

# “FV4” Series Vertical Flow Sensor

Swagelok

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These instructions are also  
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German and Spanish.

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Printed in U.S.A., CP  
March 2001, Rev. B  
MS-CRD-0044

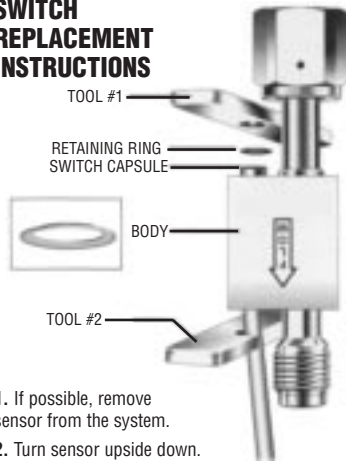
## “FV4” Series Vertical Flow Sensor



### SENSOR INSTALLATION CAUTIONS

- Install sensor with the ports **vertical** within  $\pm 7^\circ$  and the flow arrow pointing UP.
- Locate sensor at least 1" away from any ferrous materials.
- Sensor contains a strong permanent magnet which can affect the operation of nearby components.
- Sensor is designed for gas flow only. Liquids or condensation will affect the accurate operation of the sensor.

### SWITCH REPLACEMENT INSTRUCTIONS



1. If possible, remove sensor from the system.
2. Turn sensor upside down. Pry or cut **Retaining Ring** from **Switch Capsule** and discard Retaining Ring.
3. Push down on the **Switch Capsule** to remove from **Body**. Discard Switch Capsule and insert *new* Switch Capsule into Body.

4. Place **Tool #2** against bottom of **Body**, as shown, fitting the tool notch around the switch wire leads. Hold **Tool #2** against sensor body to keep **Switch Capsule** in place through Step 7.

5. Place **Retaining Ring** over bottom of capsule, with flared side towards **Body** as shown. See Figure 1.

6. Place **Tool #1** over **Retaining Ring** and capsule, with counterbored hole facing Retaining Ring.

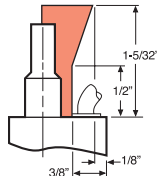
7. Press **Tool #1** and **Tool #2** together towards **Body**, forcing **Retaining Ring** in place against Body.

8. Remove and discard tools. Test sensor for proper operation.

### WELDING PRECAUTIONS for TUBE EXTENSION ENDED SENSORS.

1. When the welding procedure requires a continuous flow of purge gas through the sensor ensure adequate flow by purging **inlet to outlet**.

2. When welding onto the tube extension outlet, allow sufficient clearance (shown as red shaded area) for replacing the reed switch assembly.



# SWITCH CONNECTION INSTRUCTIONS

## CONTINUITY

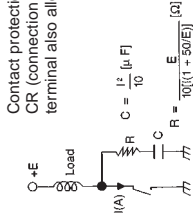
- The WHITE lead is common.
- Contact to the RED lead is closed when the float is in the down position.
- Contact to the BLACK lead is closed when the float is in the up position.

## REED SWITCH PROTECTION CIRCUIT

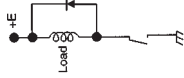
When a reed switch is connected to an inductive load or a load where surge or inrush current flows (capacitance or lamp load, long cable, etc.), the following contact protection circuits are required for the reed switch.

### Inductive Load

If the reed switch is applied in a circuit that has an inductive electromechanical device such as a relay, solenoid or coil driven counter, the energy stored in the device will provide a voltage spike to the reed contacts when the switch opens. Therefore, protection for the switch should be provided in the circuit. This protection will reduce the chance of premature switch contact deterioration. Two recommended inductive load switch protective circuits are shown below.



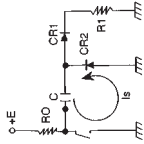
Contact protection with CR (connection to load terminal also allowed)



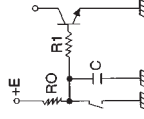
Contact protection with a quenching diode (connection to contact lead also allowed). In case the open state of the contacts continues for a relatively long time, the protection circuit should be connected to the terminal.

### Capacitive Load

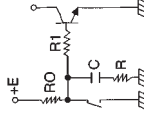
When a capacitor is in a closed circuit with a reed switch the current spike that occurs at capacitive discharge will cause reed switch contact deterioration. The following circuits are recommended to protect the reed switch when in the same circuit as a capacitor.



Differential circuit without contact protection. The energy stored in C will cause inrush current (Is) when the contacts close.



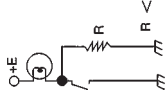
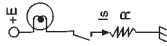
Circuit with C for chattering protection. Inrush current will also be caused as in the circuit at the left.



Circuit with R for contact protection. R should be between 50Ω & 500Ω.

### Lamp Load

If the reed switch is used in a circuit with a tungsten filament lamp load the current inrush will damage or even weld the switch contacts. To prevent lamp load contact damage to the switch a protective circuit such as the two below are recommended.



### WIRING CAPACITANCE

Where the reed switch is remote from the load and connected to the load by cable, static capacitance can be developed. In those applications, it is recommended that a contact protection circuit, such as the one below, be used.

Note: The value of the surge suppressor (Ls), in the protective circuit is 0.5 to 5mH depending on the load current. In some instances the surge suppressor can be replaced with a resistor of 10 to 500 ohms.

