PRESSURE SWITCH

Service and Repair



USER MANUAL

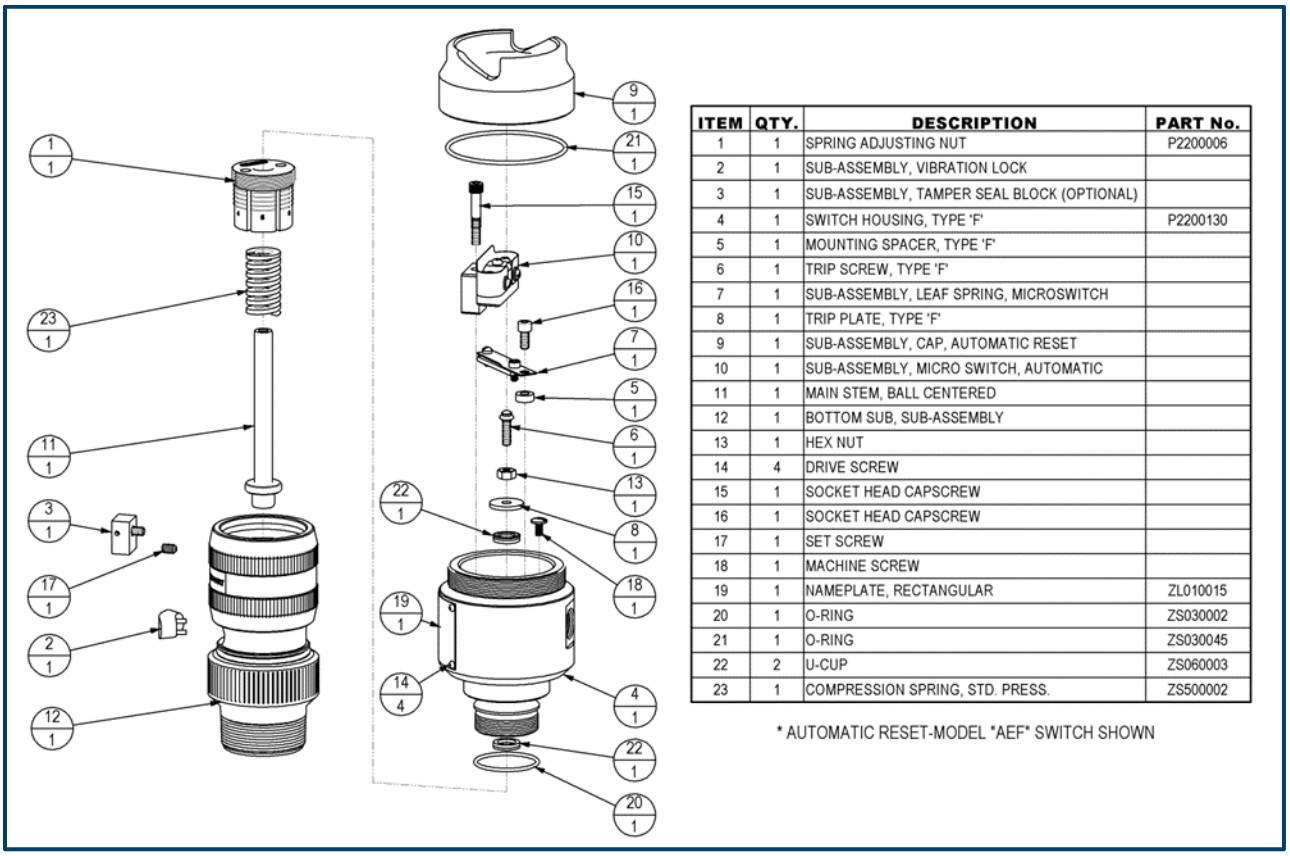
ARGUS

Manufacturing Intelligent Solutions

Table of Contents

1.0 Scope 3
2.0 General 3
3.0 Initial Assessment 3
4.0 Disassembly 4
5.0 Assembly 5
5.1 Switch Housing Sub-Assembly 5
5.2 Piston Housing Nut Sub-Assembly 5
5.3 Bottom Sub Sub-Assembly 6
5.4 Manual Reset Cap Sub-Assembly 7
5.5 Automatic Reset Cap Sub-Assembly 7
5.6 Leaf Spring Sub-Assembly 8
5.7 General Assembly 9
6.0 Testing And Pressure Setting Adjustment 10
6.1 General Testing 10
6.2 Alternate General Testing 11
6.3 Adjusting Pressure Setting: Decreasing Pressure 12
6.4 Adjusting Pressure Setting: Increasing Pressure 'Off' 13
6.5 Adjusting Pressure Setting: Decreasing Pressure 'Off' 13
6.6 Adjusting Pressure Setting: Increasing Pressure 'Off' 14
6.7 Final Preparation for Shipping 14
7.0 Assembly Tools 15
8.0 Contact Information 15

