Accord Controls
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Accord Logix Series 1000 Digital Positioner

GENERAL INFORMATION

The following instructions are designed to assist in unpacking, installing and performing maintenance as required on Logix™ Series 1000 Digital Positioners. Series 1000 is the term used for all the positioners contained herein; however, specific numbers indicate features specific to a model (i.e., Logix 1200 indicates that the positioner uses HART® protocol). Product users and maintenance personnel should thoroughly review this bulletin prior to installing, operating, or performing any maintenance on the positioner. For quick calibration instructions, see page 11.

To avoid possible injury to personnel or damage to valve parts, users must strictly adhere to WARNING and CAUTION notes. Modifying this product, substituting non-factory or inferior parts, or using maintenance procedures other than outlined could drastically affect performance and be hazardous to personnel and equipment, and may void existing warranties.

WARNING: Standard industry safety practices must be adhered to when working on this or any other process control product. Specifically, personal protective and lifting devices must be used as warranted.

Logix 1200 Positioner Overview

The Logix 1200 positioner is a two-wire, 4-20 mA input, digital valve positioner which utilizes the HART protocol to allow two-way remote communications with the positioner. The positioner can control both double and single-acting actuators and operates with a signal as low as 3.2 mA. Below 3.2 mA, the operation and communication are suspended (3.2 mA is required to restart the positioner).

Since the positioner is insensitive to supply pressure changes and can handle supply pressures from 35 to 150 psig, a supply regulator is usually not required; however, an air filter is required due to the close clearances in the spool assembly.

NOTE: The air supply should conform to ISA Standard S7.3 (a dew point at least 18 degrees Fahrenheit (7° C) below ambient temperature, particle size below five microns, and oil content not to exceed one part per million).

Positioner Operation

The Logix 1000 positioner is an electric feedback instrument. Positioning is based on a balance of two signals: one proportional to the command input signal and the other proportional to the valve stem position.

The supply pressure for the positioner pressure modulator is tapped off the main supply and is filtered as it passes through a field-replaceable, coalescing filter element in the module. Next it passes through an internal pressure regulator that regulates it to approximately 22 psig. The air then passes through an orifice that restricts the flow and air consumption.

The pressure modulator further controls the air to 6-12 psig, using a spring-diaphragm flapper that is attracted by an electromagnet to a nozzle. A temperature compensated hall effect sensor mounted on a circuit board senses the spool valve position. The hall effect sensor and circuitry create an inner feedback loop, which determines how much current to send to the electromagnet for a desired spool valve position. The electromagnet in the feedback loop varies the nozzle-flapper spacing, which regulates the output pressure to 6-12 psig, proportional to the digital position algorithm.

When the command and stem position signals are equal, the system will be in equilibrium and the valve stem will be in the position called for by the command signal. If these opposing signals are not equal, the spool valve will move up (or down) and, by means of the pressure modulator, change the output pressures and flow rate. This causes the actuator pistons to move until the signal of the position sensor equalizes with the command signal.

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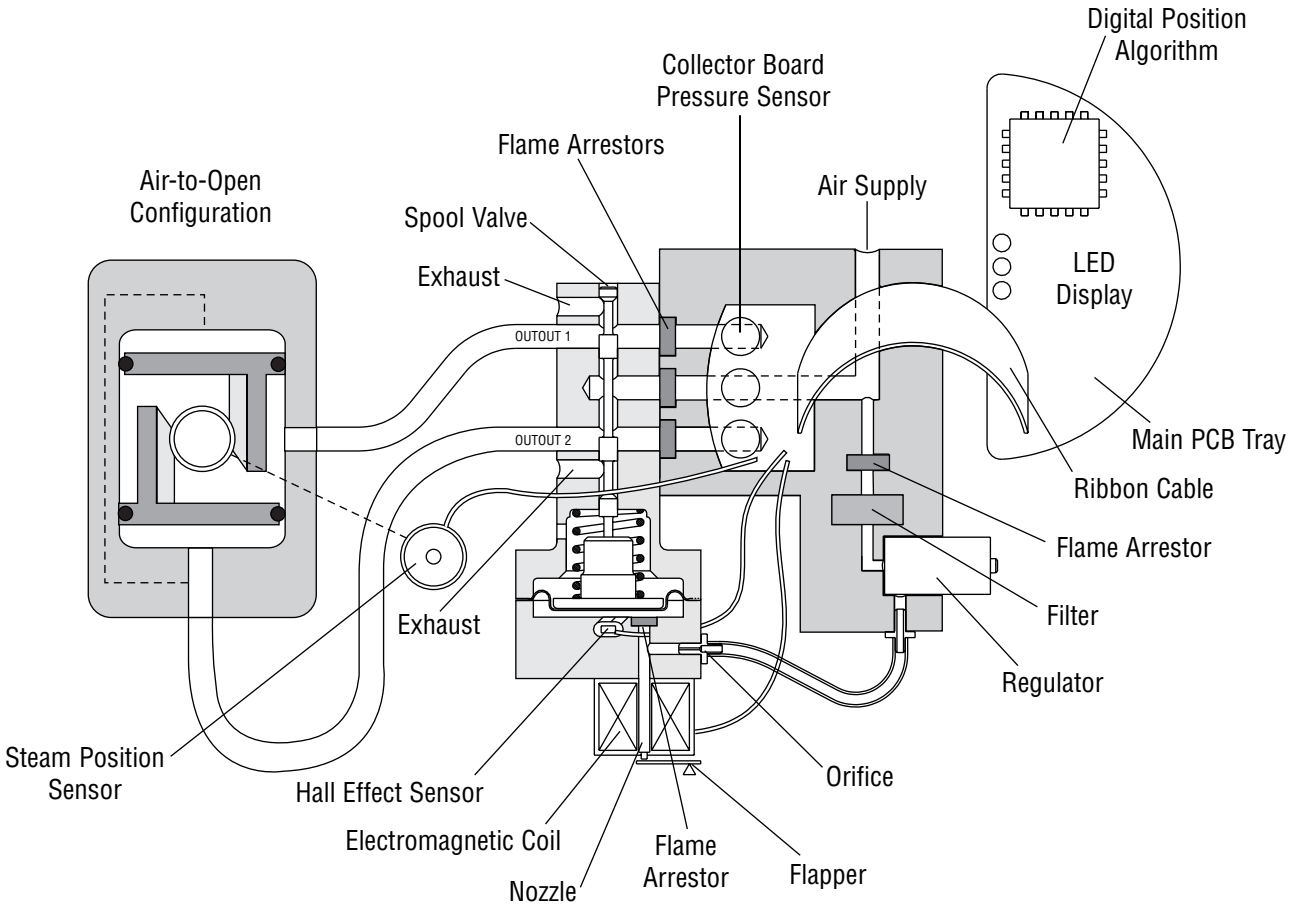

Figure 1: Logix 1000 Digital Positioner Schematic

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Detailed Sequence of Positioner Operations

An increase in the command signal causes the modulator pressure to increase, pushing the spool assembly upward from its equilibrium position. This opens the spool valve ports, supplying air to Output 1 and exhausting air from Output 2 (Figure 1). This causes the actuator shaft to rotate.

The shaft rotation is transmitted back to the positioner through the stem position feedback linkage, changing proportionally to the valve stem position. The actuator shaft continues to rotate until the stem position signal of the sensor increases sufficiently to counter the signal being sent to the control algorithm. At this point, the spool is at its equilibrium position as the pressures in the cylinder stabilize and the air flow to the actuator decreases. The computer will then make small null adjustments to fine-tune the desired position and compensate for changes in dynamic loading. A decrease in the command signal reverses the described actions.

Mounting the Positioner

CAUTION: Positioner shaft is spring-loaded and features mechanical stops at each end of stroke. Failure to follow these procedures carefully may result in severe damage to positioner. Read through entire procedure before starting.

1. Attach positioner mounting bracket to actuator using fasteners supplied with bracket (Figure 2). Tighten bolts finger-tight only at this time.
2. Install coupler (if required – coupler is not required for NAMUR mounting) on actuator shaft, making sure it is centered.

