



“SS-H”
HYDRAULIC PRESSURE SWITCH
OPERATION MANUAL
OMP # 4HL2/ 4HH2

1.0 INTRODUCTION

The Ruelco “SS-H” hydraulic pressure switch is a two way bleed valve this is operated by pressure acting on a piston opposing an adjustable spring force. It functions as either a normally closed or normally open valve. Pressure applied to the sense port will cause the valve to operate.

The Model 4HH2 operates as a normally open valve and is called a high switch. If sense pressure acting on the piston is at normal levels, it is insufficient to overcome the spring force. The middle o-ring on the spool is positioned below the bent grooves on the bottom sleeve, thus preventing the instrument pressure from passing to the “Vent” port of the switch body. When the pressure acting on the piston becomes large enough to overcome the spring force, the spool shifts and the center o-ring moves in between the vent grooves on the bottom sleeve. Instrument pressure at the “In” port “Bleeds” into the reservoir through the “Vent” port.

The pressure switch “Bleed” action is the same for Model 4HL2. For this model of operation, the switch acts as a normally closed valve and is called a low switch. When normal sense pressure is acting on the piston, the center o-ring on the spool is above the vent grooves in the top sleeve, thus preventing the instrument pressure from passing to the “Vent” port of the switch body. When the sense pressure decreases to an abnormal level, the spring force shifts the spool and the middle o-ring on the spool becomes positioned in between the vent grooves in the top sleeve. Instrument pressure at the “In” port, “Bleeds” into the reservoir through the “Vent” port.

Changing the sense pressure value when the switch is used as either a high or low id done by altering the force of the spring, the size of the sense piston force is accomplished by turning the spring cap to increase or decrease the spring compression. The piston diameter is changed by adding or removing o-rings on the piston or changing the piston.

2.0 INSTALLATION

The “SS-H” can be panel mounted (with optional panel mount nut) or supported by piping from the sense port in either vertical or horizontal positions. If the switch is mounted horizontally, it is recommended that the small vent holes in the side of the switch body be oriented in a downward position. This will prevent any debris from accumulating in the spring cavity or above the sense piston. It is recommended that the product not be exposed to direct sunlight as this may cause a hazard to personnel.

Proper PIPE thread sealant should be used on any pipe fittings threaded into the pressure switch ports. If stainless steel fittings are used, a sealant that will prevent galling is required. When the switch is mounted using the ½” NPT base connection is adequately tightened, **DO NOT** loosen the body from the base or re-position the ports. Instead, remove the switch and re-make the ½” NPT connection.

3.0 DISASSEMBLY (See Spec Sheet)

Tools and materials required for proper disassembly, repair and assembly are as follows:

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1. 7/8”, 1” and 1-5/16” open end wrenches or two crescent wrenches of adequate size.
2. Small pliers.
3. For switches using ¼” diameter piston, 1 ¼” open end wrench or a suitable crescent wrench.
4. High quality silicone base lubricant.
5. An appropriate safety solvent.

3.1 PARTIAL DISASSEMBLY

A) Spring Removal

- 3.1.1 If the switch is installed in an operating instrument system, it is not necessary to remove any instrument supply or sense pressure. If the unit is a high switch, it will trip when changing the spring. If it is a low switch, it will not trip when changing the spring. Precautions should be taken to avoid any unwanted reactions in the instrumentation system.
- 3.1.2 To obtain access to the spring (Item 2), rotate the lock ring (Item 4) clockwise to loosen it from the spring cap (Item 1).
- 3.1.3 Rotate the spring cap (Item 1) counterclockwise until it is disengaged from the switch body (Item 10).
- 3.1.4 Remove the spring from its cavity in the switch body. If the parts tube (Item 3) is inside the spring, care should be taken not to lose it.
- 3.1.5 Follow the procedures in repair and assembly section (Steps 4.15 and 4.16) of this manual re-install the spring.

