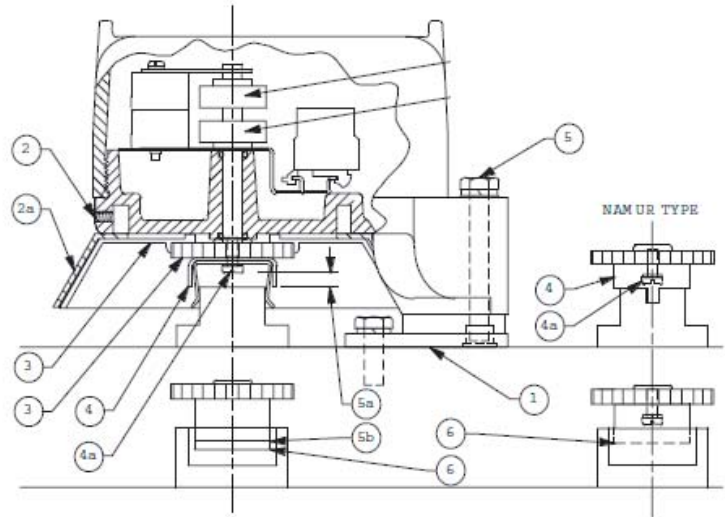


## Installation & Adjusting Instructions

### Thru-Bolt™ Mounting

1. Attach mounting plate to actuator using fasteners and lockwashers provided.
2. Loosen indicator cover set-screw.
- 2a. Rotate indicator cover to desired viewing angle and retighten set-screw. (Make sure indicator cover is pushed all the way into housing slot.)
3. Rotate coupling spacer and indicator drum to desired position. (OPEN or CLOSED appearing through indicator window)
4. Remove spacer screw and fit torque coupling or Namur coupling onto coupling spacer. Separate spacer and indicator drum and rotate spacer to align coupling with actuator shaft. Fit coupling spacer over indicator drum drive hub.
- 4a. Secure torque coupling assembly or Namur coupling with screw of proper length. (Additional coupling spacers and longer screw may be required on some mountings.)
5. Slide Thru-Bolts with washers into housing and fit retaining quad-rings over bolts to retain them.
- 5a. **Top of actuator shaft should be within 1/4" (6.35mm) from coupling screw head or Namur coupler.**
- 5b. Torque coupler or Namur coupler must be fully engaged in slot and be centered on the shaft or block attached to the shaft.
6. Operate actuator to full open and full closed positions and check for proper alignment between switch and actuator. **Eccentricity of shaft must be no greater than .01" (.254mm) from centerline.** The torque coupler or Namur coupler must be centered on the flats of the actuator shaft or block in both the full open and full closed position. Realign as necessary and final tighten Thru-Bolts.
7. "Fine-tune" visual indicator cover repeating #2 and lightly tighten set screw.



**CAUTION:**

**TO PREVENT IGNITION OF HAZARDOUS ATMOSPHERES, REPLACE COVER BEFORE ENERGIZING THE ELECTRICAL CIRCUITS.**

**KEEP COVER TIGHTLY CLOSED WHEN IN OPERATION.**

**NOTE:**

**FOR SIL APPLICATIONS REFERENCE THE QUARTZ VALVE POSITION INDICATOR SAFETY MANUAL AVAILABLE AT: [www.stonel.com/approvals](http://www.stonel.com/approvals).**

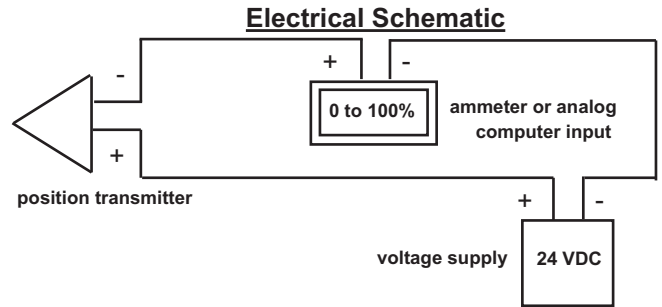
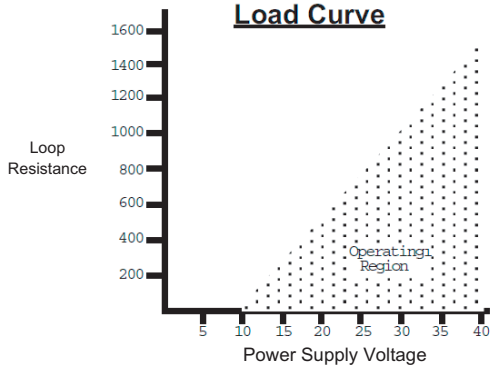


