enabling the following monitoring functions: media flow, reduced/ increased flow rate; media presence/absence; media flow/stationary; monitoring fluid flow rate within the pipe, shut-off monitoring or preventing pump idling. It is widely used in petrochemical, electric power, metallurgy, steel mills, paper making, food processing, water treatment, battery factories and other industries. Gas-liquid dual-purpose, for pneumatic and hydraulic systems, for shut-off monitoring of circulating water, cutting fluids and lubricants, and idling protection of pumps.

## TECHNICAL DRAWINGS



**Explosion-proof Type**



**Non-explosion proof Type**

## TECHNICAL DATA

<b>Setup range</b>	1...150cm/s (water)
	3...300cm/s (oil)
	20...2000 (air)
<b>Signal output</b>	NPN
	PNP
	Relay
	Analog (4...20mA)
	Normally open + normally closed (SPDT)
<b>Power supply</b>	24V ± 20% DC
<b>Power</b>	Max. 400mA (PNP or NPN type) up to 1A @ 48VAC/DC Power (relay type)
<b>No-load current</b>	Up to 80mA
<b>Flow indication</b>	LED
<b>Setting method</b>	Potentiometer setup
<b>Withstand voltage range</b>	100bar
<b>Medium temperature change</b>	≤4°C/s
<b>Response time</b>	1...13s, typical value 2s
<b>Initialization time</b>	About 8s
<b>Electrical protection</b>	Reverse phase
	Short circuit
	Overload protection
<b>Protection class</b>	Ip67
<b>Medium temperature</b>	-20...+100°C
<b>Ambient temperature</b>	-20...+80°C
<b>Storage temperature</b>	-20...+100°C
<b>Wiring method</b>	M12 connector
<b>Repeatability</b>	±2%
<b>Material of Probe</b>	Stainless steel housing

## MODEL SELECTION

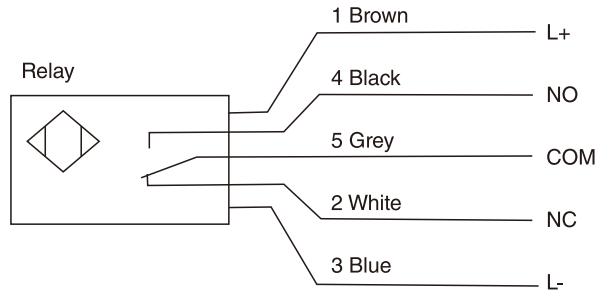
Model Code							Selection
TFS-FRC	-	/	/	/	/	/	
Type	A						Insertion type
	B						Display type
	C						Pipe online type
Connection	G1						Interface Thread G1/2"(Insertion type)
	G2						Interface Thread G1/4" (insertion type)
	H1						Male connection (on pipeline)
	H2						Flange connection(on pipeline)
Power		G					24V DC $\pm$ 20%
Output			P				PNP output(ON+OFF(SPDT))
			N				NPN output(ON+OFF(SPDT))
			C				Relay output(ON + OFF(SPDT))
			A				4-20mA
Material			S4				SS304
			S6				SS216
Flow Switch				E			Explosion-proof type
				N			Non-explosion proof type
Connection				C			Connector type
				Z			Along with wire cable
<b>Optional accessories - for connector type</b>							

ZI04-		/	/			Selection
	ZL					M12 four core cable connector
	SL					Self-wiring M12 with cable connector
Material		PU				PUR material
Wire Cable			2			2m
			5			5m
			10			10m
Connector Type				Z		Straight line
				W		Curved line

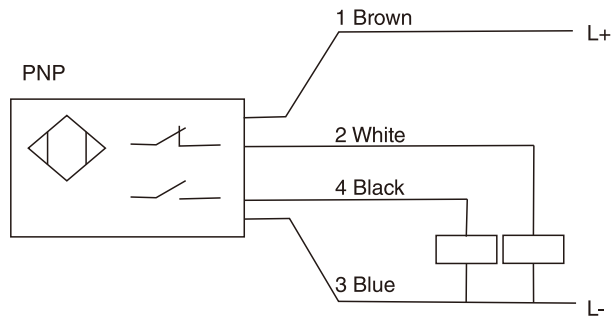
(Note: The relay type requires 5-core output!)

