
NuTec[®] Series Flow & Level Monitoring Switch Installation and Operation Guide

Quick Installation and Adjustment Overview

Section A - Instrument Description and Identification

Section B - Instrument Installation

Install the instrument as appropriate for the application. Take extra precaution not to damage the sensing elements/surface. If wiring conduit is required, make sure there are no obstructions leading to the wiring ports. Check for leaks.

Section C - Instrument Wiring

Verify the power and output load requirements for the instrument and install the proper wire size for the application. Wiring to relays will require knowledge of the alarm state and load circuit. Take extra precaution not to damage the control circuits.

Section D - Power Up, Functional Verification and Adjustment.

Before applying power to the instrument, inspect the installation workmanship. In most cases the instrument will detect a flow or level alarm with the factory settings. If the instrument does not respond, responds slowly or the alarm responds opposite to the required indication, follow the adjustment procedure in this section or go to Section E.

Section E - Maintenance and Troubleshooting

Section A - Instrument Description and Identification

Thoroughly understanding the capabilities of the NuTec instrument, and its intended use for your application, will make the installation much easier. This installation guide describes the four NuTec models available.

LS2000

The model LS2000 is an insertion instrument capable of detecting liquid levels or product interfaces in a wide range of processes. The instrument can be top or side mounted. The process connection choices are male ¼ inch NPT, ¾ inch NPT or 1-1/2 inch, 150 lb flange. See the installation outline drawings on pages 3 and 4 for the correct mounting dimensions.

FS2000

The model FS2000 is an insertion instrument capable of detecting flow/no-flow in a wide range of processes. The instrument can be top or side mounted. The process connection choices are male ¼ inch NPT, ¾ inch NPT or 1-1/2 inch, 150 lb flange. See the installation outline drawings on pages 3 and 4 for the correct mounting dimensions.

FS2000H

The model FS2000H is an insertion instrument capable of detecting flow/no-flow in a wide range of processes. This probe offers our highest range for flow detection. This probe is not required to protrude into the process flow, but can be inserted even with the pipe inside diameter and still offer extended flow ranges. The process connection is a 1" NPT male thread. See the installation outline drawings on pages 3 and 4 for the correct mounting dimensions.

FS2000L

The model FS2000L is a non-intrusive, in-line instrument capable of monitoring the flow rate of a wide range of gas or liquid processes. The instrument can be mounted vertically or horizontally. The process connection choices are male NPT, butt weld or sanitary flange. See the installation outline drawings on pages 3 and 4 for the correct mounting dimensions.


SPECIFICATIONS

Model	FS2000 Insertion Flow Switch (I) ³ LS2000 Insertion Level Switch (II) ³ FS2000H Insertion Flow Switch, High Flow Rate (III) ³ FS2000L In-Line Flow Switch, Non-Intrusive (IV) ³		LS2000 Level Switch																			
Material of Construction:	304/305 or 316L Stainless Steel (I & II) 316L Stainless Steel (III & IV)		Accuracy:	Top Mount: ±0.250 inch [±6mm] from element tip Side Mount: ±0.125 inch [±3mm] from centerline of element tip																		
Operating Temperature:	Sensor Element: -40° to +250°F [-40° to +121°C] Control Circuit: -0° to +140°F [-18° to +60°C]		Response Time:	Dry to Wet: Less than 2 seconds Wet to Dry: Less than 5 seconds Wet to Wet: interface: Less than 10 seconds																		
Maximum Operating Pressure:	For Process Connections With: Male NPT/Compression Fitting: 500 psig [35 bar (g)] Butt Weld: 500 psig [35 bar (g)] Flanges (Sanitary): 100 psig [7 bar (g)] (IV) Flanges (ANSI): Per Specification (I, II)		FS2000 Flow Switch																			
Input Power:	24 Vac or Vdc. 3 watts max. 100 to 240 Vac. 5 watts max. 2-Wire Loop Power (I, II, IV) 22.5 to 33 Vdc .5 watts max		Setpoint Range:	Water: 0.1 – 1.5 fps [0.03 – 0.45 mps] Hydrocarbon: 0.1 – 2.0 fps [0.03 – 0.60 mps] Air: 0.5 – 100 sfps [0.15 – 30 nmps]																		
Signal Output:	Available on 24 Volt and 100 to 240 input power units. Alarm indicator is a 6 amp relay, 28 Vdc/240 Vdc resistive. Secondary alarm indicator is an open collector circuit (250 mA maximum). FS2000, FS2000H and LS2000 Only 2 2-Wire Loop Power: Alarm indicator responds to change in current draw between 14 mA and 18 mA.		Repeatability:	±1% of Setpoint Range																		
Installation:	Top or Side Mount. Axial flow direction permissible.		Response Time:	0.5 – 2.5 seconds																		
Service:	General Purpose for Gases and Liquids		FS2000H Flow Switch																			
Agency Approvals:	FM, CSA (I, II, III, IV)		Setpoint Range:	Water: 0.1 – 10 fps [0.03 – 3 mps] Hydrocarbon: 0.2 – 20 fps [0.06 – 6 mps] Air: 0.25 – 750 sfps [0.08 – 230 nmps]																		
			Repeatability:	±1% of Setpoint Range																		
			Response Time:	0.5 – 7 seconds																		
			FS2000L Flow Switch (Non-Intrusive)																			
			Setpoint Range:	Water: 0.1 – 10 fps [0.03 – 3 mps] Air: 0.5 – 300 sfps [0.15 – 91.4 nmps]																		
			<table border="1"> <thead> <tr> <th>Tubing</th> <th>Air / Gas</th> <th>Water</th> </tr> </thead> <tbody> <tr> <td rowspan="2">½ inch</td> <td>1.02 – 13.4 scfm</td> <td>0.03 – 3.4 gpm</td> </tr> <tr> <td>[0.000 – 0.38 scmm]</td> <td>[0.11 – 12.9 lpm]</td> </tr> <tr> <td rowspan="2">1 inch</td> <td>0.12 – 74 scfm</td> <td>0.18 – 18.5 gpm</td> </tr> <tr> <td>[0.0030 – 2.10 scmm]</td> <td>[0.68 – 70 lpm]</td> </tr> <tr> <td rowspan="2">2 inch</td> <td>0.57 – 342 scfm</td> <td>0.85 – 85.5 gpm</td> </tr> <tr> <td>[0.0160 – 9.70 scmm]</td> <td>[3.22 – 324 lpm]</td> </tr> </tbody> </table>		Tubing	Air / Gas	Water	½ inch	1.02 – 13.4 scfm	0.03 – 3.4 gpm	[0.000 – 0.38 scmm]	[0.11 – 12.9 lpm]	1 inch	0.12 – 74 scfm	0.18 – 18.5 gpm	[0.0030 – 2.10 scmm]	[0.68 – 70 lpm]	2 inch	0.57 – 342 scfm	0.85 – 85.5 gpm	[0.0160 – 9.70 scmm]	[3.22 – 324 lpm]
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			Repeatability:	±1% of Alarm Setpoint																		
			Accuracy:	±3% of Alarm Setpoint ±0.25% of Setpoint Range																		
			Response Time:	Adjustable from 0.5 – 2.5 seconds																		