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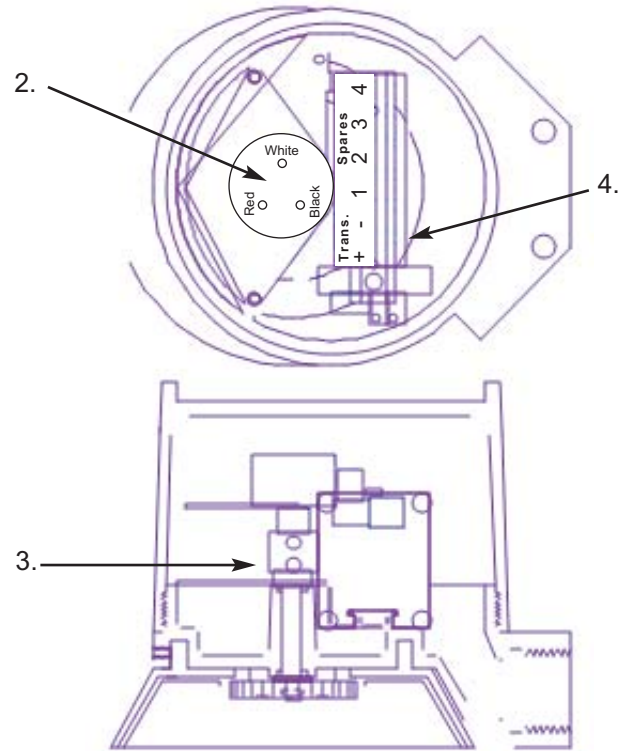
**Specifications: (QX50\_\_, QN50\_\_, QX70\_\_, QN70)**  
 Output: 4-20 mA  
 Voltage Range: 10 to 40 VDC  
 Recommended Voltage: 24 VDC, 50 mA Minimum  
 Max Load: 700 ohm @ 24VDC (See Load Curve)  
 Span: Adjustable from 35° to 270°

Max Linearity Error: Standard Potentiometer  $\pm 0.85^\circ$   
 High Perf. Potentiometer  $\pm 0.35^\circ$   
 Temperature Range: -40° to 80° C  
**NOTE: For SIL applications reference the Quartz Valve Position Indicator Safety Manual available at [www.stonel.com/approvals](http://www.stonel.com/approvals)**

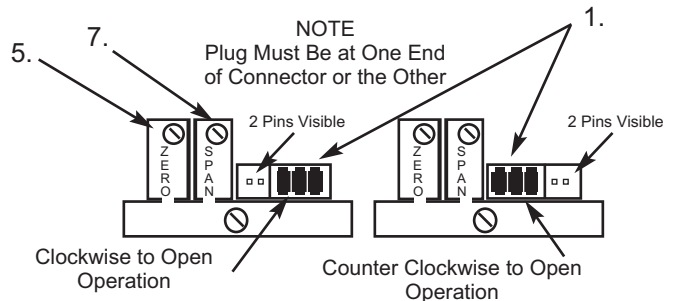
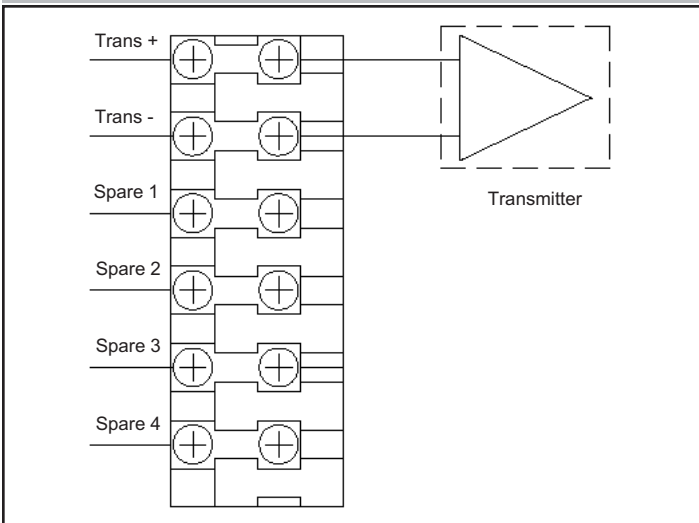


