



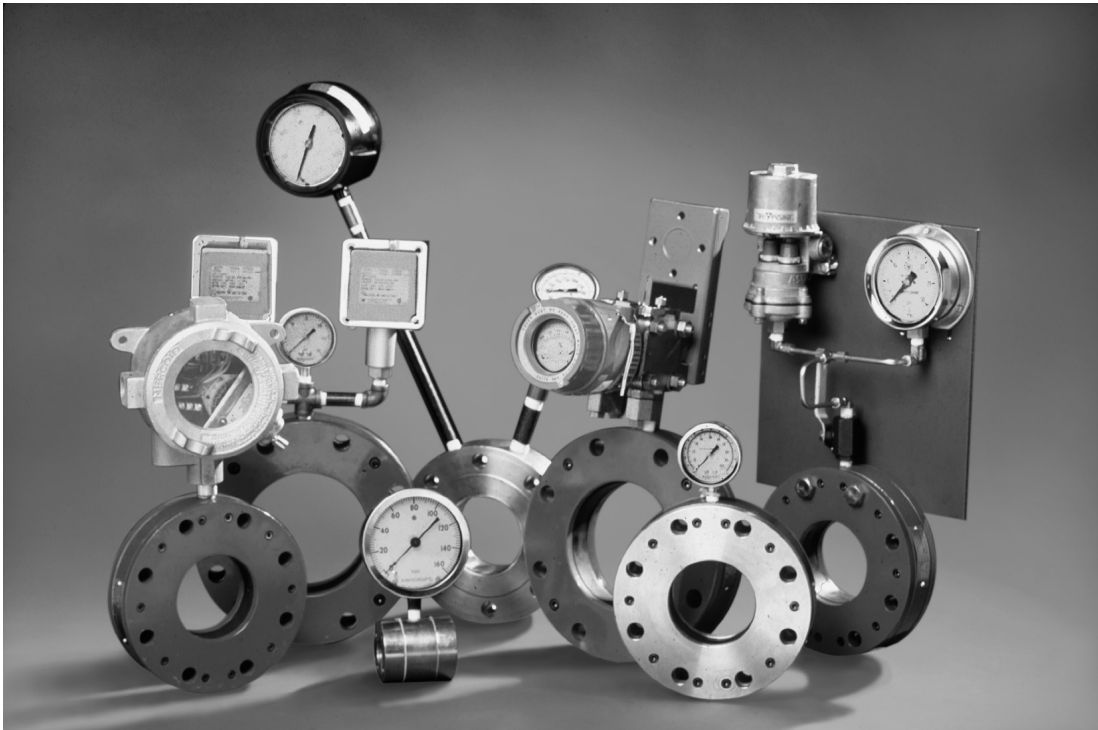
# PRESSURE SENSORS

FOR USE WITH SERIES 40, 48, 42 AND 44

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## Installation, Operation and Maintenance Manual

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### IMPORTANT

Please take a moment to review this manual. Before performing any maintenance on the pressure sensors be sure the pipeline has been de-pressurized. The improper installation or use of this product may result in personal injury, product failure, or reduced product life. Red Valve Co., Inc. can accept NO liability resulting from the improper use or installation of this product. If you have any questions or problems, please call the customer service department at (412) 279-0044. We appreciate your comments. Thank you for choosing Red Valve.

## OPERATION

Red Valve Sensors are a sealed system.

These Sensors must be properly filled and sealed before any pressure is applied. **Do not loosen the retaining bolts on the Series 40, Series 48 or Series 42, or the end caps on Series 44.** If this equipment is removed, air can be introduced into the sensing fluid, which can cause inaccurate readings. Great care should be taken to eliminate all air in the system. If the instrumentation is removed, or the bolts or end caps loosened, the sensor should be properly refilled (see fill instructions).

Gauge cocks can be used to isolate the instrumentation, however, when the instrument is removed there is going to be some fluid lost, possibly causing an inaccurate reading. Quick disconnect couplings with two-way check valves, which minimize fluid loss, can also be furnished.

Red Valve sensors have very sensitive sleeves for more accurate readings. The sleeves do not act as pressure snubbers. If a sensor is used near a pump or equipment which produces frequent pressure surges, a pressure snubber or liquid-filled gauge should be used.

NOTE: If a pressure snubber is used, the sensor should be vacuum filled to ensure complete removal of air from the instrumentation.