NOTES:


- Special Conditions for Safe Use:
 - Provisions shall be made to prevent the rated voltage being exceeded by transient disturbances of more than 40%.
 - For applications in explosive atmospheres caused by air/dust mixtures, cable and conduit entries used shall provide a degree of ingress protection of at least IP 54 according to EN 60529.
- For applications in explosive atmospheres caused by air/dust mixtures, cable and conduit entries used shall Customer must provide a 4-20 mA current loop that will maintain 18 to 29.5 volts at the controller control circuit.
- Roman numerals reflect model designation.

Section B - Instrument Installation

For the FS2000, FS2000H and the LS2000: An orientation mark  is etched on a flattened area of the sensor element body close to the housing.

For the LS2000, the orientation mark can be perpendicular or parallel to the liquid level. The sensor element can be installed top mount 90° to the liquid surface.

For the FS2000 and the FS2000H, the orientation mark must be parallel to flow (± 3°). For liquid vertical flows, FCI recommends that the sensor element be installed where the flow is going in the up direction.

For the FS2000L: A flow arrow mark  is etched onto the sensor element body close to the housing. The sensor element can be at any angle as long as the flow direction follows the flow arrow. Liquid applications where the flow element is positioned other than horizontally, FCI recommends that the flow go in the up direction.

For All Models: The position of the sensor element in reference to the media is paramount. With this in mind, the position of the control circuit enclosure also needs to be considered. After the sensor element is installed, the enclosure cover must be accessible for wiring and servicing. It is preferred that the conduit port is positioned in a downward direction to reduce the possibility of moisture collecting in the enclosure. The enclosure can be repositioned by up to 1/2 turn to ease conduit installation.