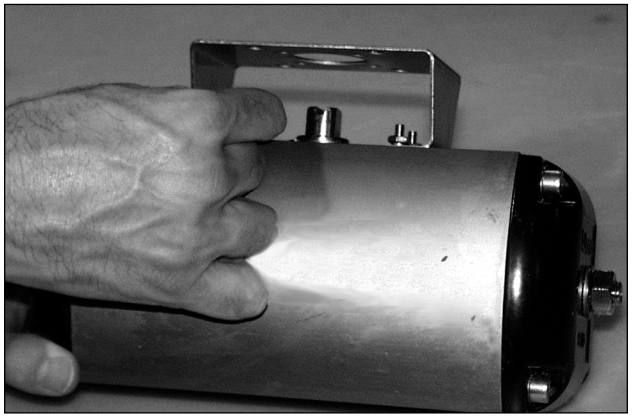

Figure 2: Positioner Mounting Bracket

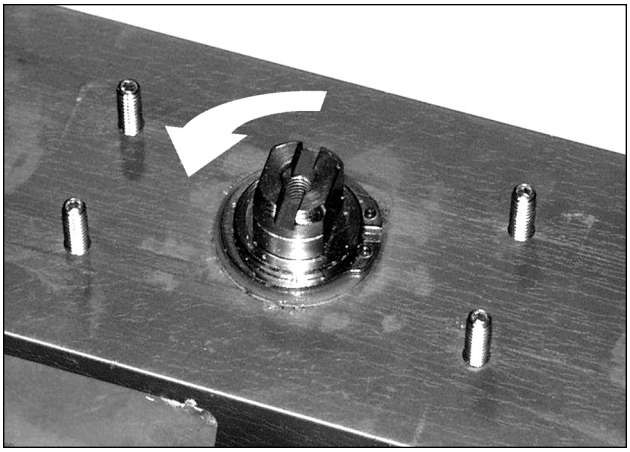

Figure 3: Actuator Shaft

3. Stroke the actuator to determine direction of rotation as shown in Figure 3. Pay specific attention to the slot that will engage positioner shaft.
4. Carefully grasp positioner shaft with pliers as shown in Figure 4. Turn shaft to determine direction of rotation.

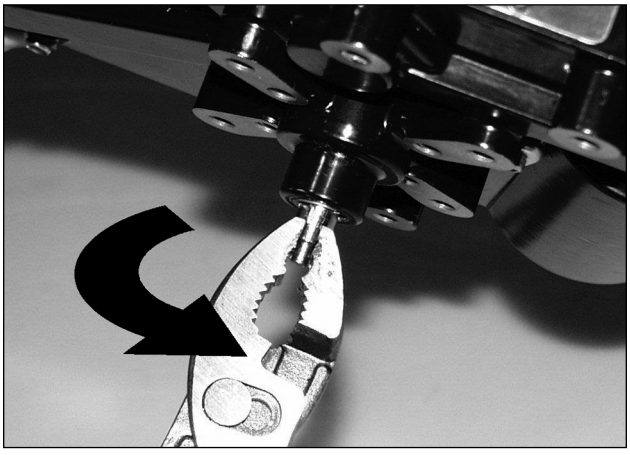

Figure 4: Turn Positioner Shaft

5. Making sure positioner shaft rotation matches actuator shaft rotation, place positioner on mounting bracket (Figure 5). Make sure shafts engage. **Do not insert fasteners into positioner at this time.**
6. Double-check actuator and positioner rotation. Hold positioner against bracket with fingertips as shown in Figure 6.

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WARNING: Keep away from positioner sides, as positioner will suddenly rotate on bracket if not properly aligned and cause injury.

Slowly rotate the actuator. If the positioner shaft is properly aligned, the shaft will rotate freely. If not, the mechanical stops will grab, causing the positioner body to rotate on bracket.

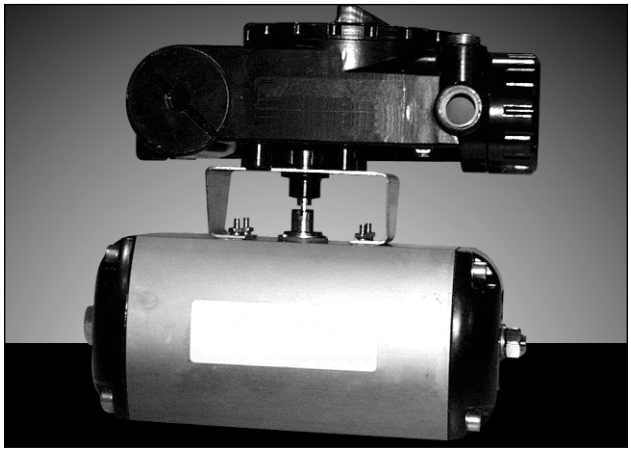

Figure 5: Positioner on Mounting Bracket

7. If the shaft is not properly aligned, repeat steps 3-6. Otherwise, attach positioner to bracket with fasteners included with bracket. Tighten bolts finger-tight only at this time.
8. Stroke actuator/positioner several times to align shafts. Tighten all fasteners.

Tubing Positioner to Actuator

Proper tubing orientation is critical for the positioner to function correctly and have the proper failure mode. Referring to Figure 1, note that for air-to-open valves, the Output 1 port of the positioner manifold, is tubed to the 'open' side of the actuator. The Output 2 port of the positioner manifold is tubed to the 'closed' side of the actuator. For air-to-close valves the above configuration is reversed.

Wiring and Grounding Guidelines

Input Cable Shielding (Figure 8)
The input loop current signal to the Logix 1200 positioner should be in shielded cable. The shields must be tied to a ground at only one end of the cable to provide a place for environmental electrical noise to be removed from the cable. In general, shield wire should be connected at the source.

Grounding Screw
The green grounding screw that is located inside the termination cap should be used to provide the unit with an adequate and reliable earth ground reference. This ground should be tied to the same ground as the electrical conduit. Additionally, the electrical conduit should be earth grounded at both ends of its run.

NOTE: The green grounding screw must not be used to terminate signal shield wires.

Compliance Voltage (Figure 7)
Output compliance voltage refers to the voltage limit that can be provided by the current source. A current loop system consists of the current source, wiring resistance, barrier resistance (if present), and the Logix Series 1200 impedance. The Logix 1200 positioner requires that the current loop system allow for a 12 VDC drop across the positioner at maximum loop current. The 12 VDC drop across the Logix 1200 positioner terminals is generated by the positioner from the 4-20 mA loop current input.

CAUTION: Never connect a voltage source directly across the positioner terminals. This could cause permanent circuit board damage.

Figure 6: Check Positioner Shaft Alignment

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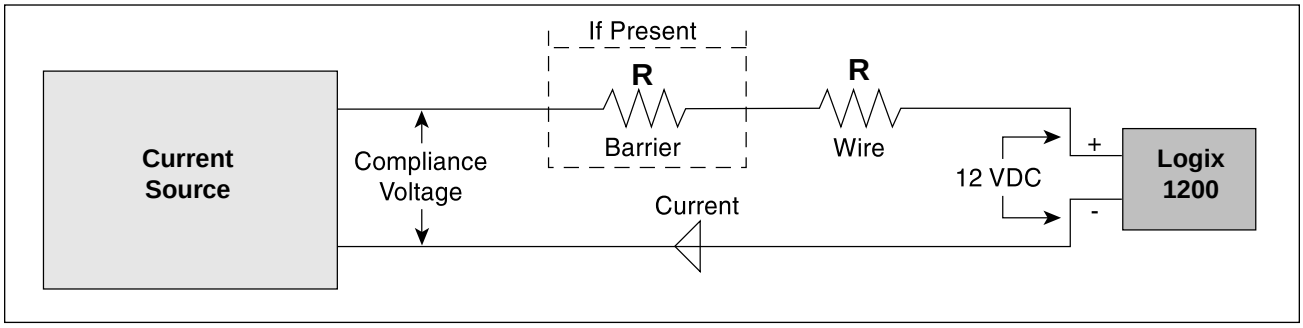

Figure 7: Compliance Voltage

Cable Requirements

The Logix 1200 positioner utilizes the HART Communication protocol. This communication signal is superimposed on the DC 4-20 mA current signal. The two frequencies used by the HART protocol are 1200 Hz and 2200 Hz. In order to prevent distortion of the HART communication, cable capacitance and cable length restrictions must be calculated. The cable length must be limited if the capacitance is too high. Selecting a cable with lower capacitance/foot rating will allow longer cable runs. In addition to the cable capacitance, the network resistance also affects the allowable cable length. In order to determine if the loop will support the Logix 1200 positioner, perform the following calculation.