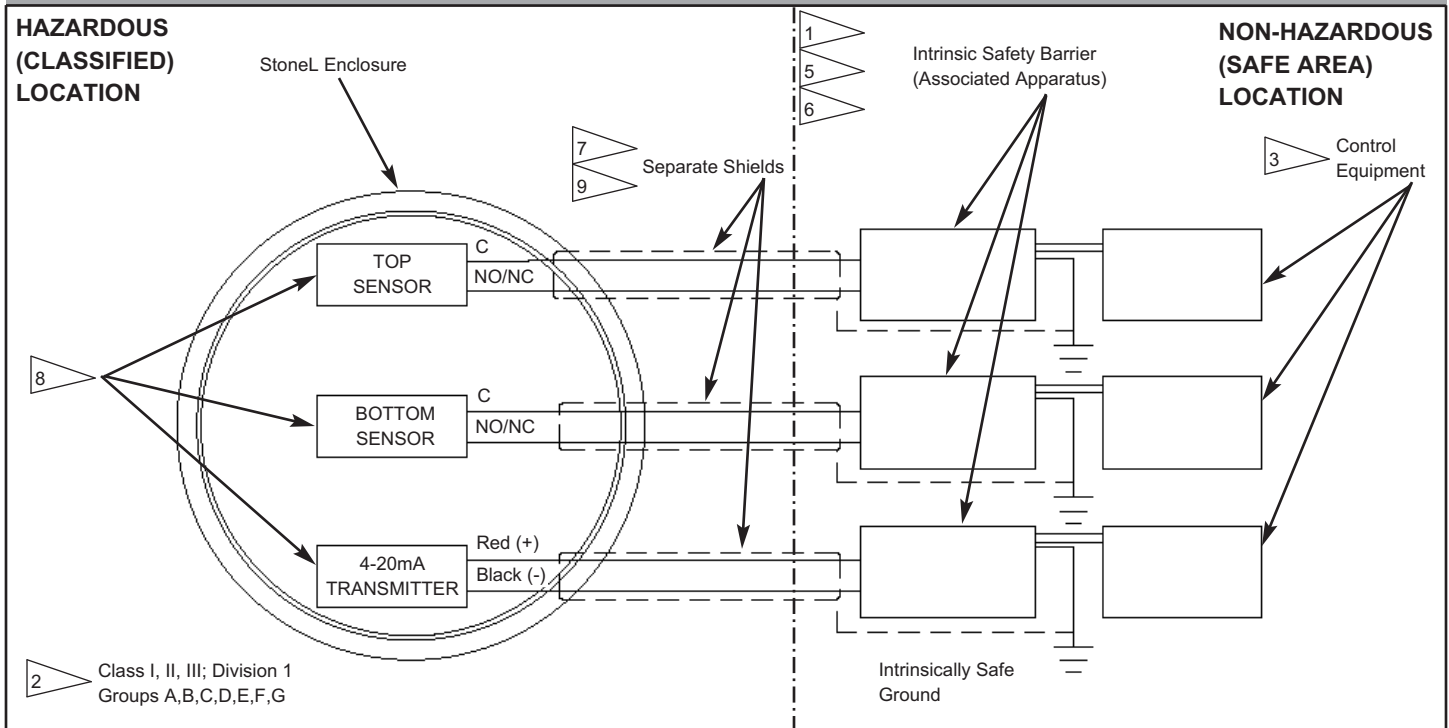
### Position Transmitter Calibration

1. Connect the plug as shown for either clockwise or counter clockwise to open operation (as viewed from top).
2. Operate actuator to desired "zero" position. With power disconnected, connect an ohm meter across the terminals located on top of the potentiometer. For counter clockwise rotation, connect to the terminals with the black lead and white lead. For clockwise rotation, connect the ohm meter to the terminals with the red lead and white lead.
3. Loosen bottom set screw and rotate coupling until the ohm meter reads between 400 - 600 ohms. Retighten set screw, verify the ohm meter still reads between 400 - 600 ohms.
4. Disconnect the ohm meter and connect DC power to the positive (+) and negative (-) terminals (see electrical schematic).
5. Adjust the screw on the zero trimpot for a 4mA output
6. Operate actuator to the desired "100%" position.
7. Adjust the screw on the span trimpot for a 20mA output. Zero and Span adjustments are non interactive.



