Single Point Flow Switch

(2025-02-07)

SU 1003

Instructions for Installation and Adjustment

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This Single Point Flow Switch SU1003 is designed and manufactured to the highest standards and is individually tested before delivery.

Prior to installation, please check the label on the Single Point Flow Switch to make sure that the correct voltage rating and model reference have been supplied, and carefully read the following instructions.

Please follow these installation, connection and adjustment instructions carefully.

Non-compliance or misuse will invalidate your warranty coverage.

Equipment installation, connection and adjustment by qualified personnel only!

6 Maintenance

E-T-A Flow Switches are virtually maintenance free.

However:

a The monitoring head sensing tips must be kept free of deposits buildup.

b Avoid damaging the sensing tips during cleaning.

Note:

Excessive buildup on the sensing tips will increase the response time to changes in the process.

When first installed the flow switch should be checked periodically to see if cleaning is required until an operating pattern is established.

7 Operating difficulties

Problem: Incorrect switching

Solution:

- Avoid bubbles in the medium.
- Ensure monitoring head has been correctly installed in accordance with para. 3.
- Adjust the switch point to permit a greater differential from the normal flow rate, particularly in the event of a wide temperature range in the medium.
- Remove the monitoring head and clean the sensors.

Problem: Switch point cannot be adjusted.

Solution:

- Verify position of the process media selector switch and re-adjust it, if required (see para 5.3). This procedure sets the gain for the sensing circuits.

5.2 Time delay (optional)

The SU1003 has an optional time delay of either 10 seconds or 60 seconds.

- The 10 sec. delay is for “Setpoint Switching”
- The 60 sec., one-shot (one-time non-resetable), “Power On” delay starts when power is applied to the SU1003 and will not become active again until initial power is again applied to the unit.

The delay in both cases is from relay “energized” to relay “de-energized”.

- The LED will turn from **GREEN** (relay energized) to **ORANGE** (green/red) (relay energized) and stay **ORANGE** for the duration of the delay and then turn to **RED** (relay de-energized).
- The “Setpoint Switching” time delay will reset to **GREEN** without the relay de-energizing if the flow condition restores to the desirable condition during the time delay.

5.3 Process media selection

The SU1003 can be easily switched to one of three different flow conditions as follows (see fig. 6):

O = oil - 0.06 FPS to 16.4 FPS

G = gas - 3.0 FPS to 160 FPS

W = liquids - 0.03 FPS to 7.0 FPS

Use a suitable screwdriver or small blunt tool to manipulate the slide switch to line up with the desired position. During calibration for liquids, gases, oil, slurries or granules it may be necessary to use the switch setting (GAIN) that works best for your medium. The above settings are suggested settings.

5.4 Setpoints

The SU1003 relay can be configured in one of the two following ways (See Fig. 5):

- When power is applied to the SU1003 (with a **No Flow** condition or the Flow is below setpoint) the relay remains de-energized and the LED will be **RED**. When the Flow increases to the setpoint the relay energizes and the LED turns to **GREEN** (See fig. 5)
- When power is applied to the SU1003 (with a **Flow** condition or the Flow is above setpoint) the relay remains de-energized and the LED will be **RED**. When the Flow decreases to the setpoint the relay energizes and the LED turns to **GREEN** (See fig. 5).

5.5 Adjustment

1 Set the flow rate in the pipeline to the critical value at which the flow switch is to be adjusted.

The following conditions should exist:

a Ensure that the flow is at temperature

b Allow the sensor probe to reach thermal stabilisation (approx. 5 min)

CAUTION:

⚠ Care should be taken to ensure that the flow is continuous and laminar, and for liquids free of bubbles (doesn’t apply when monitoring foam).

2 **Flow rate adjustment switching point** (See fig. 6 for details.)

- Use a suitable screwdriver to adjust the Flow adjustment potentiometer. Start with the LED illuminating colour **GREEN**, turn the potentiometer clockwise towards **R** until the LED turns **RED**.

  It is recommended that this adjustment be repeated several times to ensure that the relay is switching at the desired switching point (setpoint).

1 Description

The Single Point Flow Switch SU1003 is designed to operate with liquids, gases, oil, slurries or granules.