Voltage =

Compliance Voltage (@$Current_{MAX}$)

- $Current_{MAX}$*($R_{barrier}$+R_{wire})

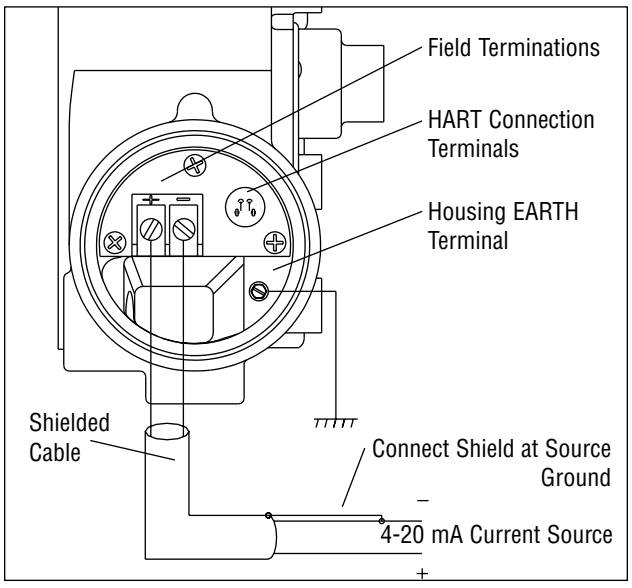

Figure 8: Field Termination

The calculated voltage must be greater than 12 VDC in order to support the Logix 1200 positioner.

Example: DCS Compliance Voltage = 19 VDC
$R_{barrier}$ = 300 Ω
R_{wire} = 25 Ω
$CURRENT_{MAX}$ = 20 mA
Voltage = 19 VDC - 0.020 A*(300 Ω + 25 Ω)
= 12.5 VDC

The voltage 12.5 VDC is greater than the required 12 VDC; therefore, this system will support the Logix 1200 positioner. The Logix 1200 positioner has an input resistance equivalent to 600 Ω at a 20 mA input current. In order to calculate the maximum network capacitance, use the formula shown in the next column. *(NOTE: To control cable resistance, No. 24 AWG cable should be used for runs less than 5000 feet. For cable runs longer than 5000 feet, No. 20 AWG cable should be used.)*

$$C_{network}\ (uF) \leq \left[\frac{65}{(R_{barrier} + R_{wire} + 390)}\right] - 0.0032$$

Example: $R_{barrier}$ = 300 Ω

R_{wire} = 50 Ω

$$C_{cable} = \frac{22\ pF}{foot} = \frac{0.000022\ uF}{foot}$$

$$\left[\frac{65}{(300 + 50 + 390)}\right] - 0.0032 = 0.08\ uF = C_{network}(uF)(Max.)$$

$$\text{Max. Cable Length} = \frac{C_{network}\ (uF)}{C_{cable}}$$

$$\text{Max. Cable Length} = \frac{0.08\ uF}{0.000022\ uF/foot} = 3636\ ft.$$

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Driver Module Assembly

The driver module assembly moves the spool valve by means of differential pressures on its diaphragm. Air is routed to the module from the interface plate through a hose that connects to the assembly through a hose barb with an integral orifice. Wires from the module connect the hall effect sensor and the pressure modulator coil to the collector board.

Driver Module Assembly Replacement

To replace the driver module assembly, refer to Figures 9-11, 13, 19 and proceed as outlined below. The following tools are required:

0.25-inch open-end wrench
0.50-inch hex wrench
Phillips screwdriver.

1. Make sure valve is bypassed or in a safe condition.
2. Disconnect the power and air supply to the unit.
3. Remove the driver module cover, using a 0.50-inch hex wrench (Figure 11). Do not force the cover. If undue resistance is encountered, use slots to loosen cover.
4. Remove the spool valve cover by removing the screw and sliding the cover assembly backwards until the tab is clear of the slot. Removing the sheet metal cap from this assembly is not necessary (Figure 13).
5. Being careful not to lose the nylon washers, remove the two Phillips-head screws that attach the driver module to the main housing (Figure 10).
6. Remove the spool valve block by removing the two Phillips-head screws and carefully sliding the block off the spool (Figure 10).
   CAUTION: The spool (extending from the driver assembly) is easily damaged. Use extreme caution when handling driver assembly.
7. Remove the tubing from the orifice in the driver module assembly to the collector board. Using a 0.25-inch open-end wrench, remove the orifice from the driver module (Figure 11).
8. Remove the two wiring connections that link the driver module assembly to the collector board (Figure 11).

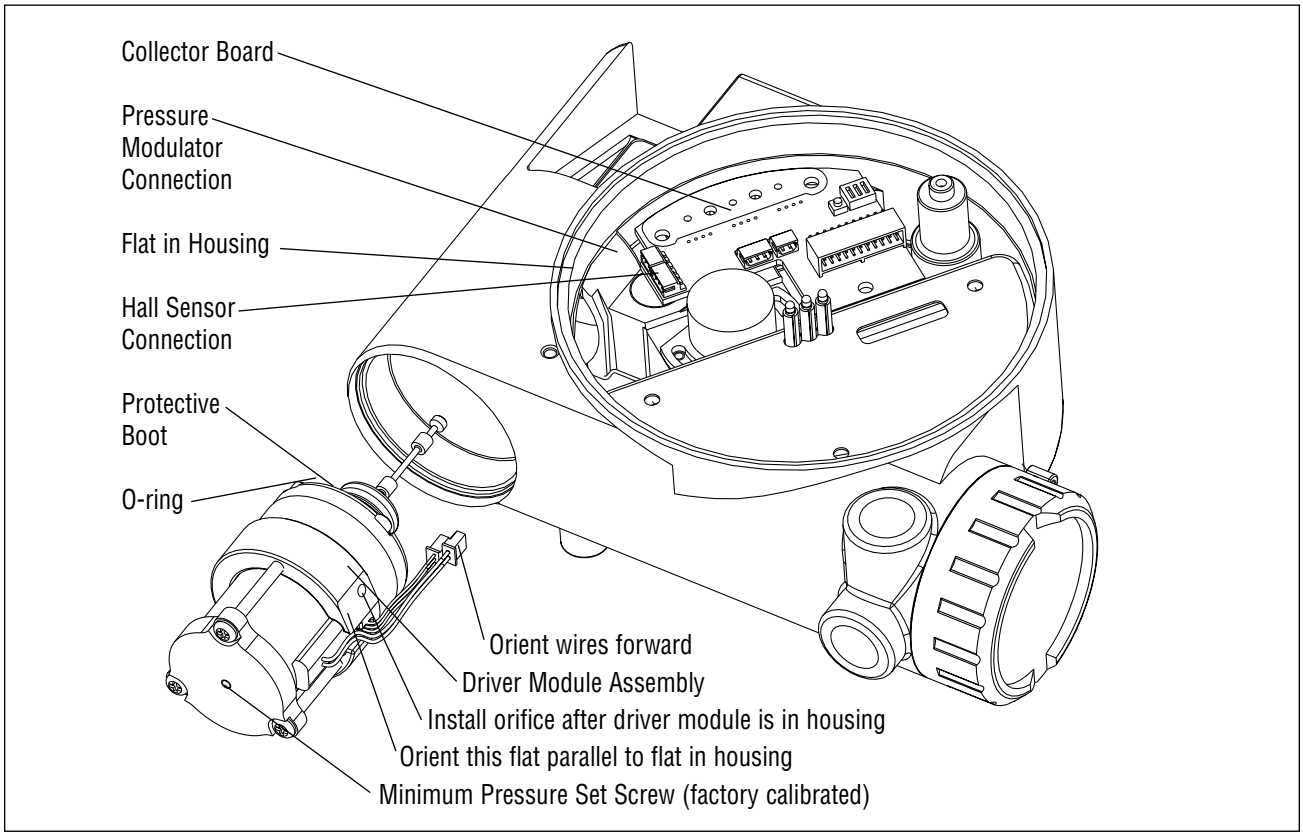

Figure 9: Driver Module Assembly

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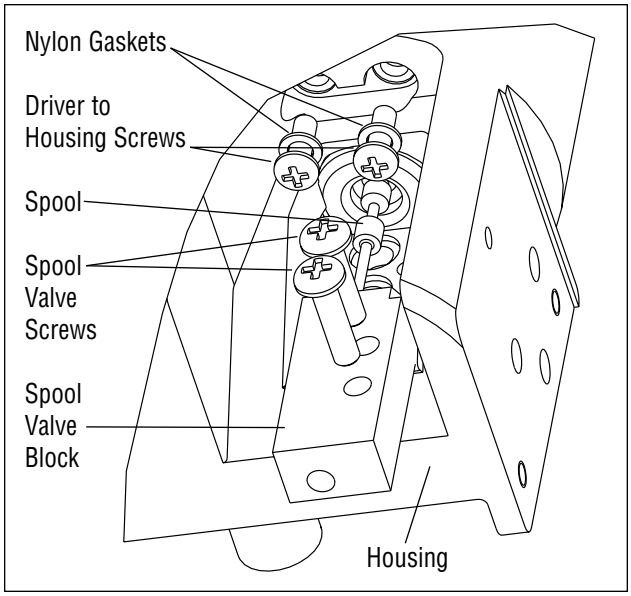