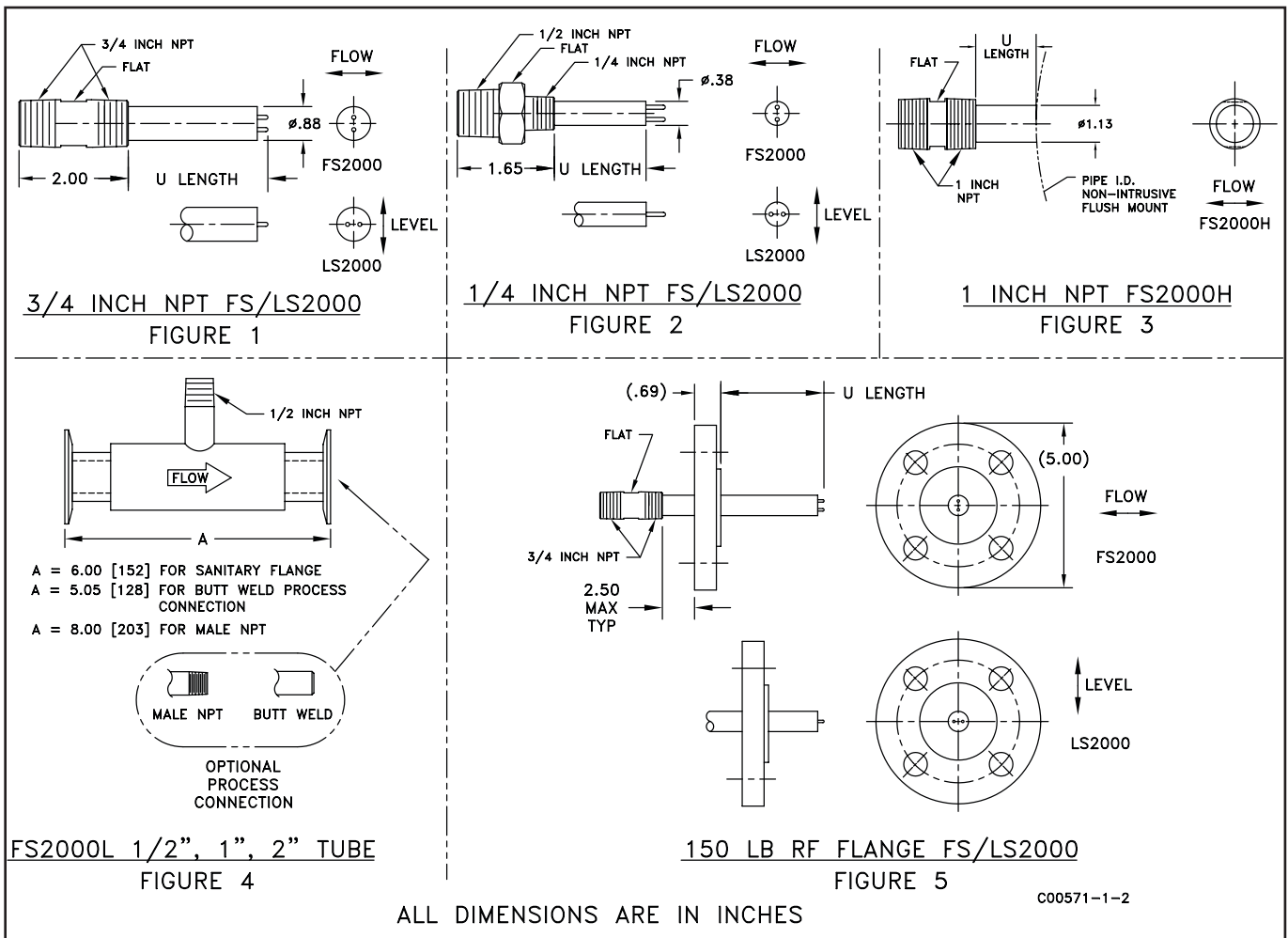
CAUTION: To minimize the possibility of damage, leave the protective covers over the sensing area until the time of installation. Take extra precaution with the sensing elements and surface when installing.

For NPT Process Connections: Apply the appropriate sealant compatible with the process media to the male threads. Tighten until the orientation mark is positioned correctly. Check for leaks.

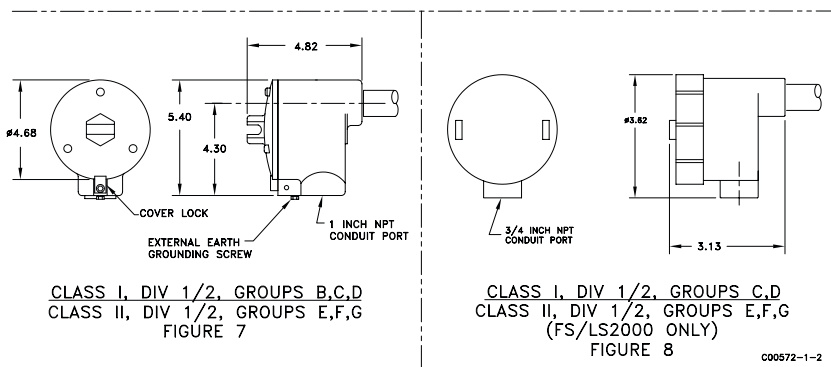
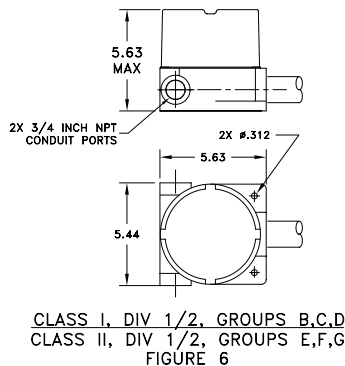
For Flange Connections: Refer to the installation outline diagrams. The bolt pattern on the process connection flange must be positioned in a way that the orientation mark on the sensor element ends up in the correct position as mentioned above. Use gasket material compatible to the process media. Check for leaks.