B) Piston Removal

- 3.1.6 If the switch is panel mounted, it is not necessary to remove it from the panel. It will be necessary to disconnect any piping or tubing from the base that would prevent the base from being removed. When the switch is supported by the ½” NPT connection on its base (Item 16), disconnect any piping or tubing from the switch body that would prevent its removal from the switch base. **CAUTION:** Be sure that all instrument and sense pressures are completely bled to zero before disconnecting any piping or tubing.
- 3.1.7 Use the appropriate wrenches to hold and loosen the base from the switch body. Unthread the base completely from the switch body.
- 3.1.8 Use the small pliers and grip the raised ridge on top of the piston (Item 15) and pull it from the switch base (Item 16).
- 3.1.9 If the ¼” diameter piston (Item 19) is installed and must be removed from the large piston, use the proper wrench to hold the ¼” diameter piston and grip the large piston with the pliers at the small diameter above the groove for the .5” piston o-ring (Item 18). Rotate either one counterclockwise to loosen and separate the pistons.
- 3.1.10 Remove the installed o-ring from the piston.
- 3.1.11 Procedures for re-installing the piston o-rings are in the repair and assembly procedure of this manual.

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3.2 FULL DISASSEMBLY

NOTE: Use the following instructions to completely disassemble the pilot for repair and cleaning. **CAUTION:** Be sure that all instrument or sense pressures are completely bled to zero before disconnecting any piping or tubing.

3.2.1 Follow the procedures stated under partial disassembly to remove the spring and pistons.

3.2.2 Remove the spool (Item 14) from the switch body. If it is necessary, use the small pliers and grip the small end of the spool. Removing the spool also removes the bottom sleeve (Item 13).

3.2.3 To remove the top sleeve (Item 8), an o-ring pick (pointed prying tool) can prove useful. Just insert the pick into one of the .041 holes in the top sleeve and pull the sleeve out. **Note** that while using the pick, care should be taken not to scratch the bore on the top sleeve.

3.2.4 The seals on the spool and sleeves may now be replaced as per instructions given in the repair and assembly section of this manual.

4.0 REPAIR AND ASSEMBLY

4.1 Remove the seals from the spool (Item 14), top sleeve (Item 8), bottom sleeve (Item 13), and the piston (Item 15).

4.2 Clean all parts using an appropriate safety solvent.

4.3 Inspect the spool for any major damage such as burrs or nicks on its outside diameter. Also inspect it for straightness. Replace the spool if damaged.

4.4 Examine the polished bores of the pressure switch body (Item 10) for gouges and rough surfaces. Be sure that all heavy dirt deposits have been removed and replace if the body is damaged.

4.5 Replacement seals from an authentic **RUELCO REPAIR KIT** are recommended to ensure proper switch performance.

4.6 Install new seals on the spool, top sleeve, and bottom sleeve and lightly lubricate the seals. **CAUTION:** Do not leave excessive lubricant on the spool. Doing so may prevent the switch from operating to specifications.

4.7 Verify the required switch range from the Range Selection Chart on the specification sheet.

4.8 Install the required o-ring on the piston. **CAUTION:** Do not install more than one o-ring on the piston. Only one spring range can be selected per switch. Place any unused o-rings into the parts tube (Item 3) for storage.

4.9 When replacing seals on the optional ¼” piston, install the back-up seal (Item 20) first. Be sure that the angle cut ends of the back-up seal overlap to form a smooth flat surface. Make sure that the back-up is closest to the large diameter of the piston and install the o-ring (Item 21) onto the piston.

4.10 Lightly lubricate all seals before rebuilding the pressure switch.

4.11 Place the spool into the top sleeve, with the angled side going into the top sleeve. Then place the top sleeve/ spool into the bottom sleeve.

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The spool should move back and forth around .25” inside the sleeves.

- 4.12 Place the entire spool/ sleeve assembly into the body.
- 4.13 Install the piston fully into the switch base. The piston should move back and forth freely.
- 4.14 Thread the switch base into the body and firmly tighten using the appropriate wrenches.
- 4.15 Install the lock ring (Item 4) onto the body and place the spring plate (Item 6) into the body cavity. Note: If the switch is panel mounted, install it into the panel and secure with a panel mounting ring (Item 5) prior to installing the lock ring and spring plate.
- 4.16 Install the spring (Item 2) into the switch body. **CAUTION:** Verify that the spring is the proper color for the range required as shown on the Range Selection Chart on the SS-H cut sheet.
- 4.17 Place the parts tube inside the cap (Item 1) and thread onto the switch body. Adjust the switch operation as per user requirements and methods.

5.0 RECOMMENDED MAINTENANCE

- 4.1 Test Switch Trip Pressure Every 30 days
- 4.2 Disassembly, inspect and lubricate Yearly or as required
- 4.3 Replace all seals Every two years or as required