**FLUID VOLUME:** Red Valve Pressure Sensors are manufactured with a small volume of sensing fluid. Some types of pressure switches require a large amount of sensing fluid. If these switches or multiple instruments are used, check the amount of fluid required to operate the instruments. The amount of usable fluid in the sensor is slightly less than the total fluid volume. In sensors with elastomer sleeves, the approximate amount of usable fluid in cubic inches is .25 x Nominal Pipe Size. If a larger volume of usable fluid is needed, an Extra Large Volume (XLV) sensor should be specified on the purchase order.

**INSPECTION:** Red Valve Pressure Sensors should be periodically inspected for wear or aging of the elastomer sleeve. Since there is very little sleeve movement, the wear on the sleeve is minimal. The sleeves are, however, subject to chemical attack from the process fluids. The entire sleeve should be periodically checked for cracks, cuts and blisters and replaced if necessary. The inspection interval should be determined by the severity of the service.

## INSTALLATION

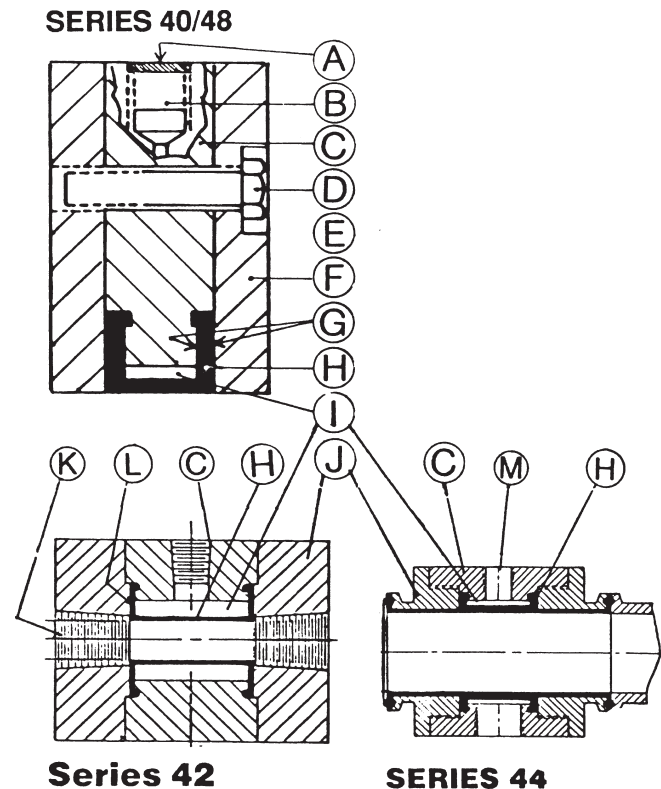
Standard Series 40 Sensors have ANSI 125/150 class bolting dimensions, and flat flange faces. Series 40W and 48W use the sleeve face to act as the flange gasket. Only use flat face flanges and tighten according to bolt grade and lubrication used for the installation. The maximum working pressure of a standard Series 40 is 225 psi. Series 40 sensors with higher pressure ratings are also available. Series 48 Sensors fit between ANSI 125/150 flanges.

1. Full face gaskets should be used, flanges with raised faces may distort the sensor and cause an inaccurate reading.
2. Bolt the sensor between two flanges and tighten the bolts to the recommended torque.

**Series 42 Sensors** have a standard NPT end connections and 1/4"-18 NPT gauge connections. When installing the sensor in the pipe line, be sure to tighten the NPT end connections by gripping the end caps of the sensor.

### CODE

A. Epoxy Fill	H. Sleeve
B. Hex Socket	I. Fill Fluid
C. Body	J. End Cap
D. Retaining Bolts	K. End Connection
E. Retainer Ring	L. Lubricant
F. Flange	M. 1/4" NPT
G. Sealant	



Teflon tape should be used on all NPT connections (end connections and gauge connections).

**NOTE:** Great care must be taken not to strip the NPT end connections if PVC end caps are used.

**High Pressure Series 42 Sensors** can have either a standard NPT or Autoclave end and gauge connection. When installing the sensor in the pipe line, be sure to tighten the end connections by gripping the end cap. Only use Teflon tape on NPT connections.

**Series 44 Food Grade Sensors** have Tri-Clamp® end connections, which are interchangeable with the Cherry Burrell "S" type clamp connection.

1. The end gaskets of the Series 44 sensors are molded into the sleeve. If the gasket needs to be replaced, the whole sleeve must be replaced. Make sure that the sensor is thoroughly sterilized before installing the sensor in line.
2. Install the appropriate size clamp and tighten to the recommended torque.  
Tri-Clamp is a Registered Trademark of Ladish Co.