For Sanitary Flange Connections: Use o-rings compatible with the media. Position the o-ring(s) and join the sanitary flanges. Install the flange clamp(s) snug to permit rotation of the sensor element. Rotate the sensor element until the orientation mark is correctly positioned. Tighten the clamps and check for leaks.

For Butt Weld Connections: Make sure all parts are cleaned. Mount the instrument to check fit. Make sure the flow arrow is in the same direction of flow. Align the inside diameter (I.D.) of the instrument to the I.D. of your piping. Tack weld in place. Use a qualified welder to make welds per ASME Section IX, Boiler Code. For best results, 100% penetration with the weld size of 1 1/2 times the wall thickness is desired. Check for leaks.



Sensor Element Diagrams



Control Circuit Enclosure Diagrams

Section C - Instrument Wiring

There are three basic wiring configurations with the main difference being the way the instrument is powered. Only qualified personnel are to wire or test this instrument. The operator assumes all responsibilities for safe practices while wiring or troubleshooting. Refer to the wiring instructions below as appropriate for your instrument.

CAUTION: The instrument contains electrostatic discharge (ESD) sensitive devices. Use standard ESD precautions when handling the instrument.


Recommended Minimum Wire Gauge

The following wire gauge chart specifies the correct wire for the distance to the power source or loads. Note that the open collector maximum cable length is to 50 ft. It is also recommended that the open collector cable be shielded and that the cable is not run in the same conduit with the power source or the relay load.

Connection	Maximum Distance for Wire Gauge					
	10 ft. (3 m)	50 ft. (15 m)	100 ft. (30 m)	250 ft. (76 m)	500 ft. (152 m)	1000 ft. (305 m)
Input Power 100 – 240Vac	22	20	18	16	14	12
Input Power 24(AC or DC)	24	24	22	22	20	18
Loop Power	24	24	22	22	20	18
Relay Output	18	16	14	12	10	x
Open Collector Output	24	22	x	x	x	x

Grounding

The switch must be properly grounded for safety and operational reasons.

100 –240 Vac input power units: A minimum gauge of 14 AWG is required on the earth ground terminal.  Verify that the resistance to earth ground is less than 1 ohm. Do not connect the earth ground to DC ground (terminals marked "GND" or "COM" or "-").

24 volt and Two wire (loop powered) units: An earth ground wire is attached to the inside of the enclosure on a grounding screw along with the ground wire from the control circuit. Use the recommended wire gauge specified for the input power and distance listed in the chart above. Do not connect the earth ground to DC ground (terminals marked "GND", "COM" or "-").

Input Power, 100-240 Vac

FCl recommends installing an input power disconnect and a fuse near the instrument to interrupt power during installation, maintenance, calibration, alarm selection, and troubleshooting procedures. Install conduit according to the local electrical codes or hazardous location requirements. If the wires are to be pulled through the enclosure it is recommended that the electronics first be removed from the housing (refer to removal instructions on page 9).

1. Make sure power is OFF before wiring the instrument.
2. With the enclosure cover removed, locate the control circuit (top board) captive nylon 4-40 hold down screw (next to the silkscreened serial number block). Unfasten the screw from the nylon hex standoff and flip the board up to expose the power supply (bottom board).
3. Attach the AC power leads to TB4 on the power supply board. The terminal assignments are silkscreened on the board. Make sure that an earth ground wire is attached to the earth ground terminal. See Figure 9.
4. Attach the relay load wires to TB5 on the power supply board. The terminal assignments are silkscreened on the board (the relay contact labeling reflects the de-energized alarm state). The relay's maximum rating is 6 amps 28 Vdc-100/240 Vac, resistive loads. The minimum voltage and current rating is 10 volts, 20 mA. If the load is less than the minimum values use the open collector terminal on TB1 located on the solder side of the control circuit (top board).
5. After making the power/relay/open collector connections, secure all the wires to the power supply's tie down bracket using a cable tie wrap. See Figure 9. The tie down bracket is a safety agency requirement that provides wiring strain relief and prevents fly off of any wire carrying high voltage.
6. After securing the wiring, lower the control circuit board onto the nylon hex standoff and secure it with the 4-40 captive screw.
7. Refer to the next section for functional verification and adjustments.

Input Power, 24 Vdc/Vac

FCl recommends installing an input power disconnect and a fuse near the instrument to interrupt power during installation, maintenance, calibration, alarm selection, and troubleshooting procedures. Install conduit according to the local electrical codes or hazardous location requirements. If the wires are to be pulled through the enclosure it is recommended that the electronics first be removed from the housing (refer to removal instructions on page 9).