Important operational safety and reliability enhancing features designed and built into these units include:

- Calorimetric flow monitoring, which avoids the need for moving parts in the flow stream.
- Steplessly adjustable switching point that is clearly indicated by means of a multicolour LED (red/orange/green).
- The Flow Switch can be set for oil (O), gas (G) or liquids (W) by means of a three position slide switch.
- One, 5 A, SPDT, relay output suitable for use with 230 V AC; 115 V AC or 24 V AC or DC.

CODE	Process connection “A”		“B”
050	1/2" MNPT		0.7"
075 *		3/4" MNPT	0.9"
075 **		3/4" MNPT	0.7"
100		1" MNPT	0.7"
	Insertion length “C”		
01	1.0" [1]	1.0" [1]	N/A
02	2.0" [1]	2.0" [1]	1.0" [3]
04	4.0" [1]	3.0" [2]	3.0" [3]
06	6.0" [1]	5.0" [2]	5.0" [3]
08	8.0" [1]	7.0" [2]	7.0" [3]
10	10.0" [1]	9.0" [2]	9.0" [3]

* 1.0" and 2.0" insertion length

** 3.0" through 9.0" insertion length

[1] No size adaptor

[2] 1/2" FNPT to 3/4" size adaptor supplied

[3] 1/2" FNPT to 1" size adaptor supplied

All dimensions in inches.