## ELECTRICAL WIRING

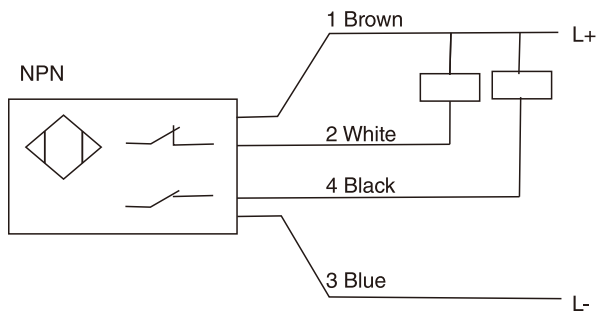
Relay type output wiring



PNP type output wiring



NPN type output wiring



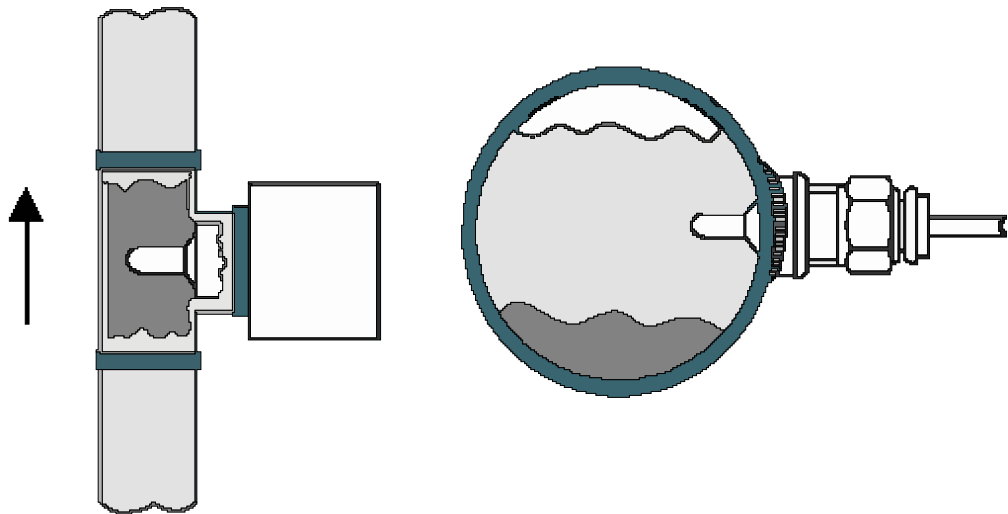
**Note:**

According to the wiring diagram, the wiring is correctly connected. When the probe touches the medium, when the probe touches the medium, the indicator light is observed. If the red light is on, it can be adjusted counterclockwise. Only the timing adjustment can be made. If the green light is on, it can only be adjusted counterclockwise. Cannot adjust clockwise.

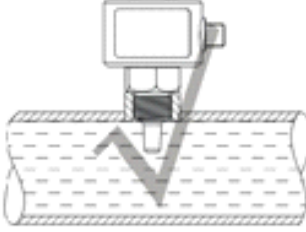
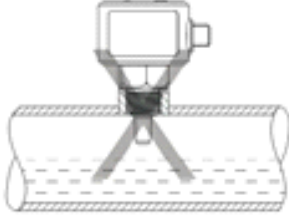
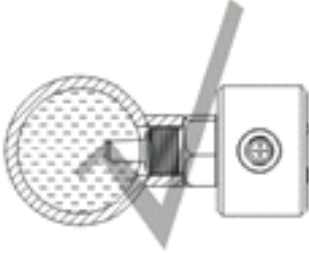
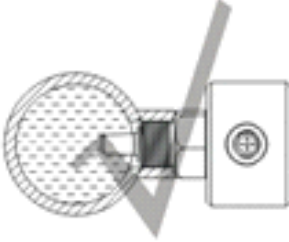
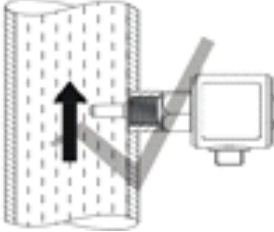
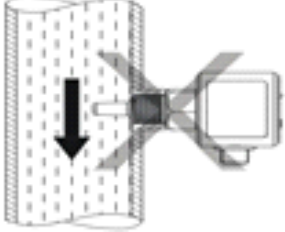
## MODEL SELECTION

<ul style="list-style-type: none"> <li><input checked="" type="radio"/> The red LED is ON:</li> <li><input type="radio"/> The flow is cut off or the</li> <li><input type="radio"/> flow velocity is lower than the set value. The switch is released or the analog is at 4-20mA.</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> The yellow LED is ON:</li> <li><input type="radio"/> The flow velocity is</li> <li><input type="radio"/> equal to the set value.</li> <li><input checked="" type="radio"/></li> <li><input type="radio"/></li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> The yellow and green LED are ON: When the flow velocity is bigger than the set value, the flow velocity is becoming bigger and bigger while the green light is more brighter and brighter.</li> <li><input type="radio"/></li> <li><input checked="" type="radio"/></li> <li><input checked="" type="radio"/></li> <li><input type="radio"/></li> </ul>
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## CAUTIONS FOR INSTALLATION



When installed vertically, the flow should be flows from bottom to top in the pipe section

<p><b>1. Horizontal Installation</b>          This installation method can be used when the medium in the pipeline is full. However, when the liquid in the pipeline is not full, this installation method cannot be used because the probe of the flow switch may not be in contact with the medium and cannot work normally.</p>		
<p><b>2. Side Installation</b>          This installation method can be used when the medium in the pipeline is full or not full.</p>		
<p><b>3. Vertical Installation</b>          When installed in a vertical pipe, it should be installed under the flow pipe section from bottom to top.</p>		
<p><b>4. Flip Installation</b>          This installation method is forbidden. This installation method will cover the head at the bottom of the pipe, causing the flow switch to not work properly. If the sealing is not tight during installation, the leakage water will be soaked for a long time, causing the flow switch to be damaged, and this installation method is not conducive to setting the parameters of the flow switch.</p>	