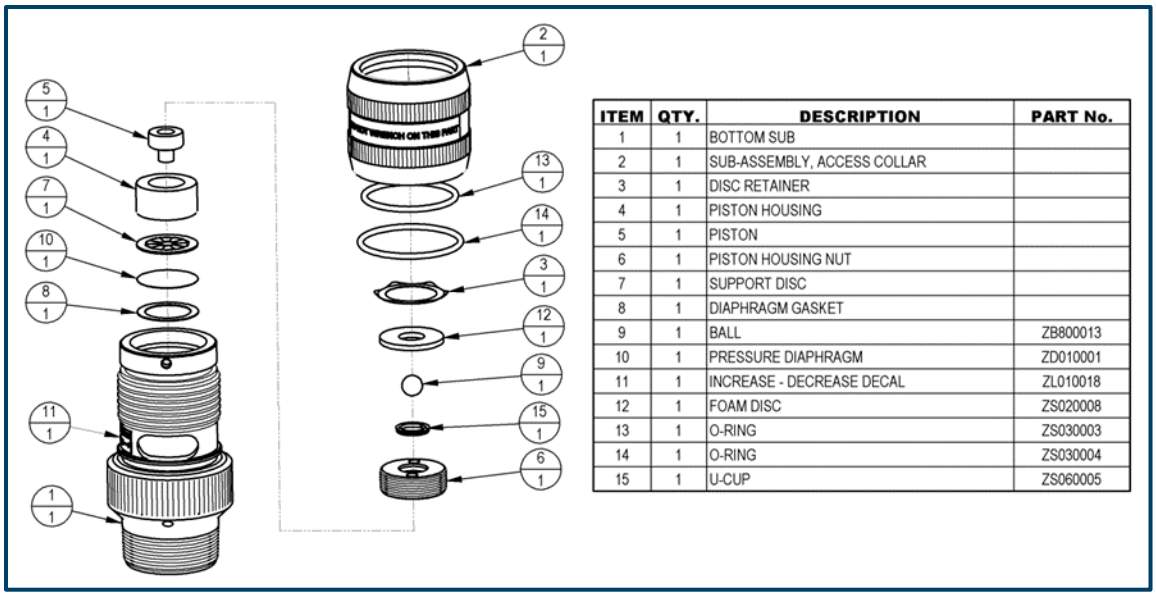
PRESSURE SWITCH



ITEM	QTY.	DESCRIPTION	PART No.
1	1	SPRING ADJUSTING NUT	P2200006
2	1	SUB-ASSEMBLY, VIBRATION LOCK	
3	1	SUB-ASSEMBLY, TAMPER SEAL BLOCK (OPTIONAL)	
4	1	SWITCH HOUSING, TYPE 'F'	P2200130
5	1	MOUNTING SPACER, TYPE 'F'	
6	1	TRIP SCREW, TYPE 'F'	
7	1	SUB-ASSEMBLY, LEAF SPRING, MICROSWITCH	
8	1	TRIP PLATE, TYPE 'F'	
9	1	SUB-ASSEMBLY, CAP, AUTOMATIC RESET	
10	1	SUB-ASSEMBLY, MICRO SWITCH, AUTOMATIC	
11	1	MAIN STEM, BALL CENTERED	
12	1	BOTTOM SUB, SUB-ASSEMBLY	
13	1	HEX NUT	
14	4	DRIVE SCREW	
15	1	SOCKET HEAD CAPSCREW	
16	1	SOCKET HEAD CAPSCREW	
17	1	SET SCREW	
18	1	MACHINE SCREW	
19	1	NAMEPLATE, RECTANGULAR	ZL010015
20	1	O-RING	ZS030002
21	1	O-RING	ZS030045
22	2	U-CUP	ZS060003
23	1	COMPRESSION SPRING, STD. PRESS.	ZS500002

* AUTOMATIC RESET-MODEL "AEF" SWITCH SHOWN

Figure 1: Pressure Switch Assembly



ITEM	QTY.	DESCRIPTION	PART No.
1	1	BOTTOM SUB	
2	1	SUB-ASSEMBLY, ACCESS COLLAR	
3	1	DISC RETAINER	
4	1	PISTON HOUSING	
5	1	PISTON	
6	1	PISTON HOUSING NUT	
7	1	SUPPORT DISC	
8	1	DIAPHRAGM GASKET	
9	1	BALL	ZB800013
10	1	PRESSURE DIAPHRAGM	ZD010001
11	1	INCREASE - DECREASE DECAL	ZL010018
12	1	FOAM DISC	ZS020008
13	1	O-RING	ZS030003
14	1	O-RING	ZS030004
15	1	U-CUP	ZS060005

Figure 2: Bottom Sub (Sub-assembly)

1.0 Scope

Argus manufactures automatic and manual reset Pressure Switches (switch) designed to make or break an electrical circuit upon sensing high or low flow line pressure. This manual covers service and repair of models 'AEF' and 'MBF' switches (serial No. 52000 and greater) with 'Dual Seal' certification. (Pressure Switches with serial No. 48500 and lower are single seal and not manufactured anymore. A conversion program is offered to replace/certify Pressure Switch Dual Seal. Contact Argus for more information.)

2.0 General

Service and repair of Pressure Switches shall comply with the procedures described in this manual. It is assumed when repairing a switch, the switch has been taken out of service and is no longer attached to the flow line. Use only Argus OEM replacement parts for repairing a Pressure Switch.

Note: Troubleshooting and/or testing may be required prior to disassembling the switch. See 'Testing' section of the Installation, Operation, and Maintenance Manual for procedures.

3.0 Initial Assessment

If an Argus Pressure Switch develops any problems, Argus recommends that the unit be sent to one of its approved service centers for servicing. A qualified service technician should conduct an initial assessment to determine the extent of the problems. The initial assessment should include, as a minimum, the following:

Table 1: Initial Assessment

Inspection Point	Possible Causes	Possible Solutions
Visually check exterior of pressure switch for any physical damage	1. Damaged or corroded threads 2. Damage to housing 3. Damaged/missing nameplate	1. Clean up corrosion; chase the threads; replace part with damaged threads if not repairable 2. If extensive damage, replace housing 3. Replace nameplate. Replacement must be ordered from Argus; all necessary information must be provided
Access collar or cap difficult to operate	1. Damaged, corroded, or dirty threads	1. Clean the threads
Check for moisture in the switch housing	1. Leaking weather seal 2. Leaking internal seal 3. Leaking through conduit	1. Replace cap O-ring 2. Replace switch housing internal seals 3. Check the ½" NPT port for damage (Apply thread sealant upon reinstallation)
Switch does not trip at proper pressure, or does not trip at all	1. Pressure set point needs adjustment 2. Microswitch failure 3. Stem not moving properly 4. Trip screw height incorrect 5. Leaf spring height incorrect	1. Adjust pressure set point using the spring adjustment nut, see Sections 6.2 – 6.5 2. Verify function ability, if necessary, replace the microswitch 3. Pressure test (see Figure 13 and Section 6.1) to verify stem travel, if stem does not travel properly, disassemble and replace any parts that are damaged/corroded 4. See Section 5.7 for assembly and TB-PS-008 for height 5. See Section 5.6 for assembly of leaf spring and TB-PS-008 for height
Leaking from weep holes	1. Pressure diaphragm gasket leaking	1. Disassemble pressure switch, replace diaphragm gasket

4.0 Disassembly

Upon completing the initial assessment of an Argus Pressure Switch, a complete repair may be required. Carefully disassemble, clean, and inspect all the parts by the following procedure. Note any physical damage, wear, dirt, or debris, etc. which may have caused the switch to fail.

