



Series 522CR Electronic Pressure Switch

General Instructions



General

These instructions provide information for installation, electrical connection, process connection, calibration and troubleshooting of the Series 522CR Electronic Pressure Switch.

The Series 522CR consists of a field-proven ceramic pressure transducer and reliable microelectronic circuit contained in a rugged compartmentalized weathertight and explosion proof housing.

Input pressure ranges to the transducer are 0-200, 0-500, 0-1000, 0-2000 psig. (Consult the factory for other ranges.)

Output is 4-20 mA with two independent mechanical relays for discrete Set Points. LCD indication is field selectable to Set Point(s) or Process Pressure. The left (1) position elects No. 1 Set Point pressure, the center position selects process pressure and the right (2) position selects No. 2 set point pressure indications. The No. 1 and No. 2 Set Points have corresponding LED indicators. Normally, the red LED indicates that process pressure is equal to or greater than Set Point on rising pressure while the green LED indicates that process pressure is equal to or less than Set Point on falling pressure. LED mode color is easily reversed in the field with jumpers, depending on user preference. Fail-safe modes upon loss of power are easily configured in the field with jumpers. External adjustment permits Set Point calibration and movement of Zero Offset and Span in the field without isolating the process or disconnecting supply power. Internal adjustments for Dead Band and Display Range can be bench calibrated.

The electronic circuit and the power/output terminals are isolated in separate compartments. This arrangement

seals out hostile environments and enhances safety in hazardous locations.

Design and specifications are subject to change without notice. For the latest revision, see www.sorinc.com.

Installation

Mounting is normally by conventional pipe stanchion.

Ensure that wiring conforms to all applicable local and national electrical codes and install unit(s) according to relevant national and local safety codes.

Pipe Stanchion: Use standard PK mounting kit. Tighten the U-bolts to secure unit at desired position.

Bulkhead or Panel Rack: Use suitable bolts (1/4-20) to secure the mounting bracket to the bulkhead or panel rack.

Suggested mounting orientation is with the pressure port at 6 o'clock. Customer preference is the determinant. Should the pressure port be mounted in the 3, 9, or 12 o'clock position, the top board can be rotated in 90° increments so the LCD can be easily read.

Disconnect power supply.

CAUTION: Electrical power must be disconnected from explosion proof models before the cover is removed. Failure to do so could result in severe personal injury or substantial property damage.

Remove the sight glass cover. Remove the face plate by removing the four straight slot nylon screws. Remove the 4 hex stand-off supports with 3/16 nut driver. Remove the top board, rotate to desired position, replace and ensure plug-in connections are secure. Replace face plate and sight glass cover.

Line mounting by either process or electrical conduit connection is NOT recommended.

Process Connection

Securely connect process line to pressure port using two wrenches: 1-1/8" open end to hold hex flats on pressure port, the other to tighten 1/4" or 1/2" NPT(M) process pipe or tube fitting.

CAUTION: Use care not to loosen pressure port from housing.

Electrical Connection

All electrical connections are made at the terminal block located under the threaded cover next to the 3/4" NPT conduit connections. A condensate seal should be installed in the conduit as close to the device as practical to prevent moisture from entering the housing.

Supply Voltage

120 VAC Models (max. 130 VAC; min 90 VAC) (Designator P7): Connect line supply wires to terminals L1 and N.

Output

4-20 mA (4-wire system)

Connect signal wires to terminals I OUT and GND.

