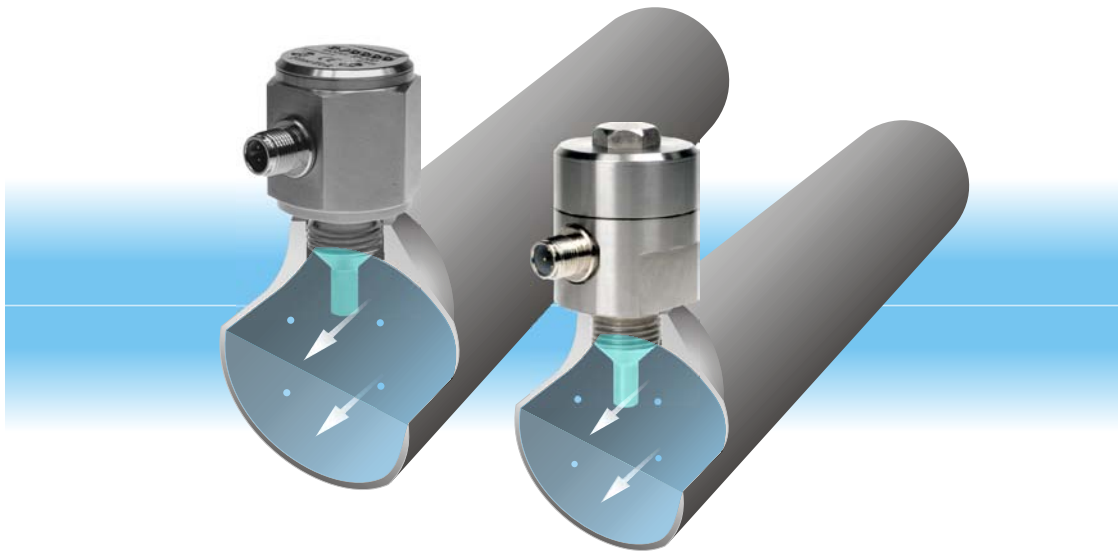


OPERATING PRINCIPLE

Thermal dispersion flow switch is a precise flow sensing device, which uses heat diffusion principle. The probe consists of two temperature sensors. One sensor measures the temperature of the fluid where the probe is immersed. The other sensor is heated at a constant power.

This creates a temperature difference between the two sensors. Temperature difference is inversely proportional to the flow velocity. The probe and housing are made by stainless steel or engineering plastic. Since the device has no moving parts, therefore there is no wear and tear problem.



FEATURE

- Comparing to the traditional paddle type flow switch, thermal dispersion flow switch offers high sensitivity, no limitation of installing location, and no moving parts wear and tear.
- Different materials can be adopted to suit liquid with impurities, acidity, and alkaline.
- Probe length is made to fit requested application specification.
- There are three different output signals for users to choose.

APPLICATION

Water Power Plant, HVAC Systems, Steel Making, Petrochemical, Shipyard, Food Process, Pharmaceutical, Optical, Semiconductor, and any transporting pipes and cooling pipes flow control.

PRODUCT SPECIFICATION

| | | | |
|-----------------------|---|--------------------------------------|--------------------------------------|
| Drawing | | | |
| Model | SP200 -□-□□-□-□ | SP201 -□-□□-□-□ | SP202 -□-□□-□-□ |
| Measuring Range | Water: 1~150 cm/s Oil: 3~300 cm/s | Water: 1~150 cm/s Oil: 3~300 cm/s | Water: 1~150 cm/s Oil: 3~300 cm/s |
| Ambient Temperature | -20 ~ 80°C | -20 ~ 80°C | -20 ~ 120°C |
| Operating Temperature | -20 ~ 80°C | -20 ~ 80°C | -20 ~ 120°C |
| Alarm Output | Open Collector : NPN / PNP(<400mA) | | |
| Operating Pressure | 100 bar (max.) | 100 bar (max.) | 100 bar (max.) |
| LED Indication : | Flow velocity below set point- Red LED on, Open Flow velocity equals set point- Yellow LED on, Close Flow velocity above set point- 4 Green LED to indicate flow speed, Close | | |
| Housing | SUS304 / 316L | SUS304 / 316L | |
| Protection Level | IP67 | | SUS304/ 316/ 316L |
| Warm-up Time | Approx.10 Sec | Approx.15 Sec | Approx.15 Sec |
| Connection Thread | G1/2, G1/4, NPT1/2 | G1/2, NPT1/2 | G1/2, G1/4, NPT1/2 |
| Operating Voltage | 19 ~ 30Vdc | | |
| Power consumption | 50mA (max.) | | |
| Wiring | 3-wire NPN/PNP Power-brown Grounding-blue Output-black | | |
| Accessory | Gasket, 2m Cable | | |