1. Remove the microswitch mounting screw (socket head capscrew), microswitch sub-assembly, leaf spring mounting screw, leaf spring sub-assembly, and mounting spacer from the switch housing.

2. Place the lock nut socket wrench (item No. P2200148) on the lock nut and place the trip screw socket wrench (item No. P2200145) on the trip screw. (See Figure 3).

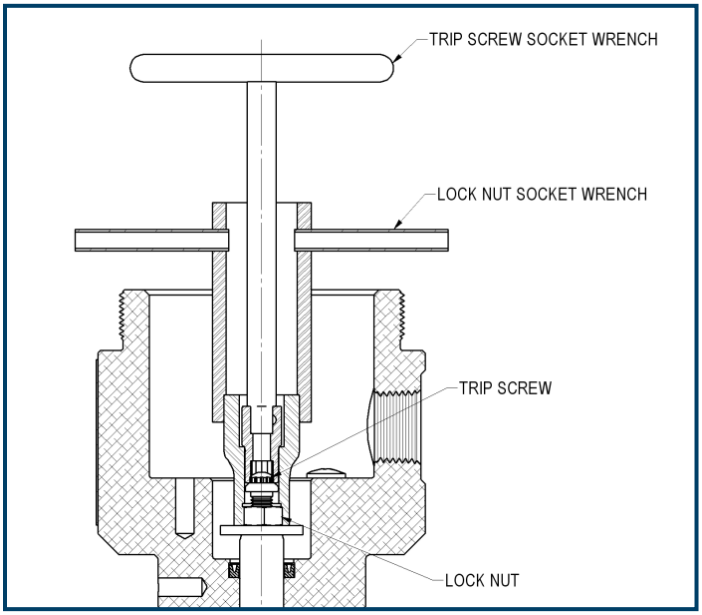


Figure 3: Trip Screw & Lock Nut Wrenches

3. Loosen the lock nut, remove the trip screw and lock nut from the stem.

4. Remove the tamper seal block, if equipped.

5. Remove the socket head setscrew which locks the switch housing to the bottom sub.

6. To loosen the switch housing, insert the switch housing handle (item No. P2200112) into the ½" NPT port and lightly tap it.

7. Remove the switch housing from the bottom sub.

8. Remove the access collar from the bottom sub.

9. Use the drive wrench (item No. P2200046) to remove the spring adjusting nut from the bottom sub.

10. Remove the main stem and spring.

11. Remove the foam disk and foam disk retainer.

12. Use the pin wrench to remove the piston housing nut.

13. Invert and remove the internal components from the bottom sub. It may be necessary to push on the diaphragm to remove the parts.

14. Remove the diaphragm gasket from the bottom sub.

15. Remove all internal and external seals

5.0 Assembly

NOTE: Lubriplate No. 630-2, Mobilith SHC 460 or an equivalent lubricant must be used during assembly.

5.1 Switch Housing Sub-Assembly

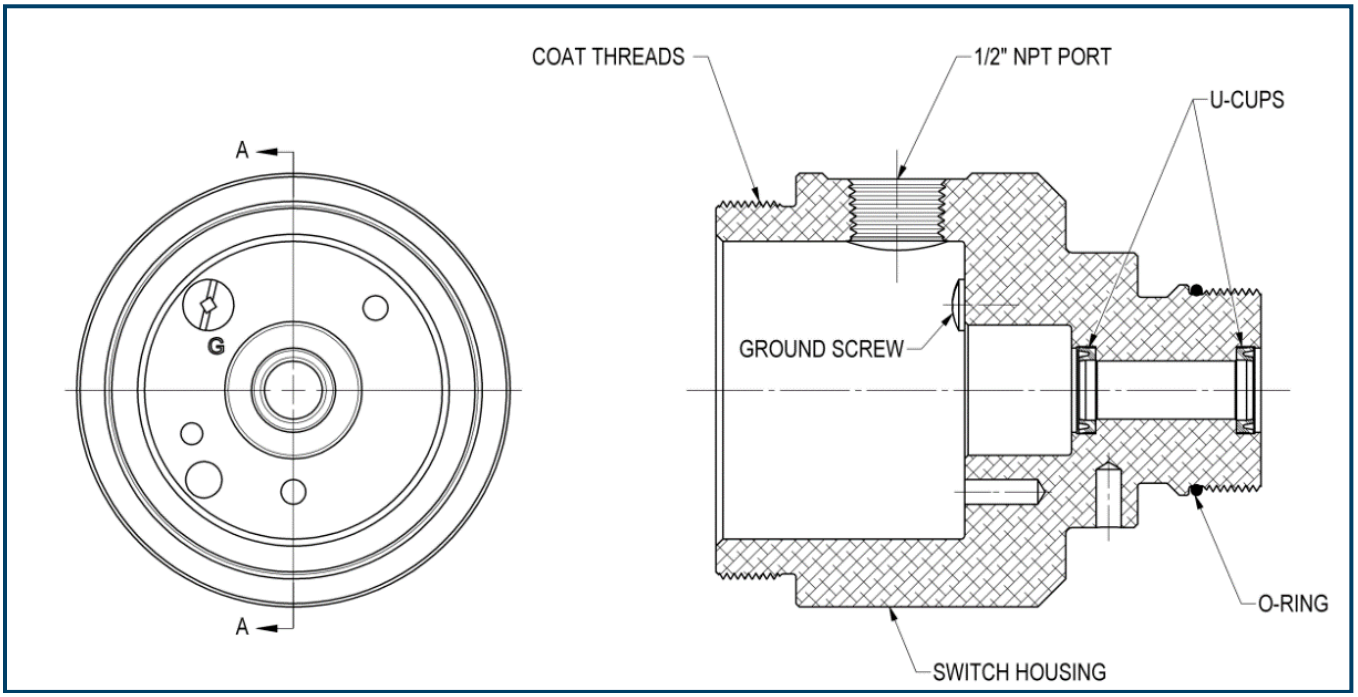


Figure 4: Switch Housing Sub-Assembly

1. Install the O-ring and U-cups (lips facing outward) as shown.
2. Ensure the ground screw is installed into the hole marked with a ‘G’.
3. Coat the large male threads with Lubriplate No.630-2 or equivalent.