### Wiring Diagram





## FM INSTALLATION NOTES:

**Entity Parameters:**  $V_{max} = 30 \text{ Vdc}$   $I_{max} = 100 \text{ mA}$   $C_i = 66 \text{ nF}$   $L_i = 0.80 \text{ mH}$   $P_i = 2.0 \text{ W}$

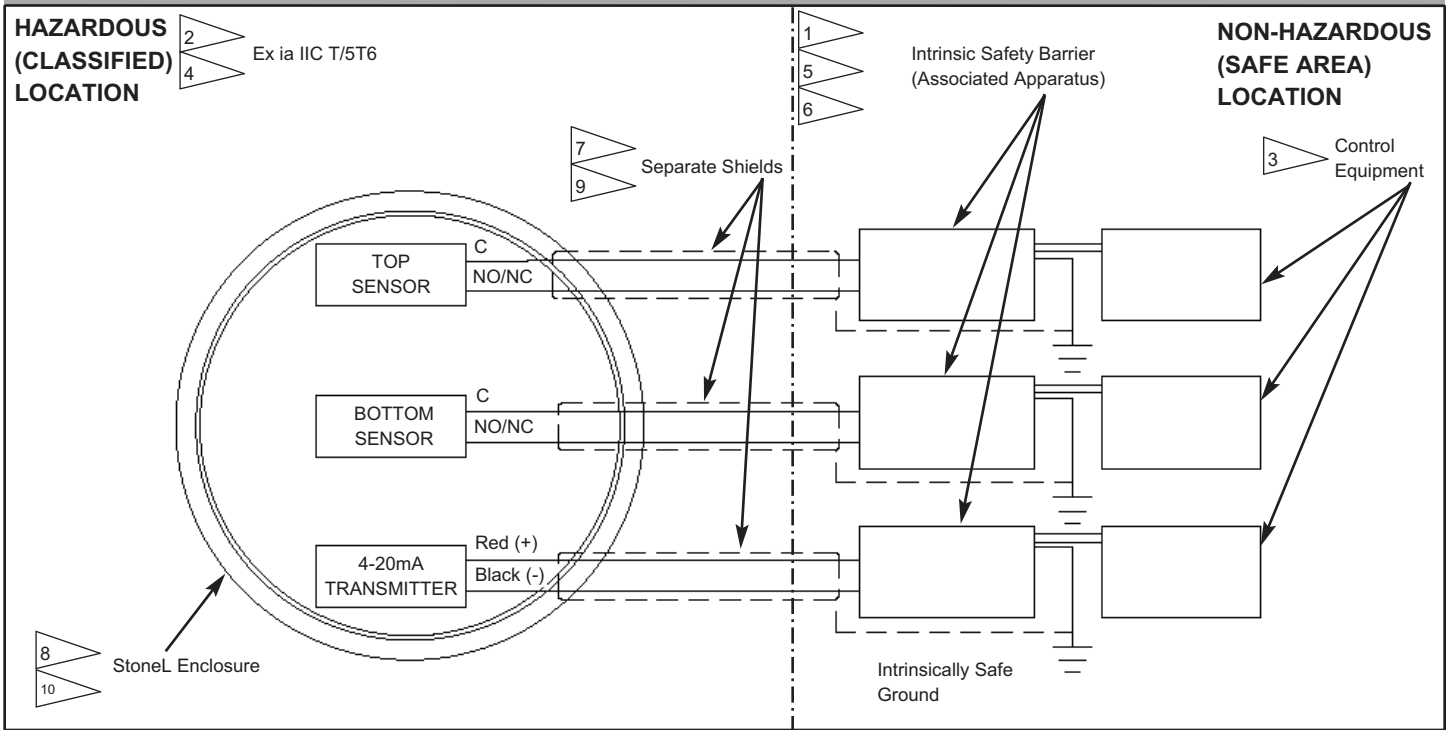
1.  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$ .
2. Dust-tight conduit seal must be used when installed in Class II and Class III environments.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or Vdc.
4. Installation should be in accordance with ANSI/ISA RPA12.6 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
5. The configuration of associated apparatus for each sensor wiring pair must be FMRC Approved.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Switches and/or transmitter are optional based on model number. (if more than 2 switches, follow instructions above for each switch.)
9. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
10. Substitution of components may impair hazardous location safety.