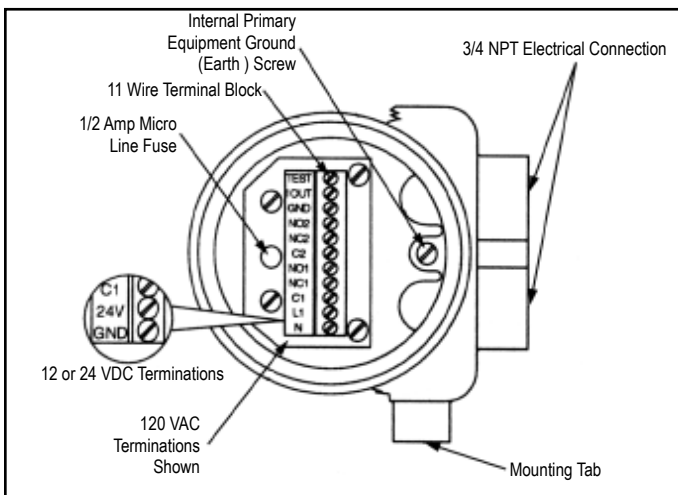


FIGURE 1
Test Terminals

Used for field verification and calibration of 4-20 mA output.

In non-hazardous locations: Remove electrical connection compartment cover and use Terminals Test (-) and I OUT (+).

In hazardous locations: Connect test wires to Terminals Test (-) and I OUT (+), and run wires through conduit.

Replace cover before connecting instrument to electrical power supply to instrument.

SPDT Relay

Two separate 4 amp, 110 VAC/28 VDC SPDT relays provide switching action for independent Set Points. Connect circuit wires as required to Common terminals C1 and C2, Normally Open terminals NO1 and NO2 or Normally Closed terminals NC1 and NC2.

Ground

Connect ground wire to the 10-32 green internal primary equipment ground (earth) screw.

Calibration

Five calibration screws are accessible by removing the knurled cap which is attached to the housing with a beaded chain. (See Figure 2.) The screws marked SET 1 and SET 2 adjust Set Points 1 and 2. The screws marked Z and S adjust Zero and Span of the 4-20 mA output. The screw marked 1-2 is a three-position selector switch for the LCD indicator. Position 1 displays increasing Set Point 1, center position displays process pressure and Position 2 displays Increasing Set Point 2.

Increasing Set Point Adjustment

- Step 1. Turn the selector switch to 1 or 2 to display the corresponding increasing set point on the LCD.
- Step 2. Slowly turn the corresponding set point adjustment (clockwise to increase) to the desired increasing set point.
- Step 3. Repeat Steps 1 and 2 for the other increasing set point.

NOTE: It is not necessary to pressurize the unit to adjust the increasing set point.

Decreasing Set Point Adjustment (Primary Procedure)

This procedure allows the LCD to be used to calibrate the decreasing set point. It can be accomplished on site or in the instrument shop. A variable test pressure source is required, unless the process pressure can be varied. Skip Steps 1- 4 if the dead band at set point is known, and start with Step 5.

- Step 1. Turn the selector switch to the center position to display the process (test) pressure.
- Step 2. Slowly increase the process (test) pressure until the relay changes state and its LED changes color, and note the reading (increasing set point) on the LCD. See Page 4 for the LED color.
- Step 3. Slowly decrease the process (test) pressure until the relay changes state and its LED changes color, and note the reading (decreasing set point) on the LCD. See Page 4 for the LED color.
- Step 4. Determine the dead band by subtracting the small reading from the larger reading (increasing set point).
- Step 5. Add the measured dead band to the **desired** decreasing set point to determine the corresponding increasing set point.
- Step 6. Turn the selector switch to 1 or 2 as desired to display the increasing set point.
- Step 7. Slowly turn the set point adjustment (clockwise to increase) to the resultant increasing set point in Step 5.
- Step 8. Repeat Steps 1 - 7 for the other decreasing set point.

Decreasing Set Point Adjustment (Alternate Procedure)

This procedure allows the LCD to be used to calibrate the decreasing set point. It can be accomplished on site or in the instrument shop. A variable test pressure source is required, unless the process pressure can be varied.