Figure 10: Spool and Block

9. Feed the wires back through the housing so they extend backwards out toward the driver module opening. This will allow the driver module to thread out without tangling the wires.
10. Grasp the driver module cap to rotate the entire driver module. Turn it counter clockwise to remove. After it is threaded out, carefully retract the driver module from the housing to avoid the spool.
11. Take the new driver module, and verify that the O-ring and boot are in place. Lay the wires back and along the modulator as shown in Figure 9, and hold in place by hand.
12. Gently direct the driver module onto the housing bore, making sure the spool does not hit the housing. Turn the driver module clockwise to thread it into the housing. Continue rotating module until it bottoms out.
13. Once the threads are fully engaged, rotate the driver module counter clockwise until the flat on the driver module and the flat on the housing are aligned. This will align the screw holes for the next step.
14. Verify that nylon gaskets are in the counter bores in the driver module retaining screw holes as shown in Figure 10.
15. Insert two driver-to-housing screws into the driver housing through the counter-bored holes in the positioner main housing. Tighten evenly with a Phillips screwdriver.
16. Feed the driver module wires into the main chamber of the housing, and connect them to the collector board.
17. Verify that the three O-rings are in the counter-bores on the machined platform where the spool valve block is to be placed (Figure 10).
18. Carefully slide the block over the spool, using the machined surface of the housing base as a register (Figure 10). Slide the block toward the driver module until the two retaining holes line up with the threaded holes in the base.
19. Install two spool-valve screws and tighten securely with a Phillips screwdriver.
20. Insert the orifice into the threaded hole in the driver module assembly. Tighten with a 0.25-inch open-end wrench (Figure 11). Attach the flexible tubing from the interface plate to this fitting.
21. Thread driver module cover into driver module bore in the main housing.

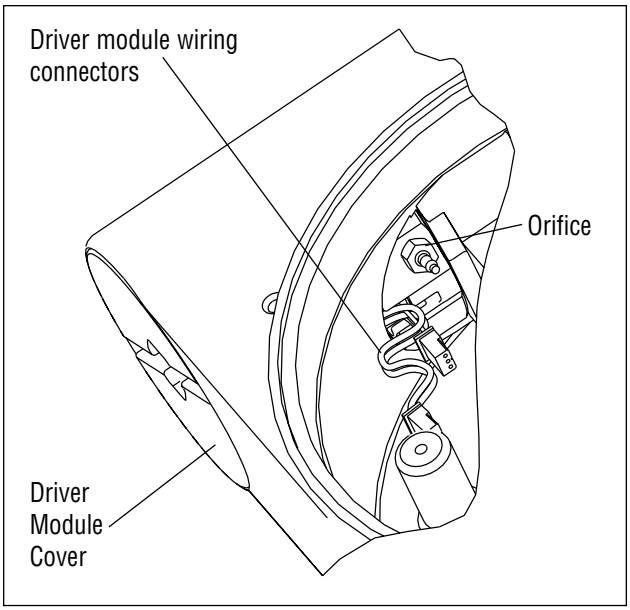

Figure 11: Driver Module Orifice

Spool Valve Cover

The spool valve cover incorporates a coalescing filter element in a two-piece cover. This protects the spool valve chamber from moisture and provides a low back pressure vent for exhaust air from the spool valve.

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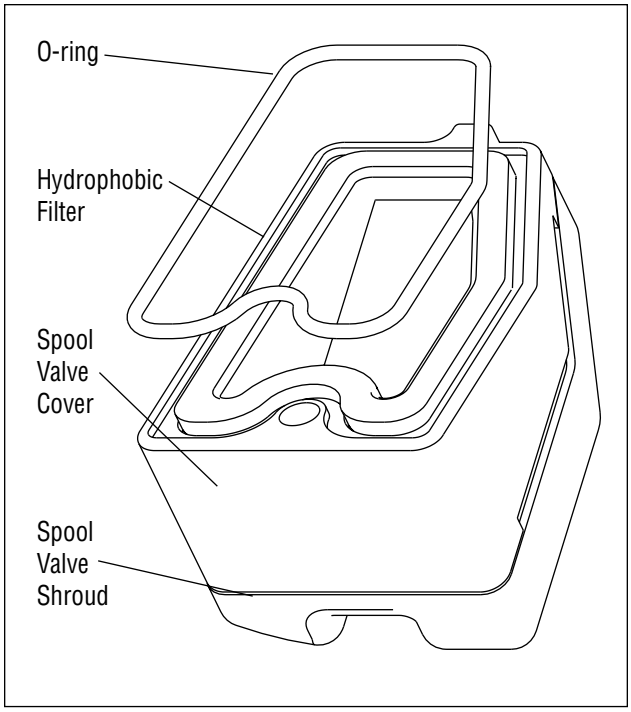

Figure 12: Spool Valve Cover Assembly

Replacing Filter in Spool Valve Cover

1. Make sure the valve is bypassed or in a safe condition.
2. Disconnect the power and air supply to the unit.
3. Remove the spool cover by removing the screw and sliding the cover assembly backwards until the tab is clear of the slot. The sheet metal cover may be removed and cleaned with a brush or by blowing out with compressed air (Figure 13).
4. Remove the O-ring from around hydrophobic filter element and set aside (Figure 12).
5. Remove the molded filter element by pulling straight out of chamber cover vent piece.
6. Place new molded filter element into the chamber cover vent piece. This element provides part of the track to secure the O-ring in the next step.
7. Install O-ring into base of chamber cover vent piece as shown in Figure 12.
8. Place spool valve shroud onto spool valve cover.
9. Place the spool valve cover assembly in place by setting it on the ramp and sliding it until the tab seats in the slot, as shown in Figure 13, and secure with No. 8-32 screw.

Regulator

The regulator reduces the pressure of the incoming supply air to a level that the driver module can use.

Replacing Regulator

1. Make sure valve is bypassed or in a safe condition.
2. Disconnect the power and air supply to the unit.
3. Remove the main cover and unscrew the regulator from the interface plate, exercising caution not to damage the collector board (Figure 19).
4. Verify that the O-rings are in place on the base of the new regulator.
5. Replace the regulator by threading into the port on the interface plate.

Internal Coalescing Filter

The internal coalescing filter ensures that supply air is clean and dry before it gets to the regulator. Because the air has already been filtered before this point, the element should not require extended maintenance.

Replacing Input Filter Element (Figure 19)

1. Make sure valve is bypassed or in a safe condition.
2. Disconnect the power and air supply to the unit.
3. Remove the main cover and remove collector board by disconnecting the wiring and removing three screws that attach it to the housing. Each cable has its own unique connector to prevent mistakes in reconnecting.