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## REPLACING SLEEVE

Replacement Sleeves are available in a wide variety of rubber compounds. The following compounds are available: Buna-N, Pure Gum Rubber, Butyl, EPDM, Neoprene®, Hypalon® and Viton®. Food grade rubber is available in white: Neoprene, EPDM, Buna-N and Butyl along with Black Viton.

Neoprene, Hypalon and Viton are Registered Trademarks of E.I. DuPont.

1. Remove the sensor from the line.
2. Remove the gauge or instrumentation, to avoid damaging the equipment.
3. Chip away the epoxy fill covering the pipe plug.
4. Remove the pipe plug.
5. Drain the fluid from the sensor.
6. Remove the retaining bolts in the Series 40 and Series 42, unscrew the end caps of the Series 42 and Series 44.

**NOTE:** Collapse the gasket/liner portion of the sleeve down to the inside diameter on the Series 44, before unscrewing the end caps.

7. Remove the sleeve with a blunt instrument.
8. Thoroughly clean the body and flanges. Remove any fragments of rubber or pieces of Teflon tape. Loose fragments may clog gauges or instruments.
9. Inspect metal parts for sharp edges. Remove any sharp edges with a fine metal file or fine grinding wheel. Be sure to remove only enough metal to smooth surface.

10. Clean the new sleeve and body with a compatible fluid. Thoroughly clean and sterilize the Series 44, body, end caps and sleeve.
11. Install the new sleeve. Be very careful not to damage the sleeve with sharp instruments during installation.

**NOTE:** Series 42 sleeves maybe lubricated with petroleum jelly (Not compatible with EPDM, natural gum rubber, SBR, and Butyl at any temp. PVC and PP at elevated temp), soapy water or another compatible fluid to ease installation. Do not lubricate any other sleeves at this stage.

12. **Series 40/48:** Bolt the flanges of the sensor together until no gap exists between the flanges and the body. Be sure to tighten all of the bolts evenly.

**NOTE:** Sensors with working pressures over 5,000 psi must have the antiextrusion rings installed before the flanges are assembled.

**Teflon Series 40/48:** Apply a layer of sealant to both sides of the sleeve flanges. Use Dow Corning Silicone Sealant, number RTV-732-Clear, or equivalent.

**Series 42:** Lubricate the exposed faces of the sleeve with petroleum jelly (Not compatible with EPDM, natural gum rubber, SBR, and Butyl at any temp. PVC and PP at elevated temp), or other compatible lubricant, and screw the end caps into the body. Tighten the end caps until they are snug.

**High Pressure Series 42:** Be sure to install the anti-extrusion rings in sensors with 5000 PSI and greater pressure ratings. For bolted models, tighten the bolts until there is no gap between the body and the end caps. Be sure to tighten all of the bolts evenly.

**Series 44 Food Grade Sensor:** Lubricate the exposed faces of the sleeve and the sleeve's outside diameters. Collapse the gasket/liner area so that the end caps can be screwed on. Be sure that the sleeve is fully engaged in the body before the end cap is completely tightened. The end cap should bottom out on the body when it is fully tightened. Use only approved lubricants and completely sterile assembly conditions.

- 13 Reinstall the gauge or instrument. Use three layers of Teflon tape on the NPT connection. For food grade applications use only approved sealants.

14. Fill sensor per the instructions below.

Recommended fill fluids include: a 50/50 mix of ethylene glycol and water, distilled water, FDA approved Silicone oil (Dow Corning 200-350). Fluorolube, vegetable oil and mineral oil.

**NOTE:** For food grade applications use only sterile fill equipment.

## STORAGE

Complete sensors and replacement sleeves should be stored in a cool, dark place. Exposure to heat, extreme cold or sunlight will damage sleeves. The sleeves also should not be exposed to electrical equipment which produces ozone, because, this will damage the sleeves. Red Valve will not be liable for parts which are improperly stored.

## FILL PROCEDURES

### GRAVITY FILL

1. Turn sensor as shown in Figure or place the gauge or instrument in the bottom connection if the sensor is still in line. If a sensor is filled while it is still in line, be sure that there is no pressure in the line.