- Step 1. Turn the selector switch to Set Point 1 or 2 as desired.
- Step 2. Turn the corresponding set point adjustment (clockwise to increase) to display the approximate desired decreasing set point.
- Step 3. Turn the selector switch to the center position to display the process (test) pressure.
- Step 4. Slowly increase the process (test) pressure until the relay changes state and its LED changes color. See Page 4 for the LED color. Reference LCD, change the process (test) pressure as necessary to the desired decreasing set point and hold.
- Step 5. Slowly turn the set point adjustment (clockwise to increase) until the relay changes state and its LED changes color. See Page 4 for LED color.
- Step 6. Verify desired decreasing set point calibration by slowly increasing the process (test) pressure until the relay changes state and its LED changes color. This is the increasing set point. Slowly decrease the process (test) pressure until the relay changes state and its LED changes color. This is the verified **decreasing set point**.
- Step 7. Repeat Steps 1 through 6 for the other decreasing set point.

NOTES:

1. User preference determines which procedure to follow.
2. The selector switch is normally left in center position, except when changing calibration, so process pressure is continuously displayed on the LCD.
3. The selector switch **only** permits LCD indication of the selected pressure.
4. Set Point 1 and 2 adjustments are active regardless of the selector switch position.

Zero and Span Adjustments

The Series 522CR Electronic Pressure Switch is calibrated at the factory for a 4 mA output at 0 psi and a 20 mA output at a maximum adjustable range specified on the nameplate. Zero (4 mA output) may be adjusted from 0 to 20% of the range by turning the screw marked Z. Span (20 mA output) may be adjusted from 20 to 100% of the range by turning the screw marked S.

NOTE: It may be necessary to readjust Zero and Span alternately two or three times in order to get precise settings. Eighty percent of Span must be available when Zero is adjusted.

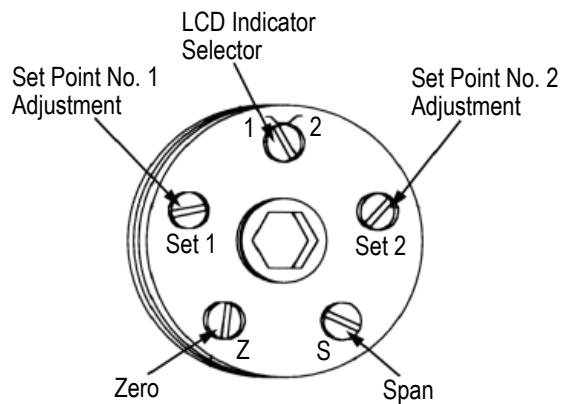


FIGURE 2

Dead Band Adjustments

Dead band adjustments are made internally which requires that the unit be removed from service if installed in a hazardous location. **Disconnect the power supply.** (It is not necessary to disconnect the power if the unit is located in a non-hazardous area.) After taking the unit out of service, remove the sight glass cover.

CAUTION: Electrical power must be disconnected from explosion proof models before the cover is removed. Failure to do so could result in severe personal injury or substantial property damage.





Dead bands are changed by adjusting the potentiometers located on the display board. The potentiometers are labeled D.B. 1 and D.B. 2. Turn clockwise to widen dead band; counterclockwise to narrow dead band. (See Figure 3.) Replace sight glass cover. Perform Calibration procedure to verify desired Dead Band.

Gauge Calibration

Adjustments to the LCD pressure indicator are made internally which requires that the unit be removed from service if installed in a hazardous location.

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Disconnect the supply circuit power. (It is not necessary to disconnect the power if the unit is located in a non-hazardous area.) After taking the unit out of service, remove the sight glass cover. The indicator may be zeroed by adjusting the potentiometer labeled Z on the LCD circuit board. Span may be calibrated by adjusting the potentiometer labeled S on the LCD circuit board. (See Figure 3.)