5.2 Piston Housing Nut Sub-Assembly

Insert the U-cup (lip facing upward) as shown in Figure 5.

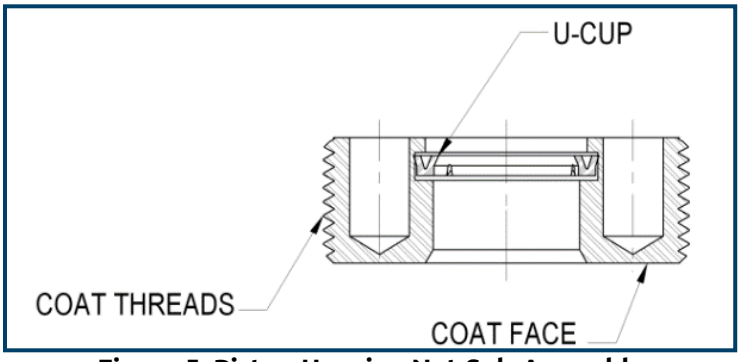


Figure 5: Piston Housing Nut Sub-Assembly

5.3 Bottom Sub Sub-Assembly

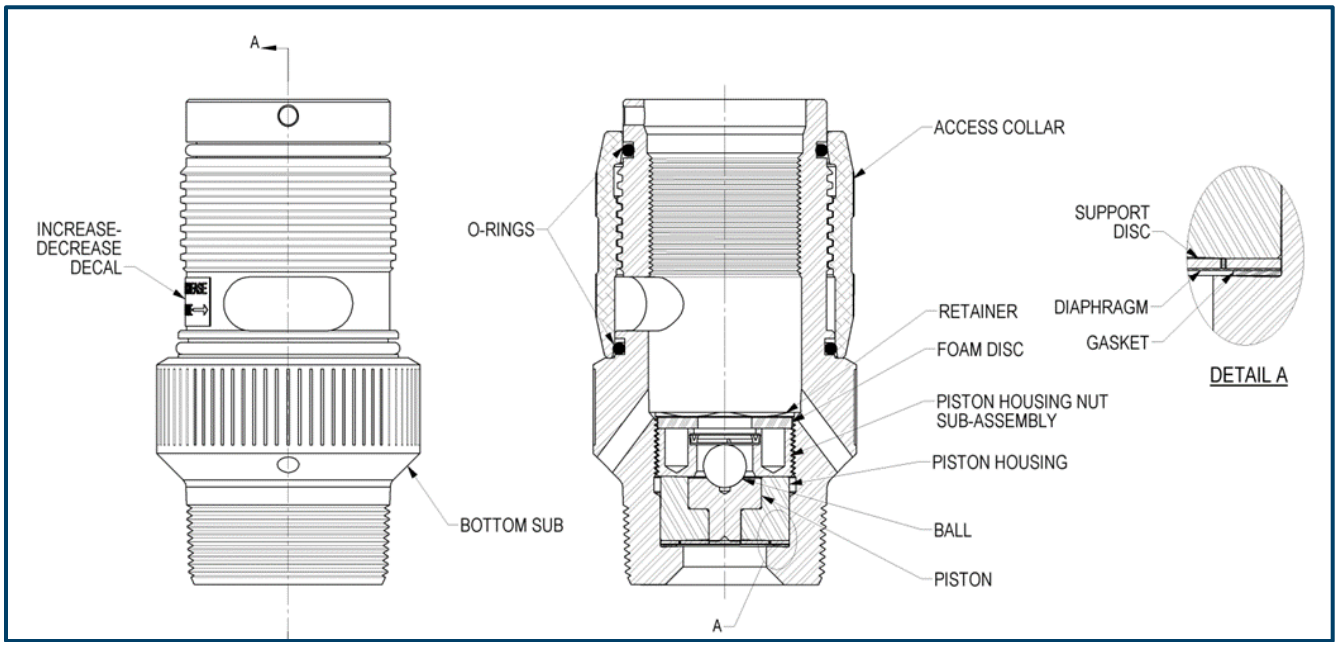


Figure 6: Bottom Sub Sub-Assembly

1. Ensure the gasket sealing surface is free of any old gasket material.
2. Replace the 'Increase – Decrease' decal, if necessary.
3. Inspect the pressure diaphragm for any damage. It must be flat and smooth.
4. Inspect the support disc to ensure there is no damage.
5. Apply a uniform coat of Marine Moly Lubricating Paste or equivalent onto the threads and bottom face of the piston housing nut. (See Figure 5). Do not coat the bore.
6. Install internal components in the following order: gasket, diaphragm, support disc, piston housing, piston, and piston housing nut.
7. With the bottom sub secured, use the pin wrench (item No. P2200046) to torque the piston housing nut according to TB-PS-006.

⚠ **Caution:** Do not over-torque the piston housing nut as it may damage the diaphragm gasket.

8. Install the bottom sub into the test stand and proof test for 1 minute. See TB-PS-007 for appropriate hydrostatic test pressures. If pressure holds continue assembling, if not disassemble and check the gasket, diaphragm, and bottom housing for possible causes. Reassemble and test.
9. Lightly coat the foam gasket in Dow Corning 550 fluid or an equivalent fluid. Place the foam gasket and then the disk retainer (tips turned upwards) on top of the piston housing nut.

   Note: Ensure that the corners of the disk retainer do not cover the holes on the side of the bottom sub.