### Notes:

1. The QN5 and QN7 series devices are approved under the Entity Concept as Intrinsically Safe for Class I, Division 1, Groups A, B,C, & D, Class II, Division 1, Groups E,F, & G, and Class III, Division 1 Hazardous (Classified) locations. Under the Entity Concept the parameters for the QN5 and QN7 devices are  $V_{max}=30\text{V}$ ,  $I_{max}=100\text{mA}$ ,  $C_i=66\text{nF}$ ,  $L_i=0.80\text{mH}$ . In order to have an approved loop the associated apparatus (barriers) must be FMRC approved under the Entity Concept with the following parameters:  $V_{oc}=40\text{V}$ ,  $I_{sc}=100\text{mA}$ . The control drawing for the associated apparatus will specify the allowed connected inductance and capacitance.
2. Installation of the solenoid and its associated barrier must be in accordance with the respective control drawings supplied by the respective manufacturers. This equipment must be approved by Factory Mutual Research Corporation as Intrinsically Safe for Class I, Division 1 Hazardous (Classified) locations.

### WARNING:

1. When used in intrinsic safety applications, the aluminum enclosure shall be installed in such a manner as to prevent the possibility of sparks resulting from friction or impact.
2. To prevent the risk of electrostatic sparking, the equipment enclosure shall be cleaned only with a damp cloth.



**INSTALLATION NOTES (Ex ia IIC T5/T6):**

**Entity Parameters:**  $U_i = 30 \text{ Vdc}$ ;  $I_i = 100 \text{ mA}$ ;  $C_i = 66 \text{ nF}$ ;  $L_i = 0.8 \text{ mH}$ ;  $P_i = 2.0 \text{ W}$

1.  $V_{oc}$  or  $V_t \leq U_i$ ,  $I_{sc}$  or  $I_t \leq I_i$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$ .
2. Dust-tight conduit seal must be used when installed in Zone 20, Zone 21, and Zone 22 environments or where Ingress Protection of IP67 is required.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or Vdc.
4. Installation should be in accordance with appropriate local code or practice.
5. The configuration of associated apparatus for each sensor wiring pair or solenoid wiring pair must be approved.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor or solenoid coil wiring must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.
10. Substitution of components may impair hazardous location safety.

**Special Conditions for Safe Use:**

1. Parts of the enclosure are non-conducting and may generate an ignition-capable level of electrostatic charge under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions which might cause a build up of electrostatic charge on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.
2. When installed within a Zone 0 location, the aluminum alloy enclosure shall be installed in such a manner as to prevent the possibility of sparks resulting from friction or impact.

### Specifications

Standard Potentiometer (B):

Output: 0-10K Ohms +/- 5%  
 Linearity: +/- 0.25%  
 Power Rating: 0.5 Watt @ 80°C  
 Cycle Life: Two million shaft rotations  
 Vibration tolerance: Acceptable  
 Temp Range: -40° to 80° C

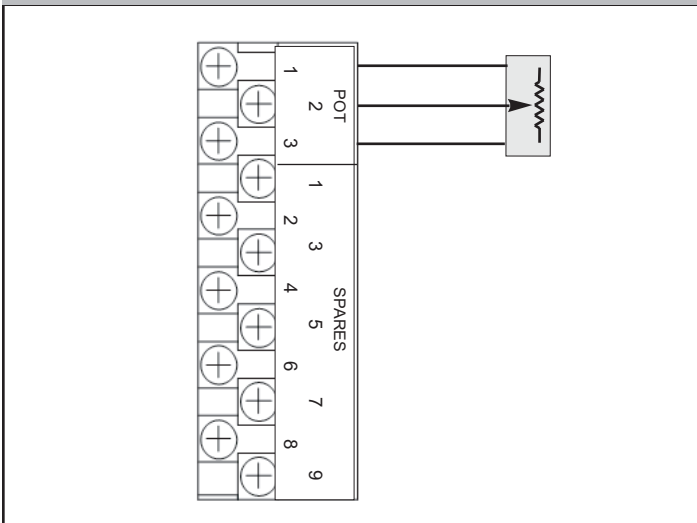
High Performance Potentiometer (C):

Output: 0-10K Ohms +/- 0.1%  
 Linearity: +/- 0.10%  
 Power Rating: 0.5 Watt @ 80° C  
 Cycle Life: 50 million shaft rotations  
 Vibration tolerance: Outstanding  
 Temp Range: -40° to 80° C