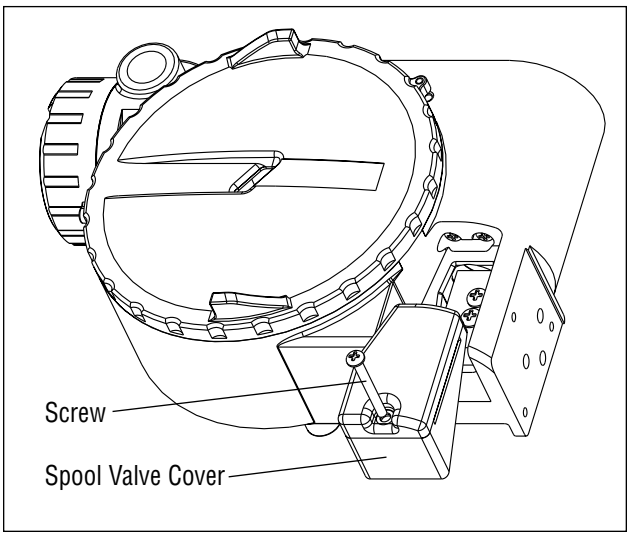

Figure 13: Spool Valve Cover Assembly

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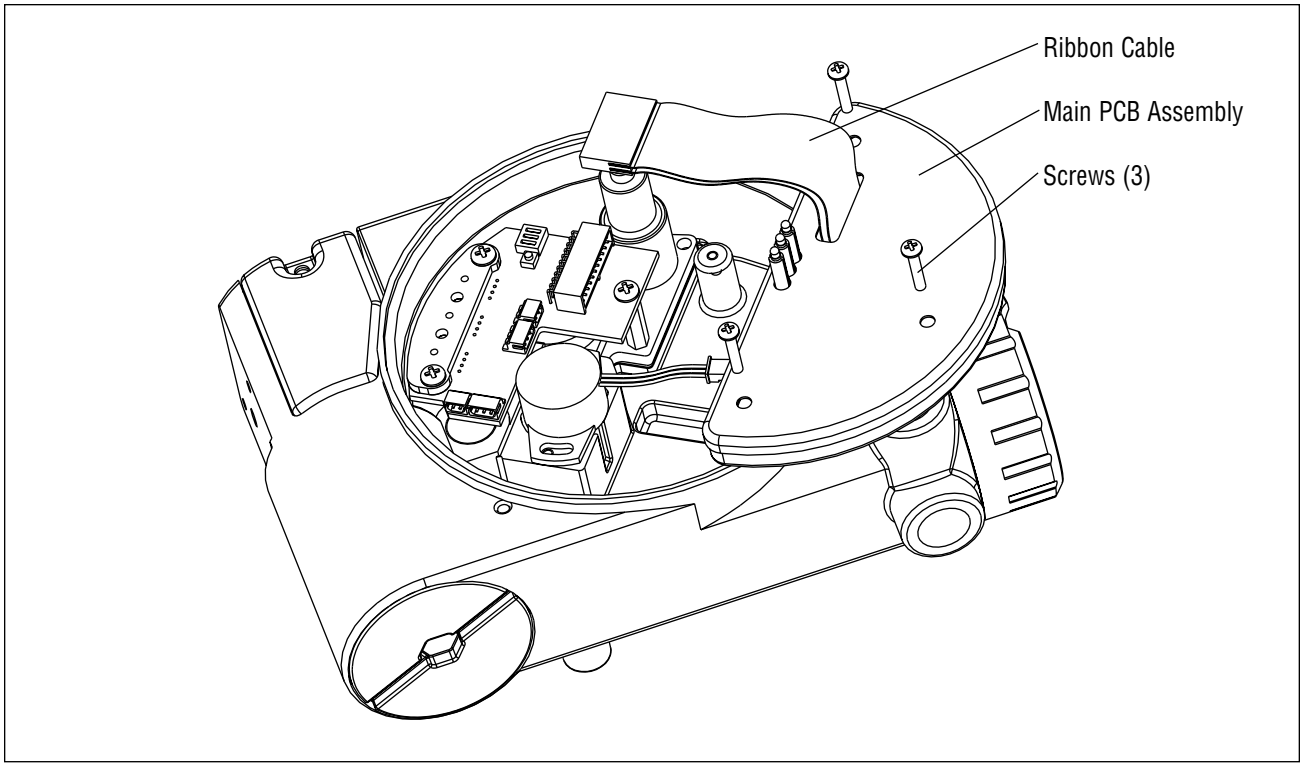

Figure 14: Main PCB Assembly

4. Remove the four No. 6-32 screws from the filter housing and remove filter housing.
5. Remove the old coalescing filter from bore in interface plate.
6. Insert new coalescing filter into bore on interface plate.
7. Verify that the O-ring is in place in filter housing.
8. Set filter housing over coalescing filter and secure with four No. 6-32 screws.
9. Replace collector board and reconnect wiring.

Main PCB Assembly

The main PCB assembly contains the circuit board and processor that perform the control functions of the positioner. The board is encapsulated in the tray with a protective silicon coating. This module can be easily replaced if positioner upgrades are desired. None of the components inside the tray are serviceable. This module is to be replaced as a unit.

1. Make sure valve is bypassed or in a safe condition.
2. Disconnect the power and air supply to the unit.
3. Remove the main cover and disconnect the ribbon cable from the collector board.
   CAUTION: To avoid damaging any components, exercise caution by gently raising the locking tab to release the ribbon cable.
4. Remove the PCB assembly by removing the three No. 6-32 screws and lifting tray out of housing.
5. Place the new PCB assembly on bosses inside the positioner housing.
6. Insert three No. 6-32 screws through the tray into the threaded bosses and tighten evenly, using a Phillips screwdriver. Do not overtighten.
7. Reconnect the ribbon cable to the collector board.

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Collector Board

The collector board assembly provides a central routing for all electronic connections in the positioner, linking the pressure modulator coil, hall effect sensor and field inputs to the main electronics. The collector board assembly also serves as a mounting for the pressure sensors used on the advanced board.

Removing Collector Board (Figure 19)

1. Make sure valve is bypassed or in a safe condition.
2. Disconnect the power and air supply to the unit.
3. Remove the main cover and disconnect the wiring to the collector board. Each cable has its own unique connector to prevent mistakes in reconnecting.
4. Remove the three No. 8-32 screws holding the collector board to the housing.
5. Remove the collector board.

Replacing/Upgrading Collector Board (Logix 1X1X)

1. For the advanced collector board, check that pressure sensors are in place on back of collector board. For the standard model (Logix 1X0X), make sure the adapter block is securely fastened to the collector board.
2. Set collector board assembly in place.
3. Insert three No. 8-32 screws through collector boards into the threaded holes on sensor shelf and standoff.
4. Tighten all three screws.
5. Connect the main ribbon from electronics tray.
6. Reconnect wiring to the collector board.

Field Terminations

The field terminations board provides a connection point inside the explosion proof housing for all hookups to positioner. While the board is not likely to experience a failure, it can easily be replaced to upgrade positioner.

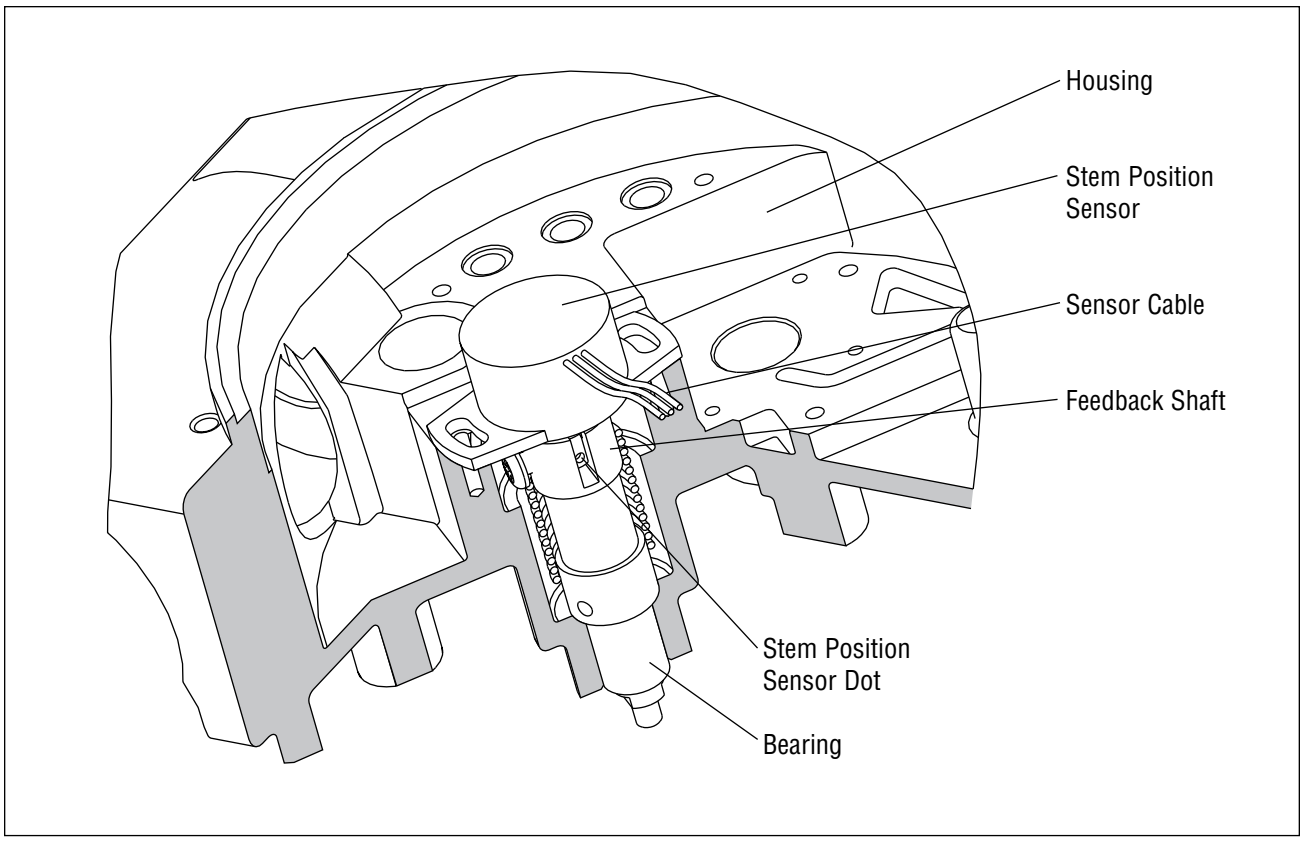

Figure 15: Stem Position Sensor Orientation

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Replacing Field Terminations Board (Figure 19)