10. Use the disk insertion tool (item No. P2200144) to push the disk retainer down lightly until it stops.
11. Install the two o-rings onto the bottom sub.
12. Apply a light coat of Lubriplate or Mobilith SHC 460 to both O-rings.
13. Screw down the access collar until it bottoms out on the shoulder of the bottom sub.

⚠ **Caution:** Do not tighten the access collar.

14. Install the ball into the hole in the center of the piston.
15. Using the syringe assembly (item No. P2200165), apply ½ cc of the Argus Sealing Fluid into the bore of the piston housing nut.

⚠ **Caution:** Keep the bottom sub in an upright position.

5.4 Manual Reset Cap Sub-Assembly

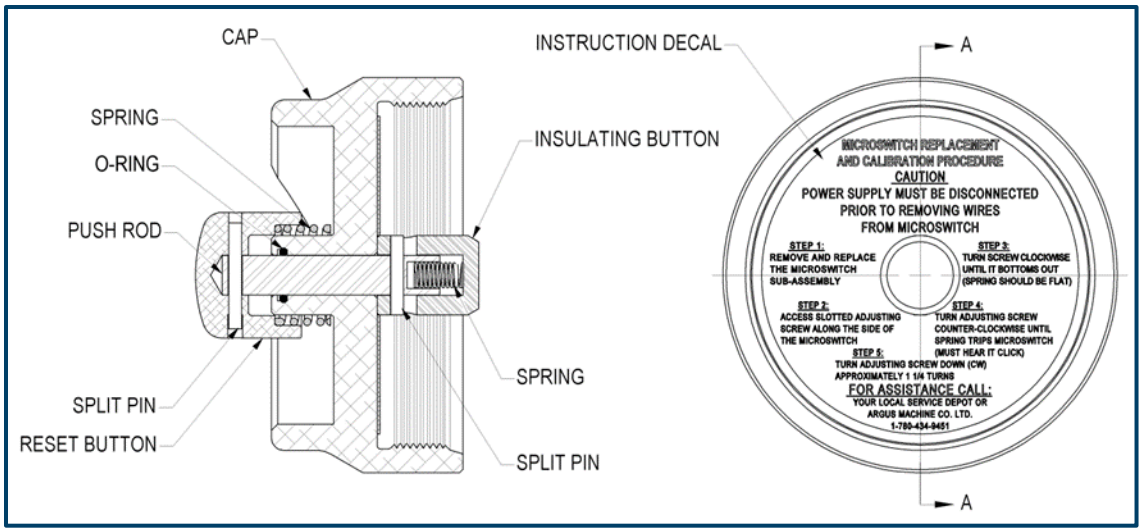


Figure 7: Manual Reset Cap Sub-Assembly

1. Replace the instruction decal, if necessary.
2. Install the spring and the insulating button onto the push rod, secure with split pin.
3. Apply a light coat of Lubriplate or Mobilith SHC 460 to the push rod.
4. Install the O-ring and push rod into the cap.
5. Install the spring and the reset button onto the push rod and secure with split pin.
6. Push the reset button down several times and rotate to make sure the button moves freely.

5.5 Automatic Reset Cap Sub-Assembly

Replace the instruction decal, if necessary.

5.6 Leaf Spring Sub-Assembly

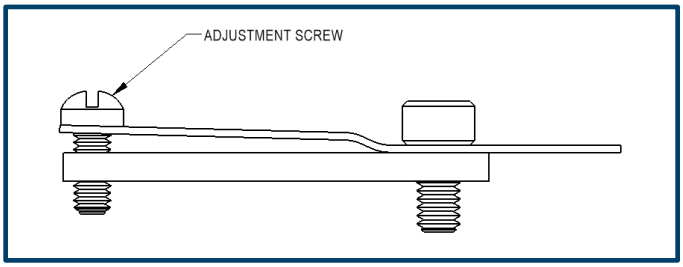


Figure 8: Leaf Spring Sub-Assembly

1. Before installing the leaf spring sub-assembly, the following inspection should be performed. Ensure the leaf spring is the proper thickness as per TB-PS-008. If the leaf spring function and form are correct, proceed to Section 5.7 General Assembly. To adjust the leaf spring form, continue with the following procedure or replace the Leaf Spring Sub-Assembly.

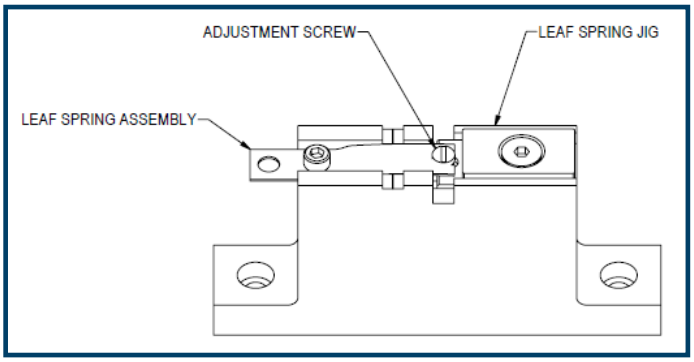


Figure 9: Leaf Spring Jig

2. Apply a small amount of Blue Loctite 243 or equivalent to the thread on the adjustment screw.

3. Install the adjustment screw (3 to 4 turns) into the threaded hole of the flat bar.

4. Place the leaf spring assembly into the slot of the leaf spring jig (item No. P2200221) so the adjustment screw is in the notch of the leaf spring jig.

5. Tighten the adjustment screw until minor resistance is felt.

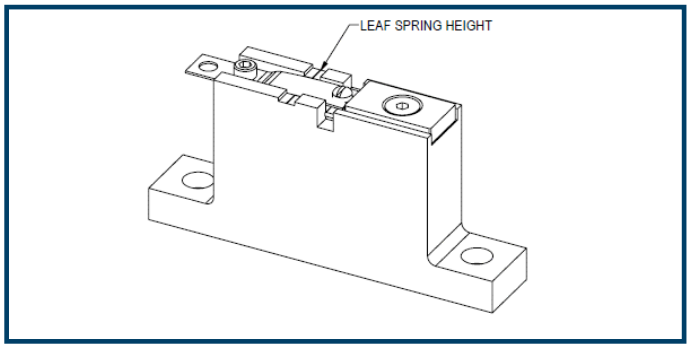


Figure 10: Leaf Spring Gauge

6. Using the leaf spring jig check the height of the leaf spring assembly. The notch located on the fixture should be flush with the leaf spring aligned with the indicator line included.