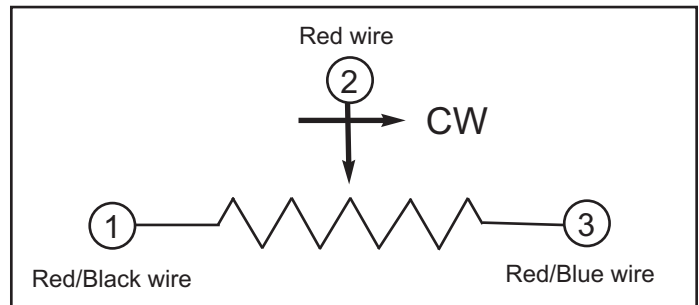
### NOTE:

**FOR SIL APPLICATIONS REFERENCE THE QUARTZ VALVE POSITION INDICATOR SAFETY MANUAL AVAILABLE AT: [www.stonel.com/approvals](http://www.stonel.com/approvals).**

### Wiring Diagram

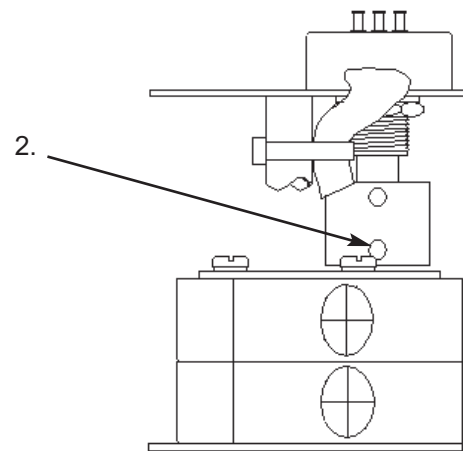
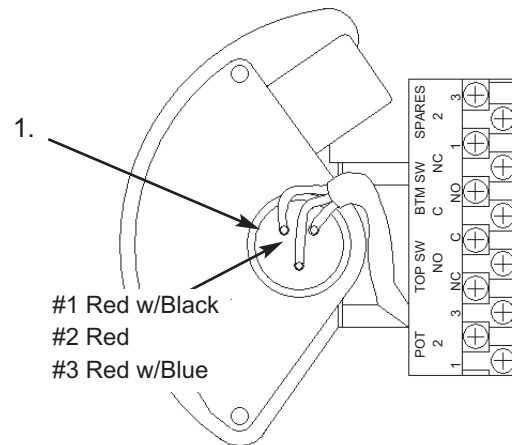