PRODUCT SPECIFICATION

| | | |
|-----------------------|---|--------------------------------------|
| Drawing | | |
| Model | SP203 -□-□□-□-□ | SP220 -□-□□-□-□ |
| Measuring Range | Water: 1~70 cm/s Oil: 2~100 cm/s | Water: 1~150 cm/s Oil: 3~300 cm/s |
| Ambient Temperature | -20 ~ 80°C | -20 ~ 80°C |
| Operating Temperature | -20 ~ 80°C | -20 ~ 80°C |
| Alarm Output | Open Collector : NPN / PNP(<400mA) | |
| Operating Pressure | 100 bar (max.) | 100 bar (max.) |
| LED Indication: | Flow velocity below set point- Red LED on, Open Flow velocity equals set point- Yellow LED on, Close Flow velocity above set point- 4 Green LED to indicate flow speed, Close | |
| Housing | PVDF | PC |
| Protection Level | IP67 | IP65 |
| Warm-up Time | Approx. 15 Sec | Approx. 15 Sec |
| Connection Thread | G1/2, NPT1/2 | G1/2, NPT1/2 |
| Operating Voltage | 19 ~ 30Vdc | |
| Power consumption | 50mA (max.) | |
| Wiring | 3-wire NPN/PNP Power-brown Grounding-blue Output-black | |
| Accessory | Gasket, 2m Cable | |

PRODUCT SPECIFICATION

| | | |
|-----------------------|---|---|
| Drawing | | |
| Model | SP210 Stainless Steel Type | SP170-(1/2) Explosion Proof Type |
| Measuring Range | Water: 1~150 cm/s Oil: 3~300 cm/s | Water: 1~150 cm/s Oil: 3~300 cm/s |
| Ambient Temperature | -20 ~ 80°C | -20 ~ 80°C |
| Operating Temperature | -20 ~ 80°C | -20 ~ 80°C |
| Alarm Output | Relay: 5A/250Vac | Relay: 5A/250Vac |
| Operating Pressure | 100 bar (max.) | 100 bar (max.) |
| LED Indication: | Flow velocity below set point- Red LED on, Open Flow velocity equals set point- Yellow LED on, Close Flow velocity above set point- 4 Green LED to indicate flow speed, Close | |
| Housing | SUS304 | SUS304 |
| Protection Level | IP67 | IP67 |
| Warm-up Time | Approx. 15 Sec | Approx. 15 Sec |
| Connection Thread | G1/2, NPT1/2 | G1/2, NPT1/2 |
| Operating Voltage | 19 ~ 30Vdc | 19 ~ 30Vdc |
| Power consumption | 60mA (max.) | 60mA (max.) |
| Wiring | 5-wire Relay Output Power- red Grounding- black COM- white NC- yellow NO- blue | |
| Accessory | Gasket, 2m Cable | ————— |

INSTALLATION

INSTALLATION

Please use given water-proof gasket for installing.

1. "a" above and below the SP in diagram 1 has to be 4 times greater than its internal diameter of pipe.(Fig. 1)
2. Make sure that the pipe is bubble free for proper alarming.(Fig. 2)
3. For not-fully-filled pipes, SP is requested to be installed underneath. Liquid level needs to be higher than the probe height. (Fig. 3)
4. SP must be tightly screwed to avoid liquid from leaking out. It can be installed in any angle. For best sensitivity and response speed, please refer to the installation in (Fig. 4)
5. It is suggested to install filtering component in upstream to filter impurities. This is to protect the wear and tear to the device.