5.7 General Assembly

1. Place the bottom sub sub-assembly in a vise, clamp on knurl section only.
2. Apply a light coat of Jet-Lube Marine Moly on the top inside threads of the bottom sub.
3. Place the spring onto the main stem.
4. Place the spring adjusting nut on the main stem.
5. Lower the stem into the bottom housing so it sits on the ball.
6. Use the pin wrench to screw the spring adjusting nut down until the top surface of the wrench head is approximately 5/8" below the top surface of the bottom sub.
7. Apply a light coat of Lubriplate or Mobilith SHC 460 to the switch housing O-ring.
8. Install the switch housing sub-assembly onto the bottom sub.
9. To tighten the switch housing, insert the switch housing handle into the ½" NPT port and lightly tap it with a hammer.
10. Apply a small amount of Blue Loctite 243 on the switch housing set screw and install it into the bottom sub and torque according to TB-PS-006.
11. Thread the lock nut to the middle of the trip screw and install the trip plate on the trip screw.
12. Insert the trip screw into the stem and screw it down approximately 8 full turns.
13. Place the dial indicator mounting block (item No. P2200150) on the top face of the switch housing with the dial indicator probe contacting the counter bore shoulder, approximately 2.14" deep (see Figure 11).
14. Zero the dial indicator.
15. Position the dial indicator mounting block so that the probe sits on top of the trip screw.
16. Read the dial. The height between the top of the trip screw and the shoulder of the counter bore must be within the range specified in TB-PS-008. Adjust the trip screw as required (see Figure 11).
17. Place the lock nut socket wrench onto the lock nut.
18. Place the trip screw socket wrench on the trip screw (see Figure 3).