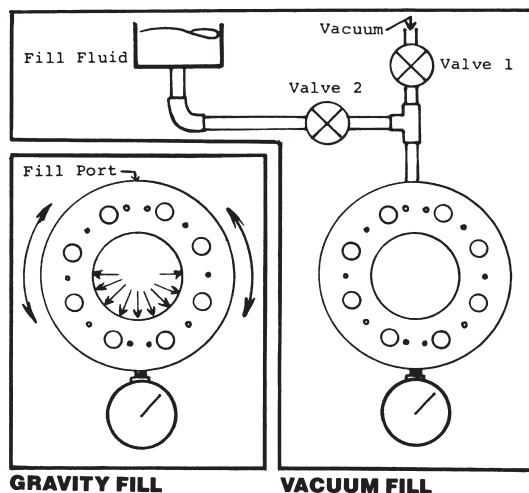
NOTE: Some types of pressure switches will not operate unless they are mounted upright.

2. Remove the NPT plug. It may be necessary to remove an epoxy fill covering the plug.
3. Pour fill fluid into the port until the threaded hole is half full.
4. Press on the inside diameter of the sleeve in several places. Bubbles should be visible in the top NPT connection, and the fluid level will decrease. The sensor may also be rotated approximately 45° if possible, this will help to get air bubbles out of the gauge or instrument.
5. Repeat steps 3 and 4 until the fluid level in the NPT connection does not change and no bubbles appear.
6. Fill the NPT connection to within a 1/4" inch of the outside diameter of the sensor.
7. Wrap the pipe plug with three layers of Teflon tape. Insert the plug into the port and tighten.

### VACUUM FILL

1. Connect the sensor to the assembly shown.
2. Close valve #2 and open valve #1.
3. Pull a 20" inch of mercury vacuum for at least 2 minutes on the sensor.  
NOTE: If a pressure snubber or pulsation dampener is used, keep the vacuum on the sensor for an additional 3 minutes.
4. Close valve #1 and open valve #2, this allows the fill fluid to be pulled into the sensor.
5. Remove the assembly and fill the NPT connection to within 1/4" inch of the outside diameter of the sensor.
6. Wrap the pipe plug with three layers of Teflon tape. Insert the plug into the port and tighten.

If the gauge or instrument can not be installed in the bottom connection, fill the sensor as described. Then turn the instrument upside down and completely fill it with fluid. Cover the ends with Saran wrap and wrap teflon tape around the threads. Puncture the Saran wrap with a pin and install the instrument into the gauge connection.



## RED VALVE WARRANTY

WARRANTIES - REMEDIES - DISCLAIMERS - LIMITATION OF LIABILITY

Unless otherwise agreed to in writing signed by Red Valve, all Products supplied by Red Valve will be described in the specifications set forth on the face hereof.

THE WARRANTIES SET FORTH IN THIS PROVISION ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER STATUTORY, EXPRESS OR IMPLIED (INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OR TRADE).

Red Valve Products are guaranteed for a period of one year from date of shipment, against defective workmanship and material only, when properly installed, operated and serviced in accordance with Red Valve's recommendations. Replacement for items of Red Valve's manufacture will be made free of charge if proved to be defective within such year; but not claim for transportation, labor or consequential damages shall be allowed. We shall have the option of requiring the return of the defective product to our factory, with transportation charges prepaid, to establish the claim and our liability shall be limited to the repair or replacement of the defective product, F.O.B. our factory. Red Valve will not assume costs incurred to remove or install defective products nor shall we incur backcharges or liquidated damages as a result of warranty work. Red Valve does not guarantee resistance to corrosion erosion, abrasion or other sources of failure, nor does Red Valve guarantee a minimum length of service, or that the product shall be fit for any particular service. Failure of purchaser to give prompt written notice of any alleged defect under this guarantee forthwith upon its discovery, or use, and possession thereof after an attempt has been made and completed to remedy defects therein, or failure to return product or part for replacement as herein provided, or failure to install and operate said products and parts according to instructions furnished by Red Valve, or failure to pay entire contract price when due, shall be a waiver by purchaser of all rights under these representations. All orders accepted shall be deemed accepted subject to this warranty which shall be exclusive of any other or previous warranty, and shall be the only effective guarantee or warranty binding on Red Valve, anything on the contrary contained in purchaser's order, or represented by any agent or employee of Red Valve in writing or otherwise, notwithstanding implied warranties. RED VALVE MAKES NO WARRANTY THAT THE PRODUCTS, AUXILIARIES AND PARTS ARE MERCHANTABILITY OR FIT FOR ANY PARTICULAR PURPOSE.



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