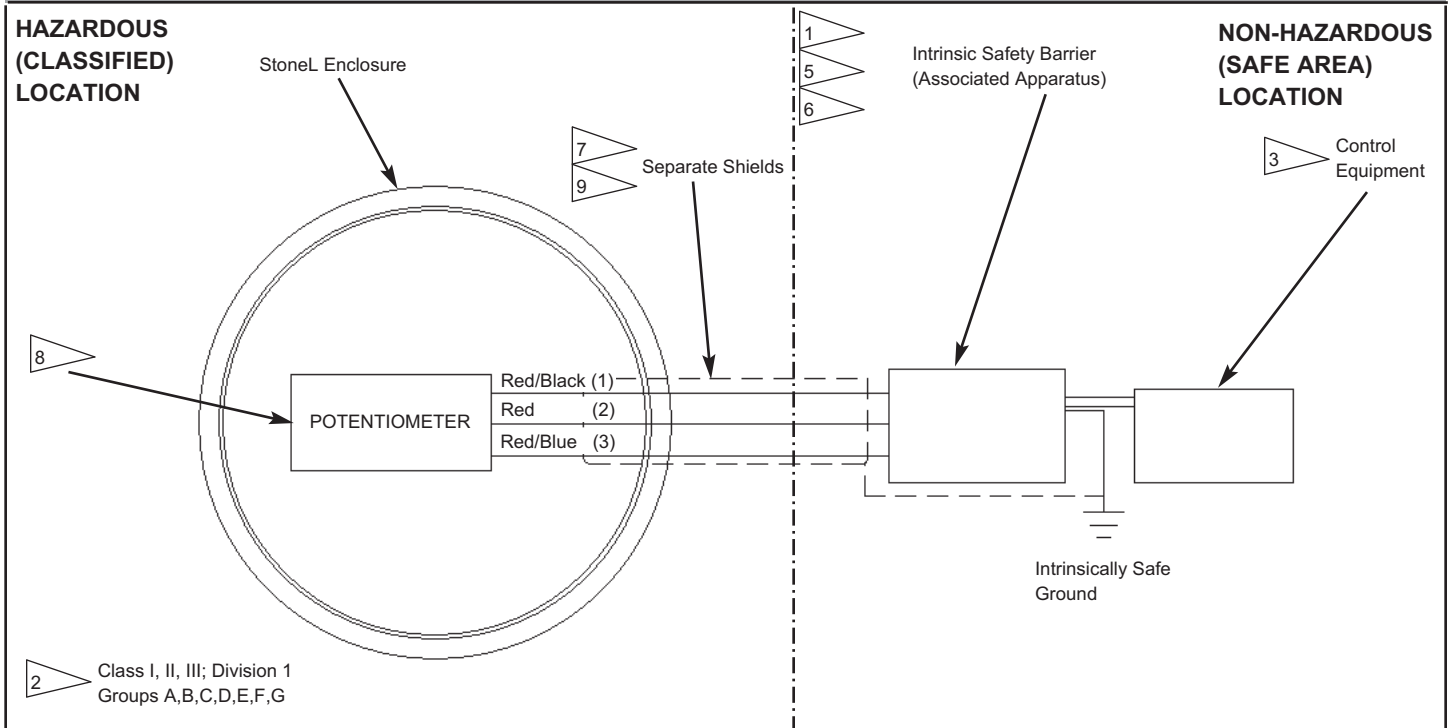
### Electrical Schematic



### Potentiometer Calibration

1. Operate actuator to desired "zero" position. Connect an ohm meter across the terminals located on top, or side, of the potentiometer. For counter clockwise rotation (Ohm value to increase), connect to the terminals with the Red lead (#2) and Red/Black lead (#1). For clockwise rotation, connect the ohm meter to the terminals with the Red lead (#2) and Red/Blue lead (#3).
2. Loosen bottom set screw and rotate coupling until the ohm meter reads < 10 Ohms. Retighten set screw, verify the ohm meter still reads < 10 Ohms.
3. Operate actuator to the desired "100%" position (assuming 90 degree rotation) and verify ohmmeter reads 2.7K Ohms +/- 10%.
4. Remove all test equipment and place unit in service.





## FM INSTALLATION NOTES:

**Entity Parameters:**  $V_{max} = 26 \text{ Vdc}$   $I_{max} = 14 \text{ mA}$   $C_i = 0.0 \text{ nF}$   $L_i = 0.0 \text{ mH}$   $P_i = 50 \text{ mW}$

1.  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$ .
2. Dust-tight conduit seal must be used when installed in Class II and Class III environments.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or Vdc.
4. Installation should be in accordance with ANSI/ISA RPA12.6 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
5. The configuration of associated apparatus for each sensor wiring pair must be FMRC Approved.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Switches and/or potentiometer are optional based on model number. (if more than 2 switches, follow instructions above for each switch.)
9. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
10. Substitution of components may impair hazardous location safety.