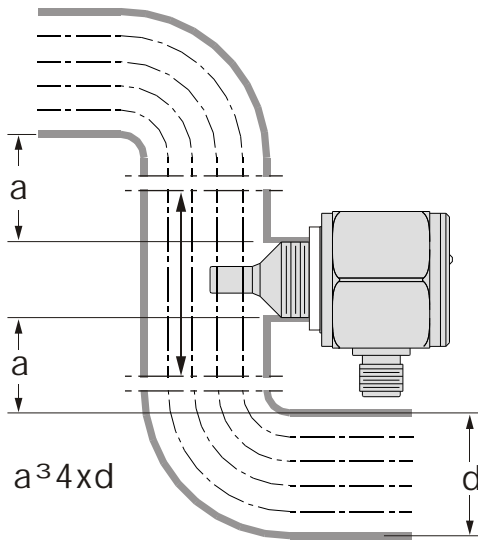


Fig. 1

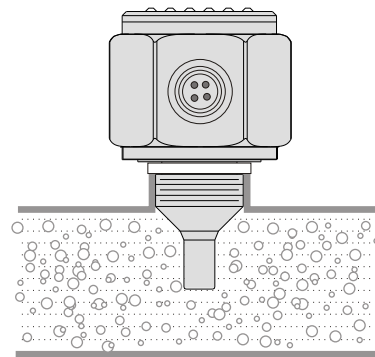


Fig. 2

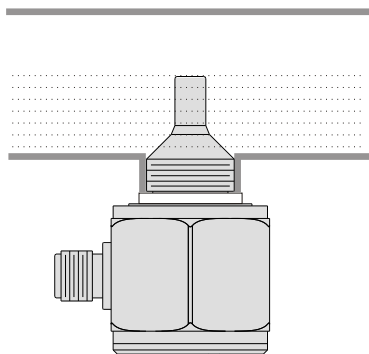


Fig. 3

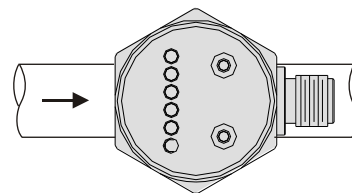


Fig. 4

CONNECTOR DIAGRAM

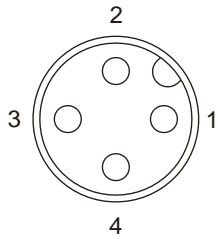


Fig. 5
Wire terminal diagram
(NPN, PNP and 1A relay output type)

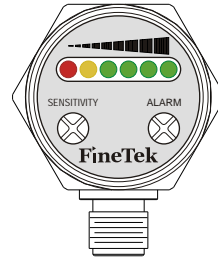


Fig. 6

WIRING

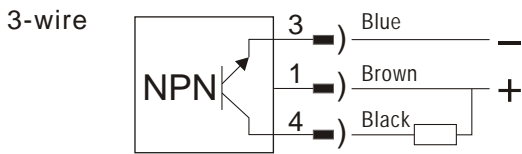


Fig. 7, NPN output type wiring

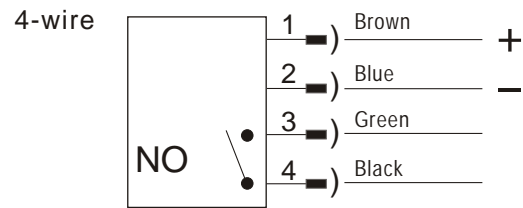


Fig. 10, Relay output type wiring (NO)

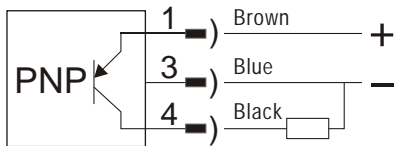


Fig. 8, PNP output type wiring

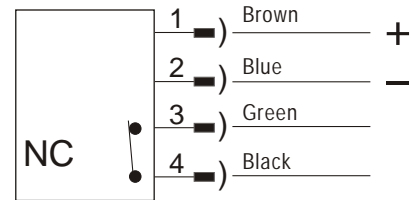


Fig. 11, Relay output type wiring (NC)

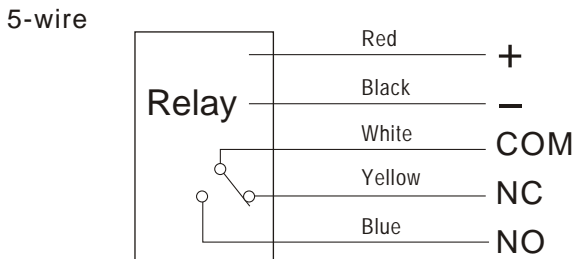


Fig. 9, Relay output type wiring

CODE NAME INFORMATION

SP2 - - - - - ()

Model Description

- 0: Compact Type
- 1: Stainless Steel Type ($\phi 70 \times 78$)
- 2: Plastic Housing Economy Type

Probe Type

- 0: Standard Type
- 1: Probe Extension Type
(PVDF probe not available)
- 2: 120°C High Temperature Type
(plastic housing economy type not available)
- 3: PVDF Anti-Corrosion Type

Material

- 0: SUS304 L: SUS316L S: Other
- 6: SUS316 F: PVDF (for SP203)