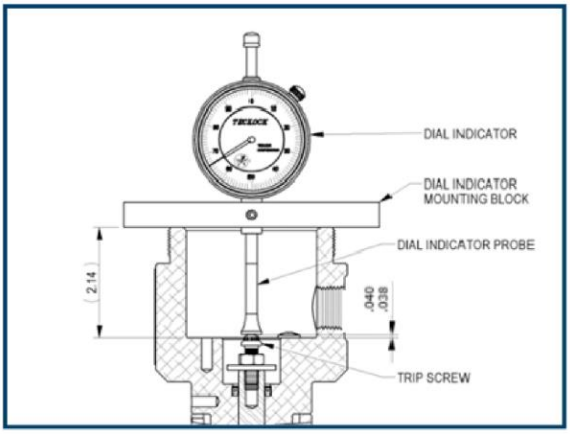


Figure 11: Trip Screw Setting

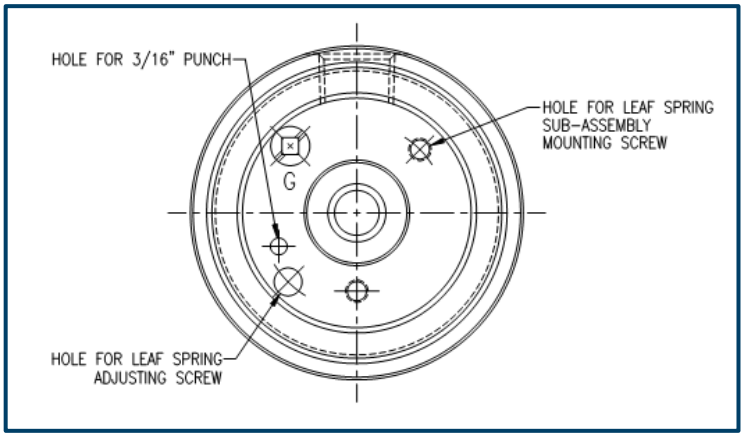


Figure 12 : Holes for Leaf Spring Sub-Assembly

19. Tighten the locking nut.

20. Verify the height of the trip screw. Loosen the trip screw and repeat the procedure if required.

21. Put Blue Loctite 243 or Nutlock T43 on the mounting screw for the leaf spring sub-assembly.

22. Place a 3/16" punch into the hole shown above (see Figure 12) to hold the leaf spring while tightening.

23. Install the leaf spring sub-assembly, using the mounting screw and spacer, in the holes shown above (see Figure 12).

24. Torque the mounting screw according to TB-PS-006 and then remove the 3/16" punch.

25. Apply Blue Loctite 243 or Nutlock T43 onto the threads of the switch mounting block capscrew.

26. Install the microswitch sub-assembly and torque the cap screw according to TB-PS-006.

27. Install the cap O-ring on the switch housing.

6.0 Testing And Pressure Setting Adjustment

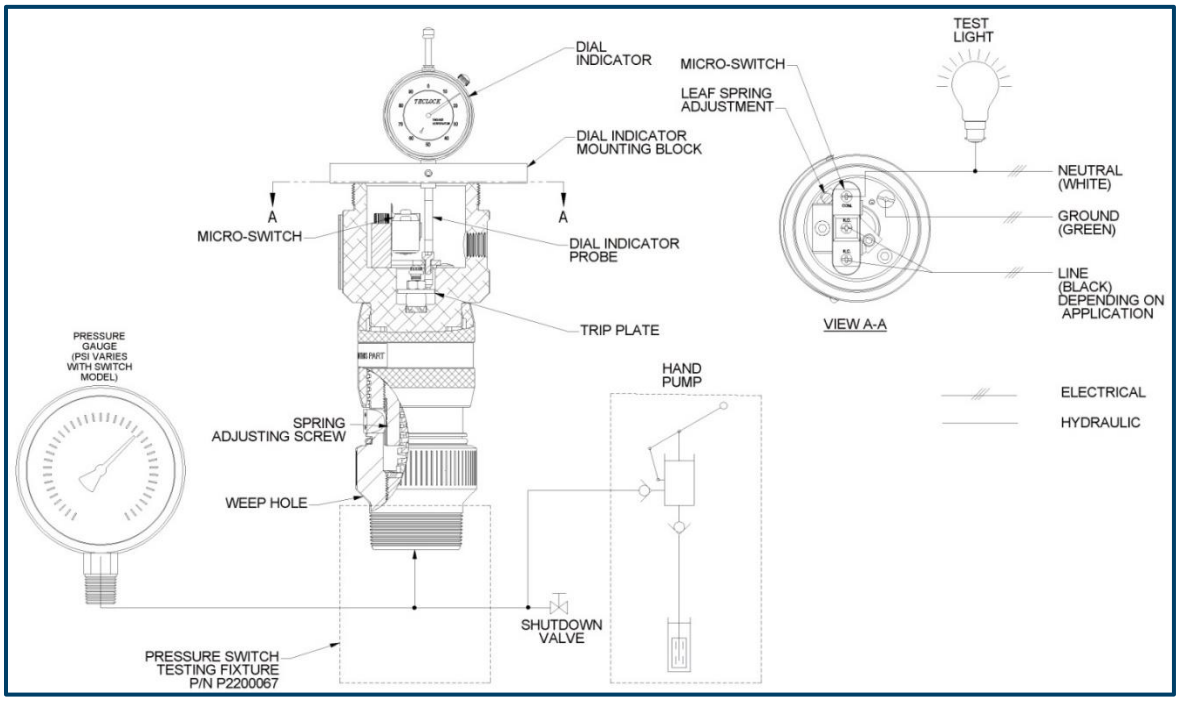


Figure 13: Testing Circuit for Pressure Switch

6.1 General Testing

1. Install the pressure switch in the test stand.

2. Set up dial indicator as shown (see Figure 13) to measure stem movement.

3. Connect the test light to the common and normally closed terminals on the microswitch. The test light should go on.

4. Close the shutdown valve and zero the dial indicator.

5. Using an appropriate pressure gauge, suited for the Pressure Switch model being tested, induce pressure as per test values in TB-PS-007 and hold for one minute. The needle movement on the dial

indicator should be smooth as the pressure increases. Refer to TB-PS-008 to determine the "Stem Travel at Test Pressure".

6. If pressure drops, this indicates a gasket leak and requires replacement.

7. While holding the pressure the dial should not move.

8. Release the pressure by opening the shutdown valve. The movement of the needle on the dial indicator should be smooth and go back to zero. If the dial indicator does not go back to zero, the stem may be jammed.

9. Close the shutdown valve and induce pressure, up to the test pressure, until the full travel of the stem has been achieved.

   Note: The amount of travel in step 9 should be the same value that was obtained in step 5.

10. Zero the dial.

11. Gradually decrease the pressure by opening the shutdown valve until the dial indicator reading meets the requirements of TB-PS-008 "Stem Travel at Set Pressure" according to the model number.

12. If the light is off, screw the leaf spring adjusting screw clockwise until the microswitch trips and the light goes on. If the light initially was on, screw the leaf spring adjusting screw counterclockwise until the light goes off.

13. Release the pressure by opening the shutdown valve.

14. Close the shutdown valve and gradually induce pressure until the microswitch trips and the light goes off. At this moment the dial indicator should show "Stem Travel at Set Pressure" . If necessary, repeat previous steps until the required parameter is achieved.

15. Proceed to the appropriate section for setting the pressure switch, depending on the application it is to be used for.

6.2 Alternate General Testing

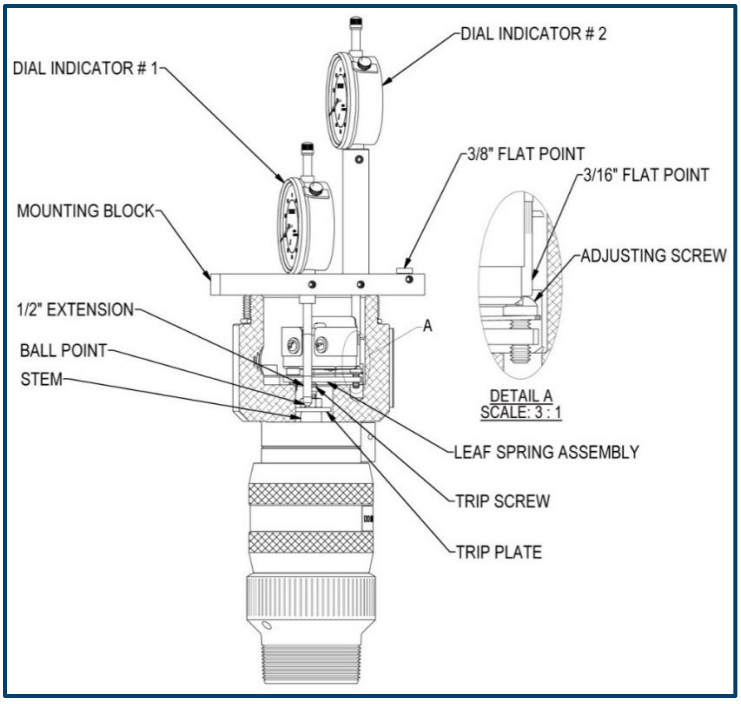


Figure 14: Dual Indicator Setup

1. Install the pressure switch in the test stand.

2. Place the dual dial indicator assembly on top of the switch housing with the ball point of indicator # 1 on the trip plate and the 1/8" flat point of indicator # 2 on the adjusting screw (Figure 14, Detail A). Ensure the extensions are clear of any other components and are allowed to move freely up and down.

3. Close the shutdown valve and zero the dial indicators.

4. Using an appropriate pressure gauge, suited for the Pressure Switch model being tested, induce pressure as per test values and hold for one minute.

5. The needle movement on the dial indicator #1 should be smooth as the pressure increases. See TB-PS-008 for Stem Travel at Test Pressure values.

6. The needle movement on dial indicator #2 should start at the same time as #1. If this does not occur this is an indication the trip screw is not contacting the bottom of the leaf spring assembly.