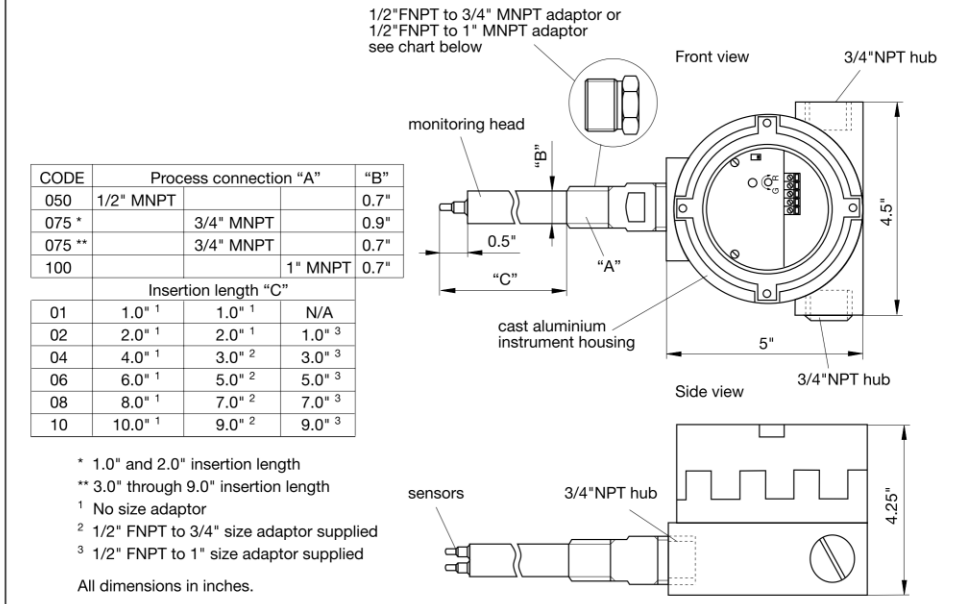


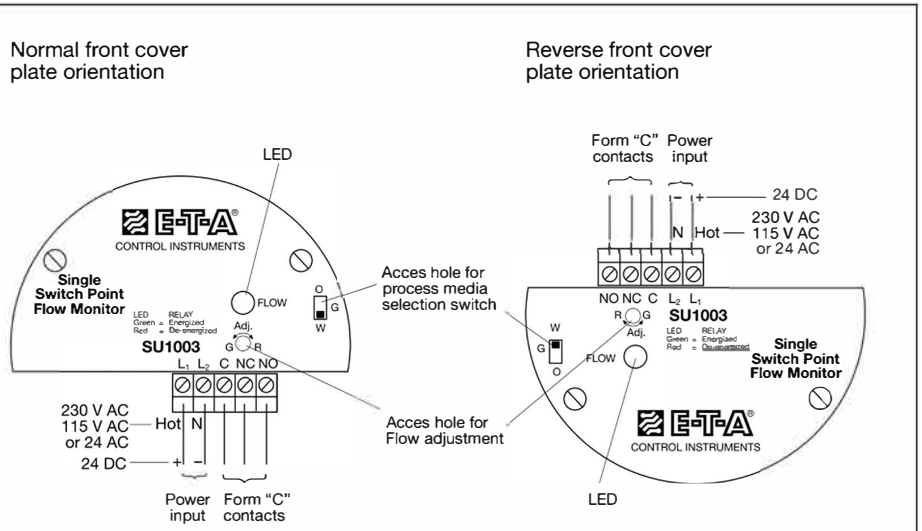
Fig. 1

2 Technical data

Flow rate range:	
Liquids	0.03 to 7.0 ft/sec
Gases	3 to 160 ft/sec
Oil	0.06 to 16.4 ft/sec
Relay outputs:	one, 5 A, max. 250 V AC/30 V DC, SPDT, form “C”
Ambient temperature:	-13 °F to +122 °F
Fluid Temperature:	-13 °F to +158 °F
Pressure resistance of the monitoring head (stainless steel):	4400 PSI
Response time:	
water	approx. 2 s *
oil	approx. 4 s *
air	approx. 7 s *

* Delay with the switch point set to 3.3 ft./s and the flow rate at 6.6 ft./s, after a sudden complete flow stoppage.

Degree of protection:	IP67 FM/CSA approved housing
Input voltage:	230 V (+10%/-15%) AC 115 V (+10%/-15%) AC 24 V (+10%/-15%) AC 24 V±10% DC
Power consumption:	approx. 1.5 VA
Standard materials of construction:	
Housing	Epoxy painted cast aluminum
Sensor	316 SS

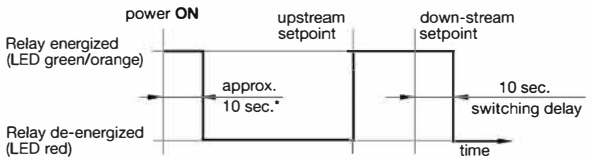


Note: Normal front cover plate orientation is used on standard unit.
Reverse front cover plate orientation is optional for top (upside down) mounting.

Fig. 2

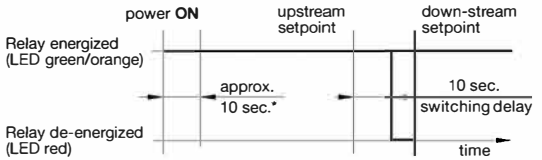
Optional (10 sec. Setpoint switching delay, energized to de-energized)
Relay configuration - **NO FLOW** relay de-energized (LED red) below setpoint

Jumper	Status
S5	C to 1 closed C to 2 open
S6 S7	open closed



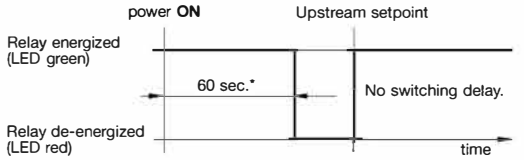
Optional (10 sec. Setpoint switching delay, energized to de-energized)
Relay configuration - **FLOW** relay energized (LED green) below setpoint

Jumper	Status
S5	C to 1 open C to 2 closed
S6 S7	open closed



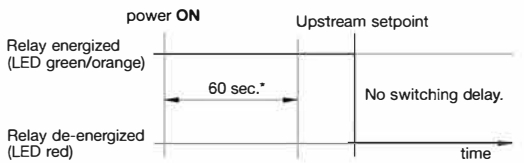
Optional (60 sec. Power On delay, setpoint switching locked out)
Relay configuration - **NO FLOW** relay de-energized (LED red) below setpoint