Connection

| Size | Specification |
|---------------|---------------|
| A: 3/8" (10A) | Q: PT |
| B: 1/2" (15A) | T: BSP |
| C: 3/4" (20A) | R: PF |
| D: 1" (25A) | U: NPT |
| 2: 1/4" | V: GAS |
| S: Other | S: Other |

*Standard thread connection: 1/2"PF, 1/2"NPT, 1/2"PT

Output

- N: NPN (current limit: 400mA)
- P: PNP (current limit: 400mA)
- A: Relay 1A/30Vdc (NO)
- B: Relay 1A/30Vdc (NC)
- C: Relay 5A/250Vac (NC) (for SP210/ SP211/ SP212)

Cable Wire Length(unit: m)

- 0: None 2: 2m 5: 5m

Length L (Unit: mm)

- * Tolerance of the total product length is $\pm 5\text{mm}$
- * Characteristics, specifications and dimensions are subject to change without notice.
- * Please contact your nearest distributing office for further informations.
- * Max.200mm
- * PVDF and PTFE are available for standard models.

CODE NAME INFORMATION

SP170- - - - ()

Model Description

70 ---Explosion Proof Type

Material

1: SUS304
2: SUS316L

| Size | Specification |
|--|--|
| B: 1/2" (15A) D: 1" (25A) S: Other | Q: PT T: BSP R: PF V: GAS U: NPT S: Other |

Output

C: SPDT 5A/250Vac

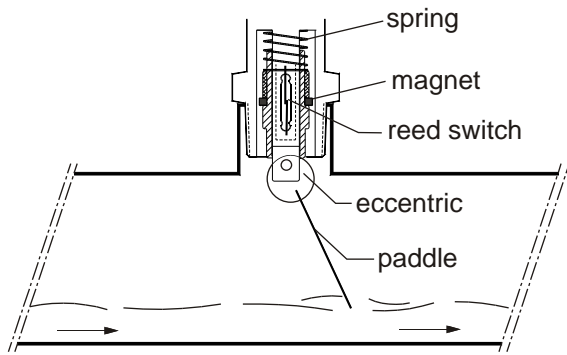
Length L (Unit: mm)

- * Tolerance of the total product length is ± 5 mm
- * Characteristics, specifications and dimensions are subject to change without notice.
- * Please contact your nearest distributing office for further informations.
- * Max.200mm

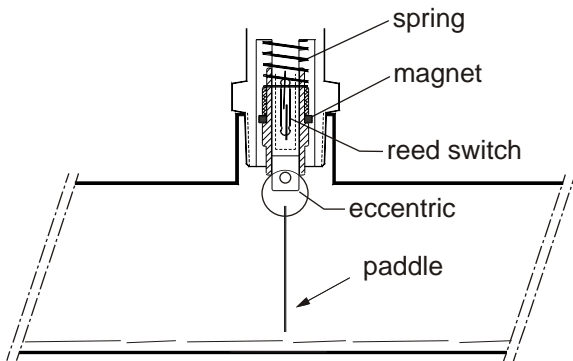
PADDLE TYPE FLOW SWITCH

Flow Switch utilizes the force of liquid flow to propel its paddle in order to detect the incoming flow or moving of the existing liquid in pipe. In condition of static liquid or no liquid, the spring is in expanding and press the magnet downward vertically. Reed switch contact is N.O.

As flow occurs and the paddle is thrust and raised at an upward angle of 20°~30° (or more), the eccentric of paddle will push the magnet upward to actuate the reed switch which is thus in a close circuit. The length of paddle can be adjusted with the diameter of a pipe.



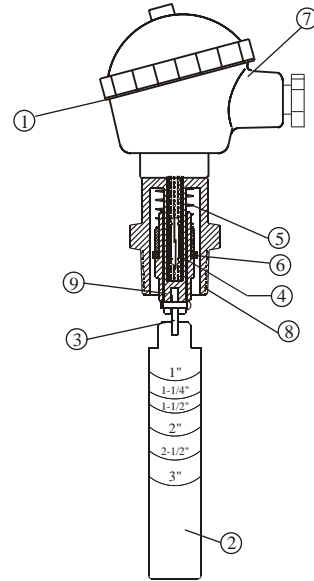
Switch on in case of liquid flowing in pipes