1. Make sure valve is bypassed or in a safe condition.
2. Disconnect the power and air supply to the unit.
3. Remove the main cover and disconnect the field termination cable from collector board.
4. Remove the field terminations cover and the three No. 8-32 screws.
5. Remove field terminations board, carefully pulling wiring through bore.
6. Verify that the O-ring is in place in the counter bore in the positioner housing.
7. Feed wiring through passageway into main chamber of housing.
8. Set the circuit board in place and secure with three No. 8-32 screws.
9. Connect field termination cable to collector board.

Stem Position Sensor

The position feedback assembly transmits valve position information to the processor. This is accomplished by means of a rotary position sensor that connects to the valve stem through a feedback linkage. To provide accurate tracking of the pin in the slot, the follower arm is biased against one side of the slot with a rotary spring. This spring also automatically moves the position feedback assembly to its limit in the unlikely event of failure of any component in the linkage.

Stem Position Sensor Replacement (Figures 15, 19)

1. Make sure valve is bypassed or in a safe condition.
2. Disconnect the power and air supply to the unit.
3. Remove the main cover and disconnect rotary position sensor wires from collector board.
4. Remove the two screws from rotary position sensor and remove the sensor from the housing.
5. Turn position sensor shaft until the dot on the slot is oriented with the wires on the pot (Figure 15).
6. Insert the position sensor into the shaft with the wires pointing toward the main PCB assembly. Turn the position sensor clockwise until the bolting slots align with the housing screw holes and the wires on the sensor protrude over the main PCB assembly tray.
7. Carefully center position sensor on the shaft bore, insert and tighten the screws. **Do not over tighten.**
8. Route wires along the position sensor and reconnect to sensor board.

LED Indicators

The Logix 1200 positioner has three LED indicators that are visible through a window in the main cover. Only one LED will blink at any given time. Each LED has a different color to convey basic information about the positioner status. Green indicates that the positioner is operating normally. Yellow indicates that a 'customer defined limit' or 'alert' has been reached. Red indicates that an error condition exists. The HART hand-held communicator or ValTalk PC software must be used to determine the specific reason for a yellow or red LED status.

During stroke and actuator calibration, no LED will blink. After calibration is complete, the green LED indicates that the calibration was completed successfully. If the yellow or red LED blinks after a calibration process, a warning or error was detected and the HART hand-held or ValTalk must be used to identify the specific calibration error.

NOTE: If the LED indicator changes from green to yellow after a calibration process, the user may have set a warning limit (position alert, cycle counter alert, etc.). Use the HART hand-held communicator or ValTalk to monitor status.

Quick-Cal Button

If the HART hand-held communicator or ValTalk PC software is not available, the Logix 1200 positioner has a Quick-Cal™ feature that performs a stroke calibration and allows basic operation of the positioner.

NOTE: The Quick-Cal operation retains all previously configured information. All settings remain unchanged except stroke calibration parameters. If the device is being installed for the first time, factory default parameters are used.

The Quick-Cal button and DIP switch settings are located on the collector board inside the main housing chamber as shown in Figure 16.

Caution: Accessing this function requires removal of the main cover. The user must take all precautions if this operation is performed in explosion-proof areas.

Make the appropriate configuration settings, using the DIP switches on the collector board. *ATO/ATC* selects air-to-

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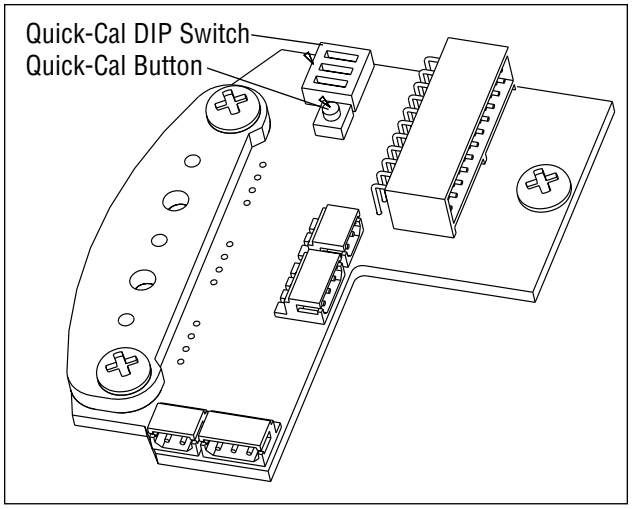

Figure 16: Quick-Cal Button

open or air-to-close (this is determined by the mechanical tubing of the actuator). The *LIN_VALV/ROT_VALV* button allows the user to select linear or rotary feedback linkage. The *LIN/CUSTOM* option allows selection of linear or custom control characterization. If *Custom* is selected, the positioner activates custom characterization. If the device is being installed for the first time, the default custom characterization is equal percent. However, if a custom curve has been previously loaded, the previous curve will be used. The DIP switch settings are only read after the Quick-Cal button is pressed; otherwise, the settings do not have any effect on positioner operation. The DIP switch settings will override any previous configuration done using ValTalk or the HART hand-held. Press the Quick-Cal button for five seconds. If the button is released before five seconds have elapsed, no action will be taken. After five seconds, the positioner will begin a stroke calibration. Release the Quick-Cal button once calibration has started. The positioner will automatically stroke the valve. No LED will blink during this process. If the calibration was successful, upon completion the green LED will blink and the valve will be in control mode. If the yellow LED blinks immediately after a stroke calibration, this usually indicates that the valve did not stroke. Check the air supply and cable connections. If a calibration error occurred, the red LED will blink. The cause of a red LED is generally a stem position linkage/feedback sensor alignment problem. For linear linkage, the active electrical feedback angle is 65 degrees. For rotary linkage, the active electrical feedback angle is 95 degrees. The red LED indicates that the mechanical travel is not centered within the electrical sensor travel. If a red LED is blinking after a stroke calibration, loosen the feedback sensor mounting screws as shown in Figure 15. Turn the stem position sensor slowly while watching the LED indicators. Try small movements, both clockwise and counter-clockwise. If the yellow LED begins to blink, the feedback sensor has been correctly moved into range. Tighten the feedback sensor mounting screws and repeat the Quick-Cal procedure. If the LED remains red even after moving the full length of the sensor slot, verify the following items: *LIN_VALV/ROT_VALV* DIP switch setting, stem clamp and take-off arm height.

NOTE: If the stroke stops in the closed position, the error occurred when the position sensor/linkage was at closed position. If the stroke stops in the open position, the error occurred when position sensor/linkage was at the open position. No calibration parameters are saved if an error occurs. If the power to the positioner is removed, the unit will power-up with the previous configuration parameters. A successful calibration will save parameters.

If the valve does not stroke after pressing the Quick-Cal button, this may be an indication that the internal regulator pressure and/or the driver module minimum pressure is low. Refer to the following instructions to check and set the internal regulator and minimum pressure settings.

Note that the tools and equipment used in the next two procedures are from indicated vendors.