1	2	3	4			Relay State @ Vent	LED Color @ Vent	SW 1&2
			Mode	Terminal	Alarm			
Open	>SP	<SO	A	NO	Hi	De-energized	Green	 A
Open	Open	Close	B	NO	Lo	Energized	Green	 B
Close	Close	Open	B	NC	Hi	Energized	Green	 B
Close	Open	Close	A	NC	Lo	De-energized	Green	 A

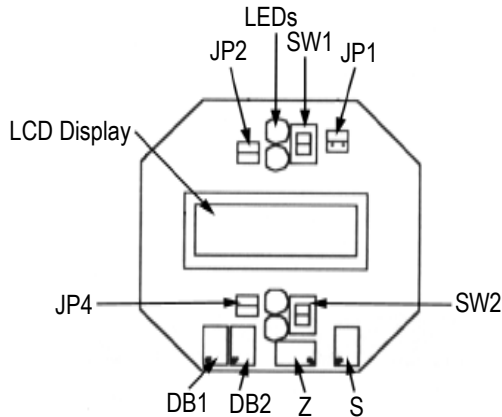


FIGURE 3

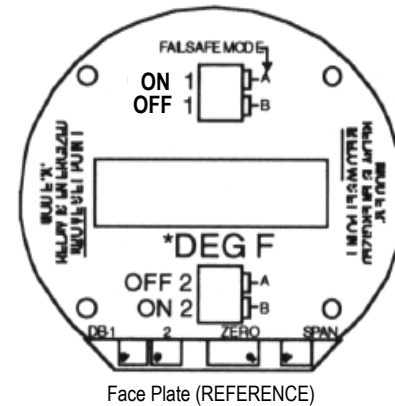


FIGURE 4

Changing Mode of LEDs

Normally, the red LEDs indicate that the relays are energized; the green LEDs indicate that the relays are de-energized unless otherwise specified at the time the Series 522 is ordered. To change the mode of the LEDs: **Disconnect power supply.** Remove the sight glass cover and face plate. (See Figure 3.)

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- Set Point 1: Use needle nose pliers to remove JP2, rotate 90° and plug in. (See Figure 3.)
- Set Point 2: Use needle nose pliers to remove JP4, rotate 90° and plug in. (See Figure 3.)

Now the green LEDs indicate that the relays are energized and the red LEDs indicate that the relays are de-energized.

Changing Mode of Fail Safe

Upon loss of power (LOP), the relays **always** go to the NC (Normally Closed) position. The fail-safe mode can be easily changed as follows: **Disconnect power supply.** Remove the sight glass cover and face plate.

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- a. Determine whether external switched circuit should open or close upon loss of power (LOP). See Column 1 in the chart at the top of this page.
- b. Determine desired switching action at Increasing (>SP) and Decreasing (<SP) Set Points. See Columns 2 and 3 in the chart at the top of this page.
- c. Connect switched external circuit to C (Common) and NO (Normally Open) or NC (Normally Closed). Use needle nose pliers to move Jumpers SW1 and SW2 to Position A or B as required. See Column 4 and last column SW1 & 2 Position.




Replace face plate and sight glass cover.

Positioning of Decimal Point in LCD

The decimal point in the LCD has been preset at the factory for the specified engineering units and range. To change decimal position: **Disconnect power supply.** Remove the sight glass cover and face plate.

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See Figure 3. Use needle nose pliers to remove JP1 and plug in as follows:

Pin Position	JP1	Decimal	Full Scale Display
Two left vertical pins		0.01	19.99
Two right vertical pins		0.1	199.9
Two top horizontal pins		1	1999

Replace face plate and sight glass cover.