1. With the enclosure cover removed, locate the control circuit's (top board) captive nylon 4-40 hold down screw (next to the silkscreened serial number block). Unfasten the screw from the nylon hex standoff and flip the board up to access its underside (solder side).
2. Determine the type of power to be used (24 Vac or 24 Vdc) and attach the power leads to TB1 on the control circuit solder side. The terminal assignments are silkscreened on the board. See Figure 10. Make sure that an earth ground wire is attached to the earth ground terminal inside the housing.
3. Attach the relay load wires to TB2 on the control circuit solder side. The terminal assignments are silkscreened on the board (the relay contact labeling reflects the de-energized alarm state). The relay's maximum rating is 6 amps 28 Vdc-100/240 Vac, resistive loads. The minimum voltage and current rating is 10 volts, 20 mA. If the load is less than these values use the open collector terminal on TB1 on the control circuit solder side. See Figure 10.
4. After making all the wire connections, lower the control circuit board onto the nylon hex standoff and secure it with the 4-40 captive screw. Refer to the next section for functional verification and adjustments.

Input Power, Two Wire (Loop Power)

FCI recommends installing an input power disconnect and a 1/8 amp, fast blow fuse near the instrument to interrupt power during installation, maintenance, calibration, alarm selection, and troubleshooting procedures. Install conduit according to the local electrical codes or hazardous location requirements. If the wires are to be pulled through the enclosure it is recommended that the electronics first be removed from the housing (refer to removal instructions on page 9).

1. With the enclosure cover removed, slide the control circuit out half way to expose terminal block P1, Figure 13.
2. Connect the loop power leads to P1 as indicated on the control circuit. See Figure 11. Make sure that an earth ground wire is attached to the earth ground terminal inside the housing. It is very important that the current loop connected to P1 maintains a voltage range between 18 and 29.5 volts at the control circuit. Figure 11 shows a typical wiring configuration with a current sense device having 250 ohms impedance. With this load, the power supply can be 22 to 33 Vdc. Check the load impedance of the current sense device and the power supply and verify that they are compatible the NuTec instrument.
3. If the open collector switch is needed, make the connections to P1. See example circuit, Figure 11.
4. After making all the wire connections, slide the control circuit into the housing until it passes the rim of the housing.

Refer to the next section for functional verification and adjustments. .