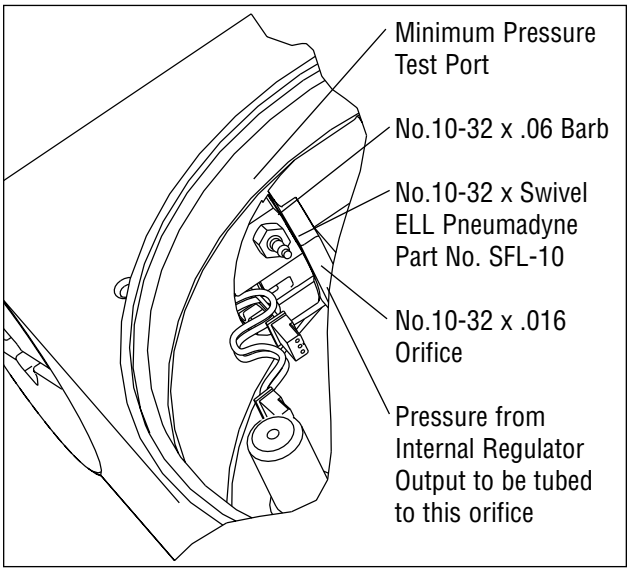

Figure 17: Driver Module

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Checking or Setting Internal Regulator Pressure

1. Disconnect the air supply from the positioner.
2. Remove the main cover. The regulator pressure set port is factory plugged with a No. 10-32 hex plug (Figure 18). Replace hex plug with a No. 10-32 x .06 barb fitting.
3. Using a 0 to 30 pressure gauge attached to some .06 flexible tubing, push the .06 tubing onto the barb fitting shown in Figure 18.
4. Reconnect the air supply to the positioner and read the internal regulator pressure on the 0 to 30 gauge (the internal regulator should be set to 22.0 psi). Adjust the regulator pressure by turning the set screw with a small flat screwdriver.
5. Once the regulator pressure is set, remove the air supply to the positioner, and replace the No. 10-32 x .06 barb fitting with the No. 10-32 hex plug.

Checking or Setting the Driver Module Minimum Pressure

Once the internal regulator pressure is set to 22.0 psi, the driver module minimum pressure can be checked. To do this, refer to Figure 17, and proceed as follows:

1. Make sure the valve is bypassed or in a safe condition.
2. Disconnect power from the positioner.
3. Remove the main cover and remove the .06 flexible tubing from the orifice.
4. Obtain a No. 10-32 x swivel elbow (pneumadyne part No. SFL-10 or equivalent).
5. Remove the No. 10-32 x .016 orifice (Figure 11) from the driver module, and screw in the No. 10-32 x swivel elbow.
6. Direct the swivel elbow so the minimum pressure test port is accessible.
7. Screw a No. 10-32 x .06 barb fitting into the test port, and screw the No. 10-32 x .016 orifice into the end of the elbow as shown.
8. Connect the tubing from the internal regulator output port to the orifice.
9. Using some .06 flexible tubing, connect a 0 to 30 gauge to the minimum pressure set port.
10. Once the gauge is connected, reapply the positioner air supply. The minimum pressure should now be registering on the gauge and must be 3.8 to 4.2 psi. If the minimum pressure is not correct, take a 0.14 Allen wrench and turn the minimum pressure set screw located at the bottom of the driver module (Figure 19) until the pressure is in the range indicated. Cycle the positioner air supply several times and recheck the minimum pressure and re-adjust, if necessary, to ensure that the pressure has settled within the range specified.
11. When the pressure is set, remove the air supply.
12. Remove the No. 10-32 x .06 barb and orifice from the swivel elbow and then remove the swivel elbow.
13. Replace the orifice as shown in Figure 11 and reconnect the .06 tubing from the internal regulator output port to the orifice. Reconnect the positioner air supply and power. The positioner should now be ready to calibrate.

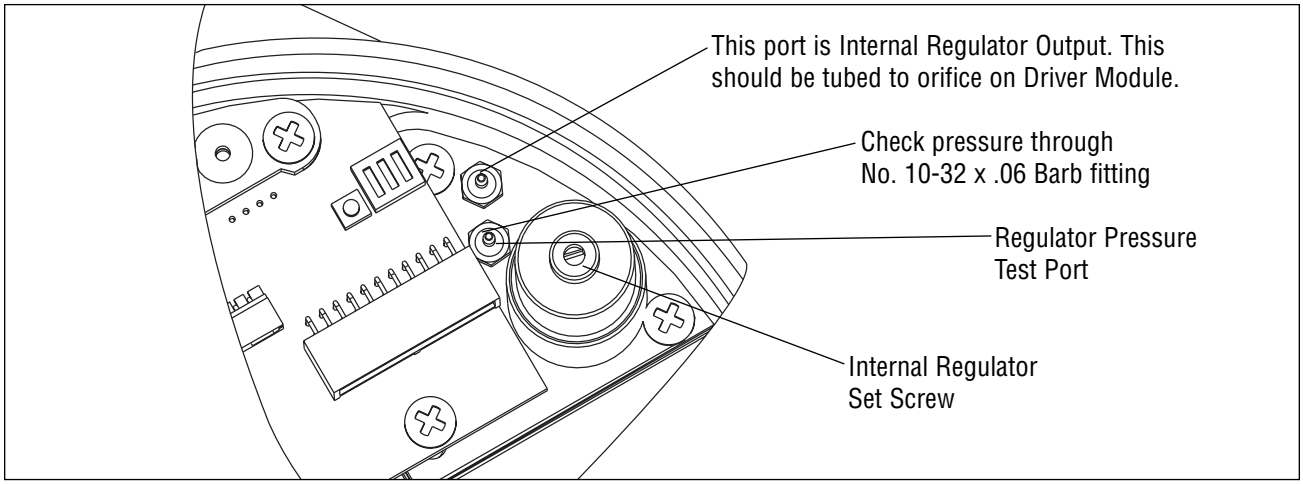

Figure 18: Internal Regulator

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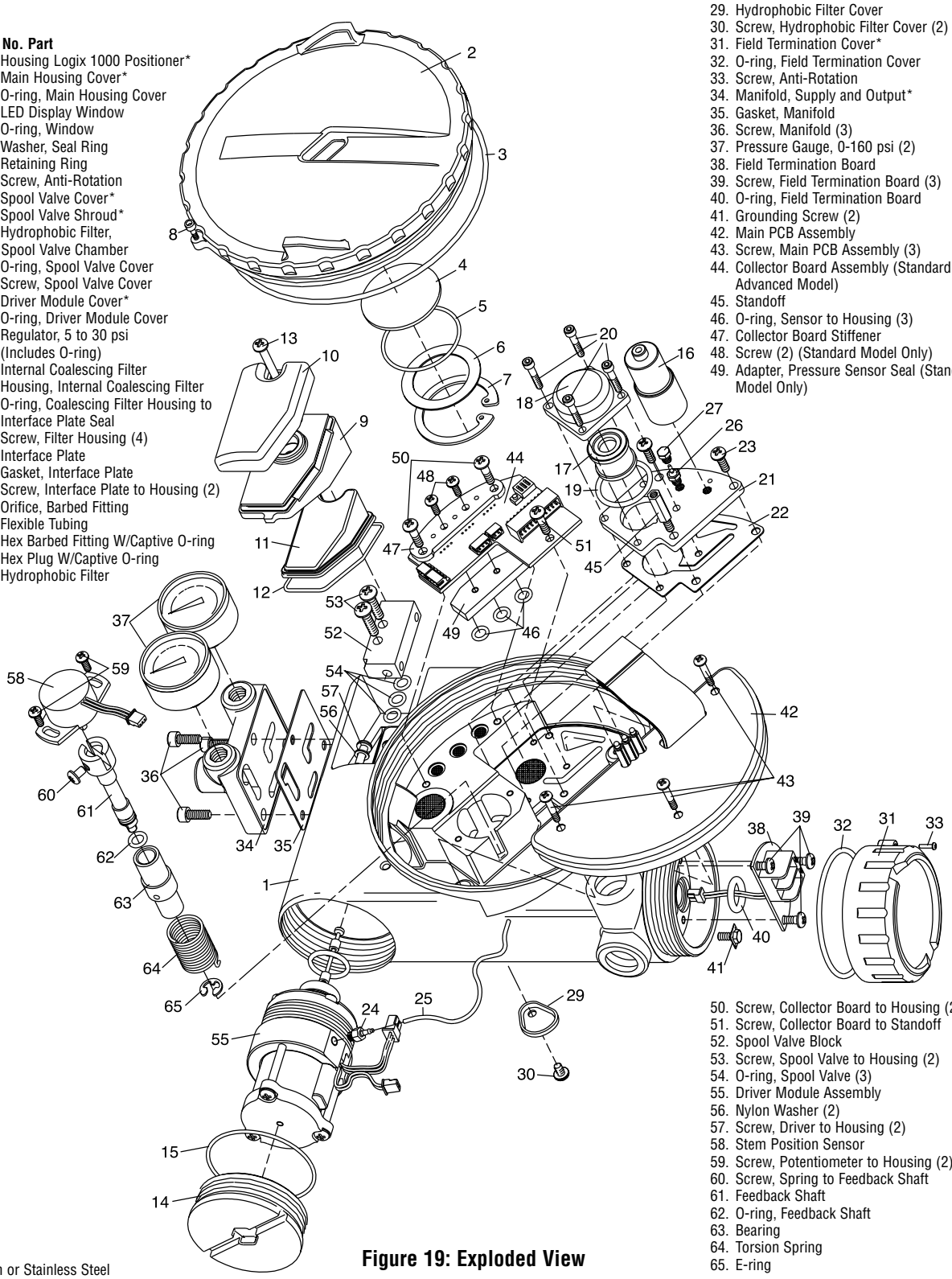
Item No. Part