Jumper	Status
S5	C to 1 closed C to 2 open
S6 S7	open open



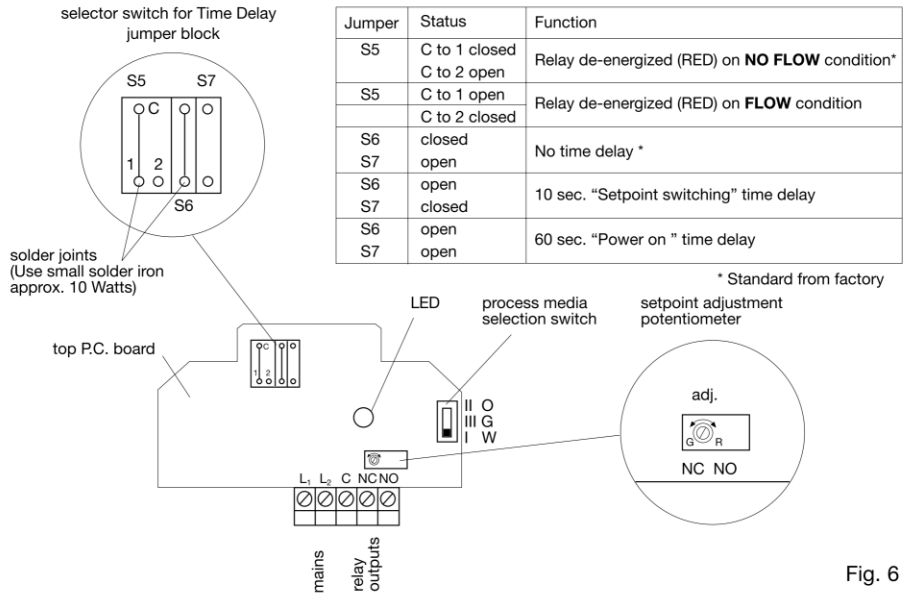
Optional (60 sec. Power On delay, setpoint switching locked out)
Relay configuration - **FLOW** relay energized (LED green) below setpoint

Jumper	Status
S5	C to 1 open C to 2 closed
S6 S7	open open



* Setpoint switching locked out during the one-shot delay.

Relay switching /Jumper settings



Jumper	Status	Function
S5	C to 1 closed C to 2 open	Relay de-energized (RED) on **NO FLOW** condition*
S5	C to 1 open C to 2 closed	Relay de-energized (RED) on **FLOW** condition
S6 S7	closed open	No time delay *
S6 S7	open closed	10 sec. “Setpoint switching” time delay
S6 S7	open open	60 sec. “Power on ” time delay

* Standard from factory

Fig. 6

Standard (Time Delay inactive)
Relay configuration - **NO FLOW** relay de-energized (LED red) below setpoint

Jumper	Status
S5	C to 1 closed C to 2 open
S6 S7	closed open

Optional (Time Delay inactive)
Relay configuration - **FLOW** relay energized (LED green) below setpoint

Jumper	Status
S5	C to 1 open C to 2 closed
S6 S7	closed open

3 Installation

1 Check that the Flow Switch is suitable for the medium to be monitored and for available supply voltage.

2 For best performance the monitoring head should be installed in the pipeline in accordance with the following conditions (see fig. 3).

a The monitoring head should be installed only in a straight section of piping. There should be a distance of at least 10 pipe diameters before the monitoring head and 5 pipe diameters after the monitoring head before or after any bends and changes in pipe diameter, to avoid any effects of turbulence.

b In the case of vertical pipelines the monitoring head must be installed where the flow is rising.

c For horizontal pipelines the monitoring head should be mounted on the underside of the line (suspended).