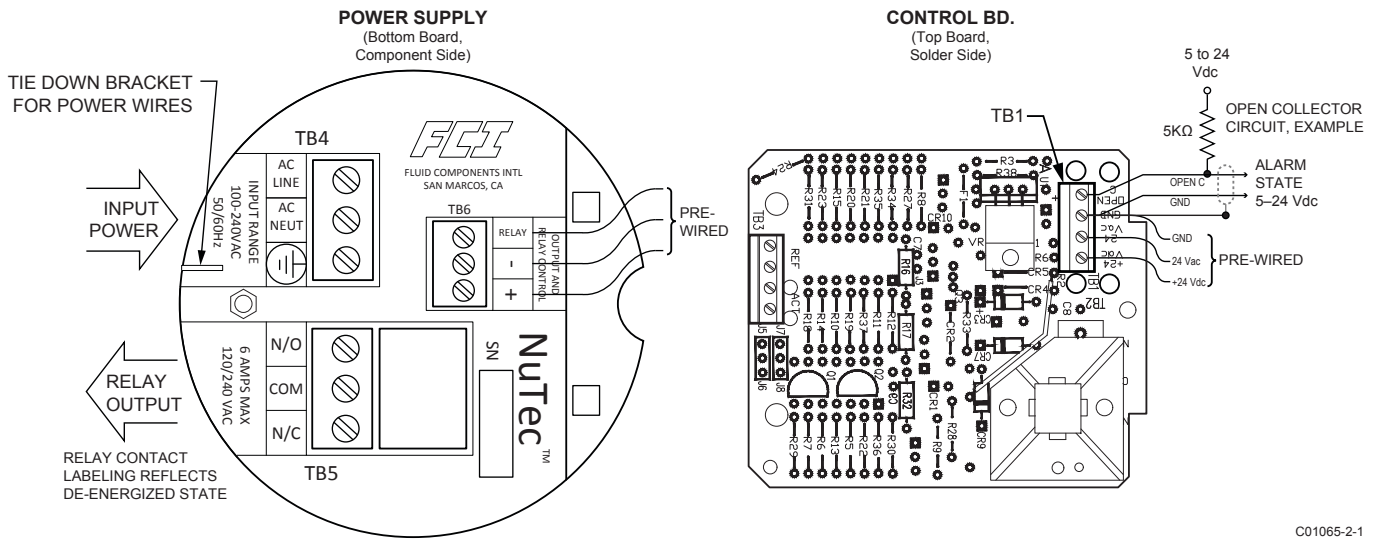


Figure 9 100 - 240 Vac Input Power

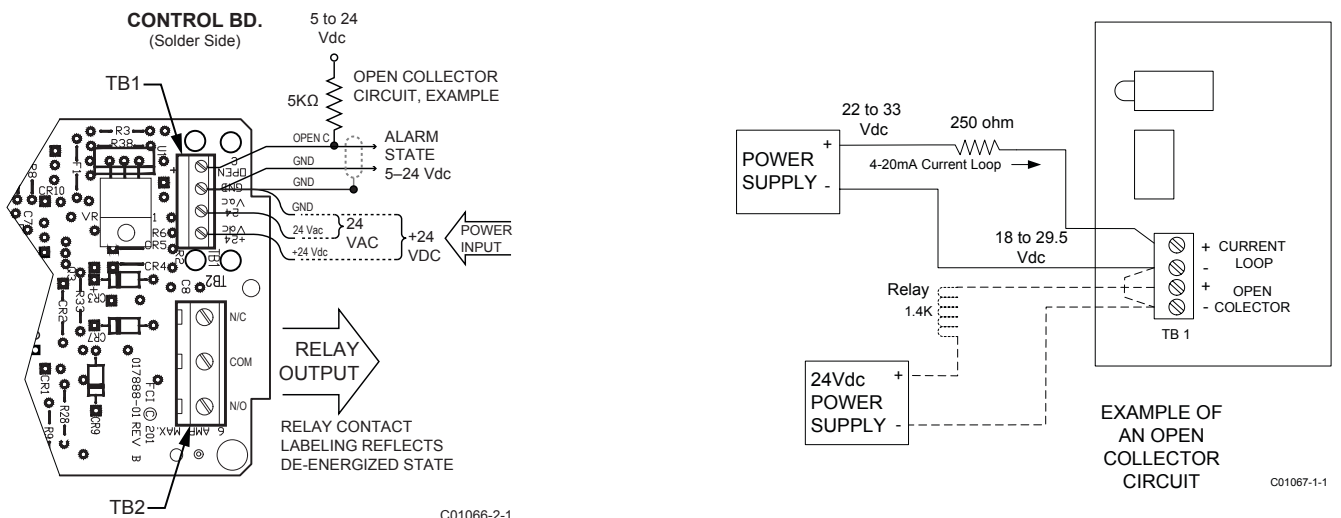


Figure 10 24 Vdc/Vac Input Power

Figure 11 2 Wire (Loop Power)

Section D – Power Up, Functional Verification and Adjustment

Before applying power to the instrument, it is recommended that a third party inspect the installation workmanship. Make sure wires are not pinched or frayed. Check for matching serial numbers on the sensing element and the control circuit. Verify that the power and alarm circuits are properly connected. Review the instrument configuration and its application.

On instruments powered by 100–240 Vac or 24 Vdc/Vac, the power indicator is a green rectangular LED and the alarm indicator is a red rectangular LED. On instruments powered with two wires (loop power), power is indicated by either one of the red LEDs at the edge of the control circuit. The bottom LED (closest to control circuit) is the flow/wet indicator and the top LED is the no-flow/dry indicator.

Apply power and verify that the power indicator LED is ON. Let the instrument warm up for 5 minutes. Run the process at normal and then at abnormal conditions. In most cases the instrument will detect a flow or level alarm with the factory settings. If the instrument does not respond, responds slowly, or the alarm responds opposite to the required indication, proceed to the section pertaining to the type of control circuit provided. Refer to Figures 12 and 13 to familiarize yourself with the location of the adjustment potentiometers and jumpers.

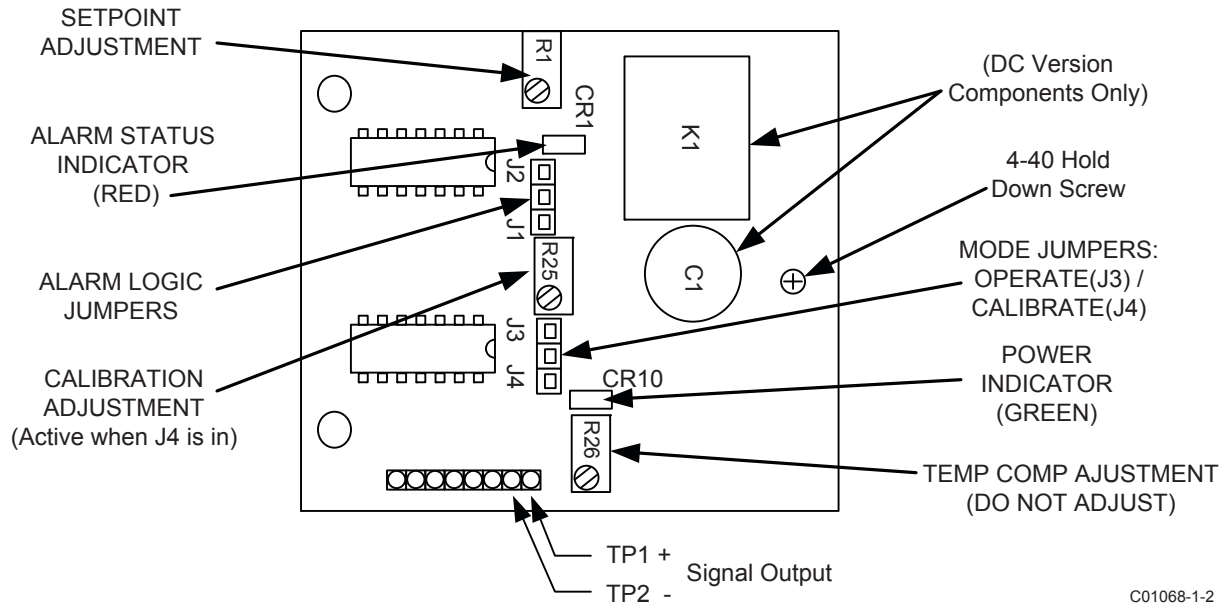


Figure 12 Control Board Adjustments for 100-240 Vac and 24 Vdc/Vac Power Input

Adjustment by Observation - Input Power, 100-240 Vac 24 Vdc/Vac

The following instructions are for both flow and level (wet/dry) applications.