1. Housing Logix 1000 Positioner*
2. Main Housing Cover*
3. O-ring, Main Housing Cover
4. LED Display Window
5. O-ring, Window
6. Washer, Seal Ring
7. Retaining Ring
8. Screw, Anti-Rotation
9. Spool Valve Cover*
10. Spool Valve Shroud*
11. Hydrophobic Filter, Spool Valve Chamber
12. O-ring, Spool Valve Cover
13. Screw, Spool Valve Cover
14. Driver Module Cover*
15. O-ring, Driver Module Cover
16. Regulator, 5 to 30 psi (Includes O-ring)
17. Internal Coalescing Filter
18. Housing, Internal Coalescing Filter
19. O-ring, Coalescing Filter Housing to Interface Plate Seal
20. Screw, Filter Housing (4)
21. Interface Plate
22. Gasket, Interface Plate
23. Screw, Interface Plate to Housing (2)
24. Orifice, Barbed Fitting
25. Flexible Tubing
26. Hex Barbed Fitting W/Captive O-ring
27. Hex Plug W/Captive O-ring
28. Hydrophobic Filter
29. Hydrophobic Filter Cover
30. Screw, Hydrophobic Filter Cover (2)
31. Field Termination Cover*
32. O-ring, Field Termination Cover
33. Screw, Anti-Rotation
34. Manifold, Supply and Output*
35. Gasket, Manifold
36. Screw, Manifold (3)
37. Pressure Gauge, 0-160 psi (2)
38. Field Termination Board
39. Screw, Field Termination Board (3)
40. O-ring, Field Termination Board
41. Grounding Screw (2)
42. Main PCB Assembly
43. Screw, Main PCB Assembly (3)
44. Collector Board Assembly (Standard / Advanced Model)
45. Standoff
46. O-ring, Sensor to Housing (3)
47. Collector Board Stiffener
48. Screw (2) (Standard Model Only)
49. Adapter, Pressure Sensor Seal (Standard Model Only)



50. Screw, Collector Board to Housing (2)
51. Screw, Collector Board to Standoff
52. Spool Valve Block
53. Screw, Spool Valve to Housing (2)
54. O-ring, Spool Valve (3)
55. Driver Module Assembly
56. Nylon Washer (2)
57. Screw, Driver to Housing (2)
58. Stem Position Sensor
59. Screw, Potentiometer to Housing (2)
60. Screw, Spring to Feedback Shaft
61. Feedback Shaft
62. O-ring, Feedback Shaft
63. Bearing
64. Torsion Spring
65. E-ring

*Aluminum or Stainless Steel

Figure 19: Exploded View

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Troubleshooting Logix 1200 Positioner Systems

Failure	Problem Cause	Corrective action
No LED is blinking	1. Current source below 3.2 mA 2. Incorrect wiring polarity 3. Stroke/actuator calibration in progress	1. Verify current source is outputing at least 3.2 mA 2. Check wiring for correct polarity 3. Normal operation
Erratic communications	1. Current source bandwidth not limited to 25Hz 2. Maximum cable length or cable impedance exceeded 3. HART modem connected to PC RS-232 port not receiving enough power 4. Interference with Intrinsically Safe barrier	1. Maximum allowable current source rate of change is 924 mA per second 2. Check cable conductor size, length and capacitance. Reference page 4, 'Cable Requirements.' 3. Verify battery is not low if using a laptop PC 4. Must use HART compatible Intrinsically Safe barrier
Unit does not respond to analog commands	1. Unit is in digital command mode 2. Error occurred during calibration Red LED blinking	1. Switch to analog command mode. 2. Correct calibration error Recalibrate
Valve position reading is not correct	1. Stem position sensor mounting is off 180 degrees 2. Stroke not calibrated 3. Tight shutoff is active 4. Custome characterization or soft stops active	1. Remove feedback sensor Rotate so that the dot on shaft faces wiring. 2. Calibrate valve stroke 3. Verify tight shutoff setting 4. Verify custom settings
Position is driven fully open or closed and will not respond to command	1. Stroke not calibrated 2. Inner-loop hall sensor not connected 3. Wrong air action entered in software 4. Actuator tubing backwards 5. Pressure modulator minimum pressure too high 6. Control parameter inner-loop offset is too high/low	1. Calibrate valve stroke 2. Verify hardware connections 3. Check ATO (Air-to-open) and ATC (Air-to-close) settings. Recalibrate 4. Verify ATO/ATC actuator tubing 5. Check minimum pressure setting and adjust if necessary 6. Adjust inner-loop and see if proper control resumes
Sticking or hunting operation of the positioner	1. Contamination of the spool valve assembly 2. Control tuning parameters not correct	1. Check air supply for proper filtering and meeting ISA specifications S7.3 2. Lower proportional gain settings
Positioner is not responding when Quick-Cal button is pressed	1. Refer to page 11	1. Refer to page 11

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Available Spare Part Kits for Logix 1000 Positioner

Kit 1 - Driver Module Assembly
Part No. 10070864

Item No.	Description	Quantity
55	Driver module	1
52	Spool valve block	1
53	Screw, spool valve housing	2
54	O-ring, spool valve	3
57	Screw, driver to housing	2
56	Nylon washer	2

Kit 2 - Soft Goods Kit
Part No. 10070866

Item No.	Description	Quantity
3	O-ring, main housing cover	1
15	O-ring, driver module cover	1
32	O-ring, customer interface cover	1
40	O-ring, customer interface terminal block	1
46	O-ring, sensor to housing	3
54	O-ring, spool valve	3
62	O-ring, feedback shaft	1
5	O-ring, main cover window	1
19	O-ring, coalescing filter housing to interface plate seal	1
12	O-ring, spool valve cover	1
22	Gasket, interface plate	1
35	Gasket, manifold	1
17	Internal coalescing filter	1
28	Hydrophobic filter	1

Kit 3 - Standard Collector Board Assembly
Part No. 10070870

Item No.	Description	Quantity
44	Collector board	1
45	Standoff	1
46	O-ring, sensor to housing	3
49	Adapter, pressure sensor seal	1
48	Screw	2
47	Collector board stiffener	1
50	Screw, collector board housing	2
51	Screw, collector board to standoff	1

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Kit 4 - Advanced Collector Board Assembly
Part No. 10070871

Item No.	Description	Quantity
44	Collector board	1
45	Standoff	1
46	O-ring, sensor to housing	3
47	Collector board stiffener	1
50	Screw, collector board to housing	2
51	Screw, collector board to standoff	1

Kit 5 - Customer Interface Assembly
Part No. 10070873

Item No.	Description	Quantity
38	Field termination board	1
39	Screw, field termination board	3
40	O-ring, field termination board	1
41	Grounding screw	1

Kit 6 - Main PCB Assembly
Part No. 10070874

Item No.	Description	Quantity
42	Main PCB assembly	1
43	Screw, main PCB assembly	3

Kit 7 - Regulator
Part No. 10070875

Item No.	Description	Quantity
16	Regulator and captive O-ring	1

Kit 8 - Orifice Assembly
Part No. 10070876

Item No.	Description	Quantity
24	Orifice barbed fitting and gasket	1
25	Flexible tubing	1
26	Hex barbed fitting with captive O-ring	1
27	Hex plug with captive O-ring	1

Kit 9 - Stem Position Sensor
Part No. 10061643

Item No.	Description	Quantity
58	Stem position sensor	1