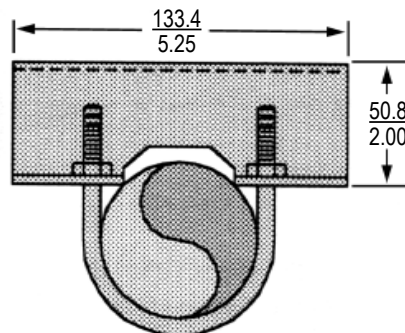
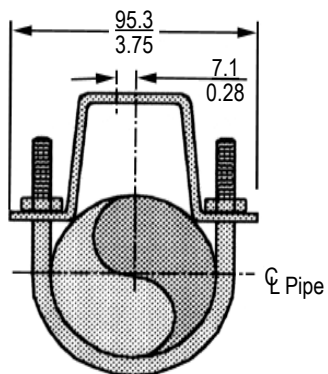
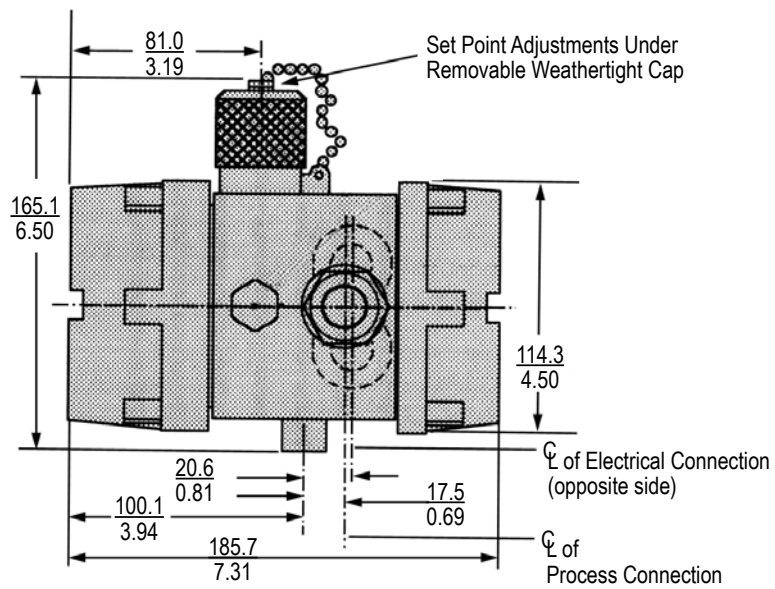
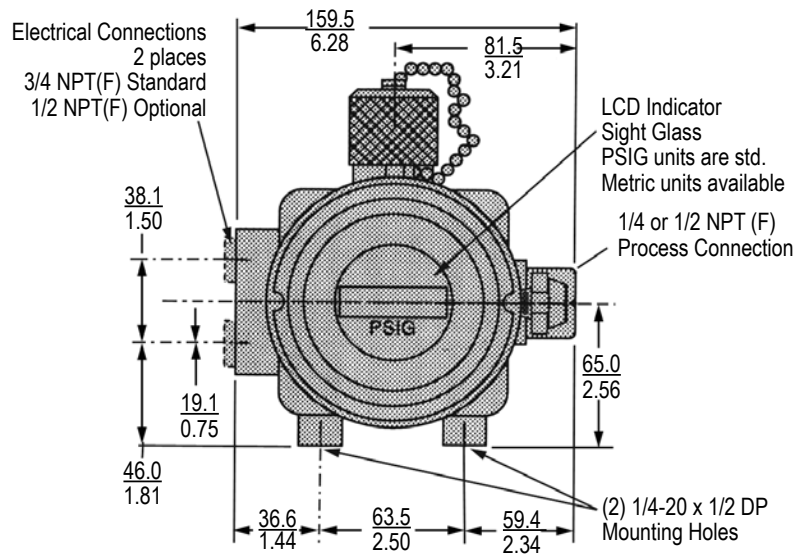
Replacing Fuse

Disconnect the supply circuit power. The fuse is located in the terminal block compartment adjacent to the terminal block. Replace the fuse with a 1/2-amp Littlefuse subminiature microfuse. (See Figure 1.)

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Dimensions

Linear = $\frac{\text{mm}}{\text{in.}}$





14685 West 105th Street, Lenexa, Kansas 66215 913-888-2630 Fax 913-888-0767 www.sorinc.com