Switch off in case of no moving liquid in pipes

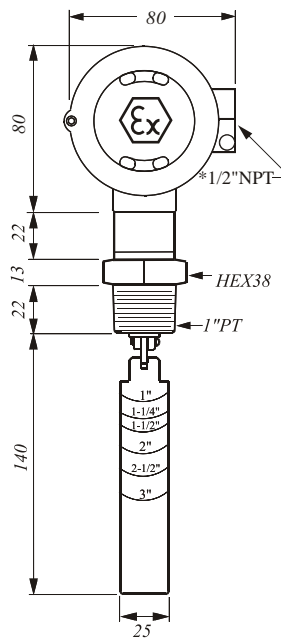
CONFIGURATION CUTTING DRAWINGS

1. O-Ring
2. Paddle
3. Eccentric
4. Reed switch
5. Spring
6. Magnet
7. Housing
8. Screw
9. Center rod

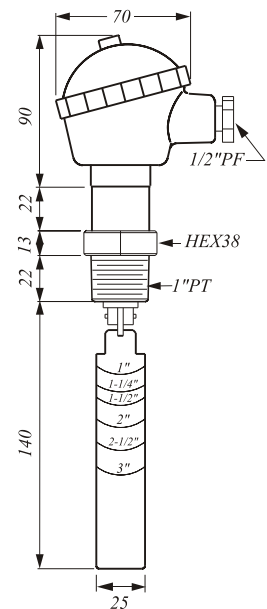


NEPSI

MODEL: SF1710



MODEL: SF1800



*Optional part 1/2" NPT

used for SF1710

| Spec. | Model | SF1710 | SF1800 |
|-------------------------|-------|-----------------------------|-------------------------|
| Housing Material | | Aluminum Alloy, Ex d IIC T6 | Aluminum Alloy, IP65 |
| Operation Temp. | | -30°C~100°C | -30°C~150°C |
| Paddle Material | | SUS304 | SUS304 |
| Operation Pressure | | Max. 355 PSIG | Max. 355 PSIG |
| Pressure Drop Allowance | | 3 PSIG | 3 PSIG |
| Set Point Tolerance | | ± 25% | ± 25% |
| Repeatability Tolerance | | ± 5% | ± 5% |
| Contact Capacity | | 60W 220Vac/200Vdc, SPDT | 60W 220Vac/200Vdc, SPDT |

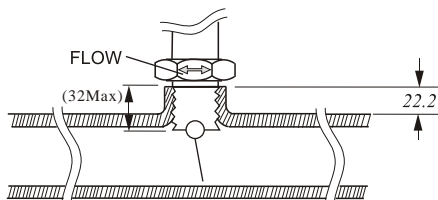
FLOW CONTROL RANGE TABLE

| Paddle Length | 1" | | 1-1/4" | | 1-1/2" | | 2" | | 2-1/2" | | 3" | |
|---------------|------|---------|--------|---------|--------|---------|------|---------|--------|---------|------|---------|
| | Act. | De-Act. | Act. | De-Act. | Act. | De-Act. | Act. | De-Act. | Act. | De-Act. | Act. | De-Act. |
| 1" | 5 | 4 | 8.5 | 6.5 | 12 | 9 | 17 | 15 | | | | |
| 1-1/4" | | | 6.5 | 4.5 | 9 | 7 | 15 | 12 | 23 | 20 | | |
| 1-1/2" | | | | | 14 | 10 | 23 | 16 | 32 | 25 | | |
| 2" | | | | | | | 18 | 12 | 24 | 17 | 33 | 27 |
| 2-1/2" | | | | | | | | | 20 | 13 | 27 | 22 |
| 3" | | | | | | | | | | | 22 | 16 |

※ 1 Gallon=3.872 Litter

INSTALLATION

1. Paddle length established approximate actuation setting of a Flow Switch unit. Paddle length is decided according to the lowest point of paddle while actuating the reed switch and the diameter of the pipe. Cut off the paddle at proper pipe size mark or wherever desired but not less than 1" left.
 2. The paddle must be parallel to the cutting face of a pipe and the mounting screw is 1" NPT.
 3. The FLOW mark on the screw hexagon must be parallel to the pipe and the ground.
 4. Before installing the unit to a tee pipe, be sure to apply tape seal to the screw then tighten up.
- It is not recommended to the 1" NPT plastic pipe.



CAUTION

1. The pressure and temperature ranges as shown in the catalog, must not be exceeded and also take the abrupt pressure and temperature into considerations.
2. Operating temperature changes do affect switch set points. In case of the liquid temperature would vary with the specific gravity changes during processing, please contact us for assistance.
3. The flow switch is designed for shock and vibration resistance. However, shock and vibration should be as minimized as possible.
4. Excessive contamination in fluid might inhibit Paddle operation, occasional wipe-down would be necessary.
5. Electrical entry and mounting require sealing from moisture.