NOTE: Do not adjust R26 located between the green LED and the edge of the control circuit board.

Detecting Decreasing Flow or Dry Alarm, Jumper at J2)

Run the process at normal flow (or raise the level). If the alarm status LED is off, turn the setpoint adjustment pot R1 counterclockwise until LED turns on. With the LED on, slowly turn the pot clockwise until the LED just turns off. Adjust the pot one-quarter turn clockwise past the point where LED turns off. Stop the process flow (or lower the level) and verify that instrument has switched to the alarm state.

Detecting Increasing Flow or Wet Alarm, Jumper at J1)

Run the process at normal flow (or lower the level). If the alarm status LED is off, turn the setpoint adjustment pot R1 clockwise until LED turns on. With the LED on, slowly turn the pot counterclockwise until the LED just turns off. Adjust the pot one-quarter turn counterclockwise past the point where LED turns off. Increase the process flow (or raise the level) and verify that instrument has switched to the alarm state.

Adjustment by Measurement - Input Power, 100-240 Vac 24 Vdc/Vac

The following instructions are for both flow and level (wet/dry) applications. Verify that the mode jumper is in the *Operate* position (J3). Attach a DMM, set to DC volts (V), to TP1(+) and TP2(-). Establish a normal flow (or wet/dry) condition, letting the instrument stabilize. Record the TP1 to TP2 voltage. Go to one of the following procedures as applicable.

NOTE: Do not adjust R26 located between the green LED and the edge of the control circuit board.

Detecting Decreasing Flow or Dry Alarm, Jumper at J2

Stop the process flow (or lower the level) allowing the instrument to stabilize. Record the TP1 to TP2 voltage. Average the normal and the abnormal process condition voltages (i.e., if the normal reading is 7 volts and the abnormal reading is 8 volts, the average setpoint is 7.5 volts). The calculated setpoint must be at least 0.04 volts over the normal condition. Change the mode jumper to the *Calibrate* position (J4). Adjust calibration pot R25 for a DVM reading equaling the calculated setpoint voltage. If the alarm status (red) LED is off, turn setpoint pot R1 slowly counterclockwise until the LED turns on. If the alarm status LED is on, turn setpoint pot R1 clockwise until the LED turns off, then slowly turn the pot counterclockwise until the LED just turns on. Set the mode jumper to the *Operate* position (J3).

Detecting Increasing Flow or Wet Alarm, Jumper at J1

Start an excessive process flow (or raise the level) allowing the instrument to stabilize. Record the TP1 to TP2 voltage. Average the normal and the abnormal process condition voltages (i.e., if the normal reading is 7 volts and the abnormal reading is 6 volts, the average setpoint is 6.5 volts). The calculated setpoint must be at least 0.04 volts below the normal condition. Change the mode jumper to the *Calibrate* position (J4). Adjust calibration pot R25 for a DVM reading equaling the calculated setpoint voltage. If the alarm status (red) LED is on, turn the setpoint pot R1 slowly counterclockwise until the LED turns off. If the LED is off, turn setpoint pot R1 clockwise until the LED turns on, then slowly turn the pot counterclockwise until the LED just turns off. Set the mode jumper to the *Operate* position (J3).

Adjustment by Observation - Input Power, Two Wire (Loop Power)

The following instructions are for both flow and level (wet/dry) applications.

NOTE: Do not adjust R32A and R35A located in the middle of the control circuit.

Detecting Flow or Wet, High Level Alarm

Set J1 to the *Wet/Flow* position. See Figure 13. With the sensing element at no-flow (or dry), turn the setpoint potentiometer (pot) to the point where the LEDs toggle back and forth (clockwise to turn on the top LED, CR3, and counterclockwise to turn on the bottom LED, CR2). Turn the pot one turn clockwise past the point where the top LED (CR3) turns on. Turn on the flow (or raise liquid level) and verify that the instrument switches to the alarm state when flowing (or wet).

Detecting No-Flow or Dry, Low Level Alarm

Set J1 to the "Dry/No-Flow" position. See Figure 13. With the sensing element at flow (or wet), turn the setpoint potentiometer (pot) to the point where the LEDs toggle back and forth (clockwise to turn on the top LED, CR3, and counterclockwise to turn on the bottom LED, CR2). Turn the pot one turn counterclockwise past the point where the bottom LED (CR2) turns on. Stop the flow (or lower liquid level) and verify that the instrument switches to the alarm state when not flowing (or dry).