7. To rectify the problem, remove the leaf spring assembly and raise the height of the trip screw to the upper end of the range found in TB-PS-008.

8. Re-install the leaf spring assembly and observe the movement between the two dial indicators. Dial indicator # 1 should show values as per step 5 and dial indicator # 2 will be approximately double the value.

9. Go to Section 6.1 Step 3 to complete the remaining part of the testing procedure.

6.3 Adjusting Pressure Setting: Decreasing 'On'

Note: Used for turning off a gas engine or turning on an electric motor.

1. Close the shutdown valve.

2. Switch the control valve to direct pressure to the appropriate pressure gauge for the required pressure range.

3. Attach the test light cables to the common and normally closed terminals on the microswitch. The test light should be on.

4. Increase pressure to the max pressure set value, the test light will be off. Gradually decrease the pressure and make note of the value in which the light turns back on. Slowly open the shutdown valve fully.

5. If the pressure noted is lower than desired, turn the spring adjusting nut clockwise ("increase"). Each band on the outside of the adjusting nut represents approximately 20 % adjustment in pressure.

6. If the pressure noted is higher than desired, turn the spring adjustment nut counterclockwise ("decrease"). Each band on the outside of the adjusting nut represents approximately 20 % adjustment in pressure.

7. Close the shutdown valve.

8. Repeat step 4-7 and repeat if required.

9. Once the desired pressure is achieved to turn off the light for a decreasing pressure event, proceed to Section 6.7.

6.4 Adjusting Pressure Setting: Increasing Pressure 'Off'

Note: Used for turning off an electric motor.

1. Close the shutdown valve.
2. Switch the control valve to direct pressure to the appropriate pressure gauge for the required pressure range.
3. Attach the test light cables to the common and normally closed terminals on the microswitch. The test light should be on.
4. Increase the pressure to the desired set point.
5. If the light is off, turn the spring adjusting nut clockwise ("increase") until the test light goes on. Monitor the pressure as it will increase as you turn the nut, if it goes outside your allowance re-adjust with pump.
6. If the light is on, turn the spring adjusting nut counterclockwise ("decrease") until the test light goes off. Monitor the pressure as it will decrease as you turn the nut, if it goes outside your allowance re-adjust with valve.
7. Release pressure by opening the shutdown valve. The test light should be on.
8. Close the shutdown valve.
9. Gradually induce pressure to the required pressure set point. At this point the microswitch should trip and the test light should go off. If all these parameters are achieved, proceed to Section 6.7.

6.5 Adjusting Pressure Setting: Decreasing Pressure 'Off'

Note: Used for turning off an electric motor.

1. Close the shutdown valve.
2. Switch the control valve to direct pressure to the appropriate pressure gauge for the required pressure range.
3. Attach the test light cables to the common and normally open terminals on the microswitch. The test light should be off.
4. Increase pressure to the max pressure set value, the test light will be off. Gradually decrease the pressure and make note of the value in which the light turns back off. Slowly open the shutdown valve.
5. If the pressure noted is lower than desired, turn the spring adjusting nut clockwise ("increase"). Each band on the outside of the adjusting nut represents approx. 20 % adjustment in pressure.
6. If the pressure noted is higher than desired, turn the spring adjustment nut counterclockwise ("decrease"). Each band on the outside of the adjusting nut represents approx. 20 % adjustment in pressure.
7. Close the shutdown valve.
8. Repeat step 4-7 and repeat if required.
9. Once the desired pressure is achieved to turn off the light for a decreasing pressure event, proceed to Section 6.7.

6.6 Adjusting Pressure Setting: Increasing Pressure 'On'

Note: Used for turning off a gas engine.

1. Close the shutdown valve.
2. Switch the control valve to direct pressure to the appropriate pressure gauge for the required pressure range.
3. Attach the test light cables to the common and normally open terminals on the microswitch. The test light should be off.
4. Increase the pressure to the desired set point.
5. If the light is on, turn the spring adjusting nut clockwise ("increase") until the test light goes on. Monitor the pressure as it will increase as you turn the nut, if it goes outside your allowance re-adjust with pump.
6. If the light is off, turn the spring adjusting nut counterclockwise ("decrease") until the test light goes off. Monitor the pressure as it will decrease as you turn the nut, if it goes outside your allowance re-adjust with valve.
7. Release pressure by opening the shutdown valve. The test light should be off.
8. Close the shutdown valve.
9. Gradually induce pressure to the required pressure set point. At this point the microswitch should trip and the test light should go on. If all these parameters are achieved, proceed to Section 6.7.

6.7 Final Preparation for Shipping

1. Ensure access collar is threaded to the bottom.
2. Remove the test light cables and dial indicator.
3. Install cap hand tight.
4. Unscrew the pressure switch from the testing stand.
5. Place a plastic thread protector over the external threads and one in the 1/2" port of the switch housing.
6. Keep switch in upright position when shipping and/or storing.

7.0 Assembly Tools

Table 2: Assembly Tools

Assembly Tool Description	Item No.
Dial indicator c/w mounting block	P2200150
Locking nut wrench	P2200148
Trip screw wrench	P2200145
Switch housing wrench	P2200112
Pin wrench	P2200046
Syringe assembly c/w Argus sealing fluid	P2200165
Disc insertion tool	P2200144
Testing/setting fixture – (Optional)	P2200067
Vise jaws (set of 2) (fits 4 ½" Record vise) – (Optional)	P2200051
Leaf spring jig	P2200221
Dual indicator assembly	P2200233

8.0 Contact Information

For ordering Argus Pressure Switches or for service please contact us at:

Argus
Order Desk (Assembly Division)
5820 97 Street NW,
Edmonton, Alberta, Canada
T6E 3J1

Website: argusinnovates.com
Email: info@argusinnovates.com
Toll Free: 1.888.434.9451
Phone: 780.434.9451

ARGUS

Manufacturing Intelligent Solutions

1.888.434.9451
info@argusinnovates.com

argusinnovates.com

© Copyright 2022 Argus Machine Co. Ltd.
Design Specifications Subject to Change Without Prior Notice