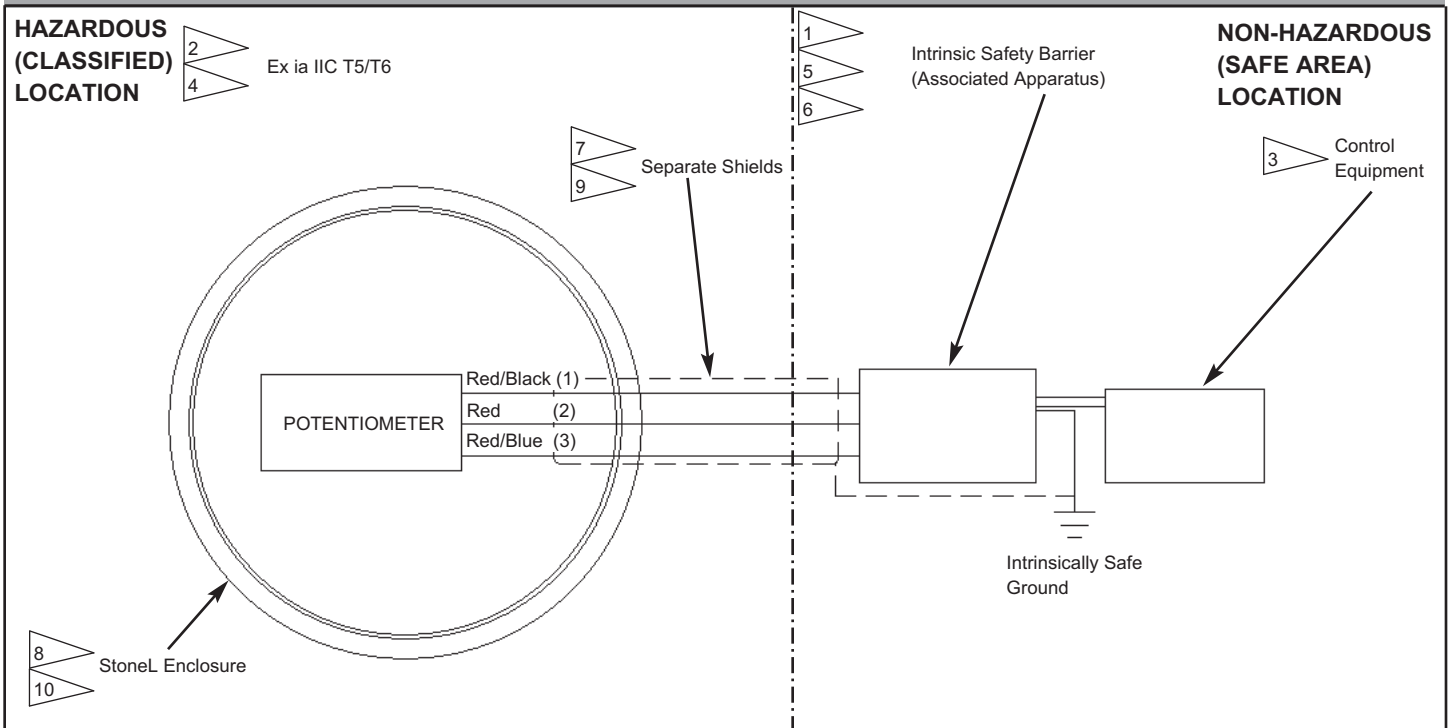
### Notes:

1. The QNB and QNC series devices are approved under the Entity Concept as Intrinsically Safe for Class I, Division 1, Groups A, B,C, & D, Class II, Division 1, Groups E,F, & G, and Class III, Division 1 Hazardous (Classified) locations. Under the Entity Concept the parameters for the QNB and QNC devices are  $V_{max}=30\text{V}$ ,  $I_{max}=100\text{mA}$ ,  $C_i=66\text{nF}$ ,  $L_i=0.80\text{mH}$ . In order to have an approved loop the associated apparatus (barriers) must be FMRC approved under the Entity Concept with the following parameters:  $V_{oc}=40\text{V}$ ,  $I_{sc}=100\text{mA}$ . The control drawing for the associated apparatus will specify the allowed connected inductance and capacitance.
2. Installation of the solenoid and its associated barrier must be in accordance with the respective control drawings supplied by the respective manufacturers. This equipment must be approved by Factory Mutual Research Corporation as Intrinsically Safe for Class I, Division 1 Hazardous (Classified) locations.

### WARNING:

1. When used in intrinsic safety applications, the limit switch shall be installed in such a manner as to prevent the possibility of sparks resulting from friction or impact.
2. To prevent the risk of electrostatic sparking, the equipment enclosure shall be cleaned only with a damp cloth.





**INSTALLATION NOTES (Ex ia IIC T5/T6):**

**Entity Parameters:**  $U_i = 26 \text{ Vdc}$ ;  $I_i = 14 \text{ mA}$ ;  $C_i = 0.0 \text{ nF}$ ;  $L_i = 0.0 \text{ mH}$ ;  $P_i = 50 \text{ mW}$

1.  $V_{oc}$  or  $V_t \leq U_i$ ,  $I_{sc}$  or  $I_t \leq I_i$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$ .
2. Dust-tight conduit seal must be used when installed in Zone 20, Zone 21, and Zone 22 environments or where Ingress Protection of IP67 is required.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or Vdc.
4. Installation should be in accordance with appropriate local code or practice.
5. The configuration of associated apparatus for each sensor wiring pair or solenoid wiring pair must be approved.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor or solenoid coil wiring must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.
10. Substitution of components may impair hazardous location safety.

**Special Conditions for Safe Use:**

1. Parts of the enclosure are non-conducting and may generate an ignition-capable level of electrostatic charge under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions which might cause a build up of electrostatic charge on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.
2. When installed within a Zone 0 location, the aluminum alloy enclosure shall be installed in such a manner as to prevent the possibility of sparks resulting from friction or impact.