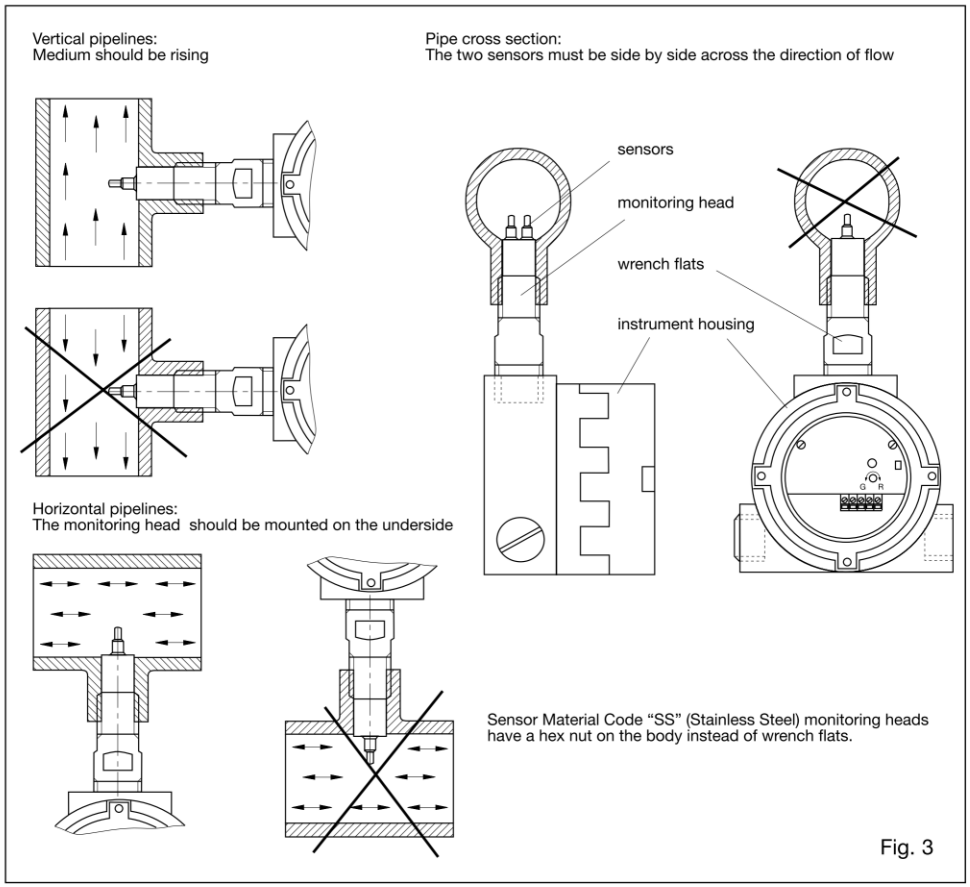


Fig. 3

d Avoid installing the monitoring head in known areas of high electrical inductance, capacitance, or high-frequency electro-magnetic fields.

e If the medium to be monitored is a gas, the mounting orientation of the monitoring head in either the vertical or horizontal position is less important.

f The monitoring head should be inserted into the pipeline such that the two sensing tips are fully in the flow stream and are positioned perpendicular to the flow stream (side by side across the direction of the flow). (See fig. 3.)

Care should be taken to avoid inserting the monitoring head too far into the pipe and unduly reducing the inside diameter of the pipe.

3 When fitting the monitoring head, a recognized compound of material should be used to seal the threads which will withstand the medium.

CAUTION:

⚠ When tightening the monitoring head on the SU1003 to the pipeline use the wrench flats on the body of the monitoring head.

DO NOT turn or apply torque to the instrument housing.

4 Electrical connection

CAUTION:

⚠ Check that the supply voltage corresponds with the voltage rating shown on the system.

1 Check the flow switch label for correct power input.

- For 230 V, 115 V and 24 V AC, connect supply voltage to terminals **L_1** (hot) and **L_2** (neutral).
- For 24 V DC, connect supply voltage to terminals **L_1** (+) and **L_2** (-).

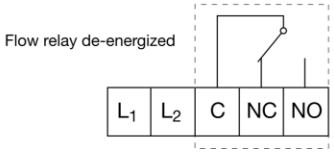
Note:

Terminals C, NC, NO are the relay contacts.

2 Feed the supply input cable and relay connecting cable through the appropriate hub.

3 Connect the supply input cable to terminals L_1 and L_2, and the relay connecting cable to terminals C, NC, NO and tighten with caution. Do not overtighten.

4 Connect power supply.



Relay contacts:
C - common contact
NC - normally closed contact
NO - normally open contact

Fig. 4

5 Relay/Setpoint - operation and adjustment

CAUTION:

⚠ Ensure flow switch has been correctly installed and connected in accordance with paras. 3 and 4.

Read the entire section including notes before starting adjustment.

Note:

The standard relay configuration is de-energized on **No Flow** condition.

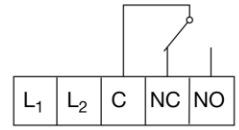
For relay de-energized on **Flow** condition specify when ordering.

To change in the field see “internal Jumper Settings” fig. 6.

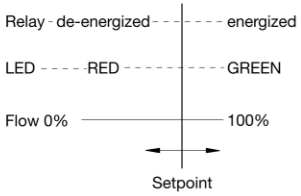
5.1 Relay

- When the multicolor LED is RED the relay is de-energized.
- When the LED turns ORANGE and GREEN the relay is energized.

When the relay is de-energized the conditions shown in the diagram (fig. 5) exist and when it energize it switch to the opposite condition.



Relay de-energized on **NO FLOW** condition configuration



Relay de-energized on **FLOW** condition configuration

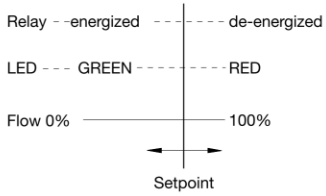


Fig. 5