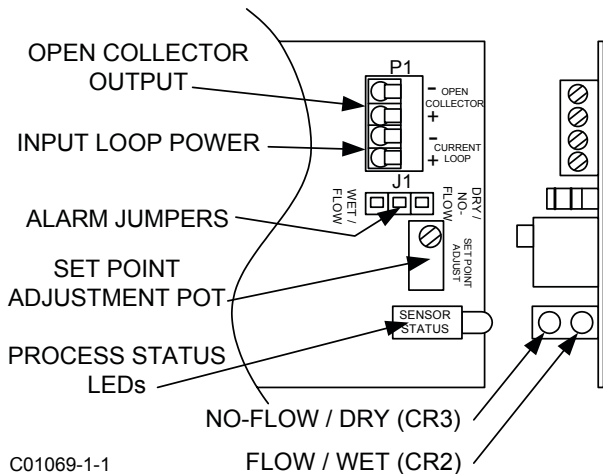


Figure 13 Loop Power Control Circuit

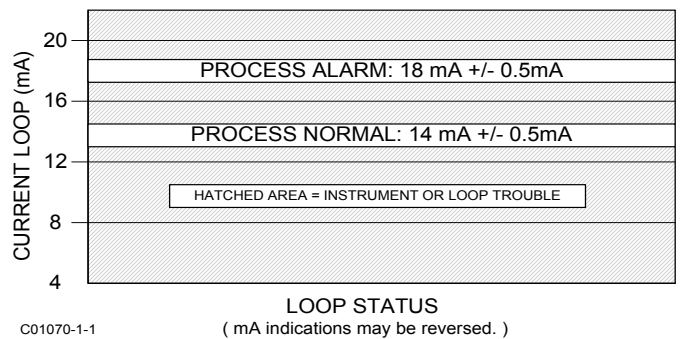


Figure 14 4-20 mA Loop Power Alarm Settings

Section E - Maintenance and Troubleshooting

Maintenance: Typically required for the sensing element. If the process media sticks to the process pipes (or tank) clean the sensing element in the same manner and frequency as the process pipe (or tank). Occasionally check for moisture in the control circuit housing and wiring connections. Check for proper functionality and response time.

Troubleshooting: If the instrument is not operating, go through the installation and adjustment procedures and verify proper installation. If the instrument fails after some time in service and it has been checked, or if it fails to operate at start up and the installation has been verified, contact FCI Technical Service. If the instrument is to be returned, obtain a Return Authorization. The form contains a declaration of decontamination cleaning information that the instrument must comply with before it is shipped to FCI. The telephone number is 1-800-854-1993 or 1-760-744-6950.

Removing Control Circuit Assembly, AC Power Unit

Follow the below steps to remove the AC-powered control circuit assembly (includes both control circuit board and power supply board).

1. With the enclosure cover removed, locate the control circuit (top board) captive nylon 4-40 hold down screw (next to the silkscreened serial number block). Unfasten the screw from the nylon hex standoff and flip the board up to expose the power supply (bottom board).
2. Disconnect the sensor element wires from TB3 (located on control circuit board solder side) using a 3/32" flat head screwdriver.
3. Remove the two 8-32 pan hd. Phillips screws/internal tooth lock washers from the power supply board and pull the control circuit assembly out of the enclosure enough to expose the ground wire.
4. Disconnect the ground wire and remove the control circuit assembly from the enclosure.
5. After pulling wire to the enclosure, reassemble the control circuit assembly back into the enclosure before wiring the power and output. Make sure the green ground wire is reconnected to the enclosure.
6. After all connections are made reinstall the enclosure cover.

Removing Control Circuit Board, DC Power Unit

Follow the below steps to remove the DC-powered control circuit board.

1. With the enclosure cover removed, locate the control circuit board's captive nylon 4-40 hold down screw (next to the silkscreened serial number block). Unfasten the screw from the nylon hex standoff.
2. Remove the green ground wire going to the ground screw.
3. Flip the board up to access its underside (solder side) and disconnect the sensor element wires from TB3 using a 3/32" flat head screwdriver.
4. Position the control circuit at a 45° angle to the plastic standoffs and snap the control circuit off the standoffs.
5. Reinstall the control circuit before connecting the power and loads. To reassemble, snap the control circuit on the plastic standoffs at a 45° angle to the plastic standoffs, and then reconnect the element wiring.
6. After all connections are made reinstall the enclosure cover.

Removing Control Circuit Board, Loop Power Unit

Follow the below steps to remove the loop powered control circuit board.

1. With the enclosure cover removed, slide the control circuit out half way to expose terminal block P1.
2. Slide out the control circuit and remove the green ground wire going to the ground screw.
3. Disconnect the sensor element wires from the REF and ACT connectors.
4. Reinstall the control circuit before connecting the power and loads.
5. After all connections are made reinstall the enclosure cover.



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