

# Integra® Pneumatically Operated Diaphragm Valves with Position Indication Option

*½", 2-way and adjustable bypass, normally closed, pneumatic designs*

## REPAIR INSTRUCTIONS

### For models:

Normally closed:

202-57-01, 202-58-01, 202-59-01,  
202-60-01, 202-66-01, 202-60-SI-01,  
202-60-SO-01, 202-66-SI-01,  
202-66-SO-01

Normally closed bypass:

202-128-01, 202-129-01

## REPAIR PROCEDURE— DISASSEMBLY

1. Refer to Figure 4. Hold the inner cap (P8) with an adjustable wrench (S6) while turning the outer cap (P9) counterclockwise with the outer cap wrench (T1).
2. Remove the spring (P7) and discard (save for assembly if only installing Omron® kit).
3. Remove red indicator subassembly (P13) and discard. For Omron kit only, remove and discard only the red indicator (not the coupling) and skip to step 19 of Assembly repair procedure.
4. **While preventing the diaphragm stem from rotating**, remove the nut (P1) with a ⅜" open-end wrench (S13) and discard.

**IMPORTANT: To prevent damage to the valve diaphragm, hold the inner cap (P8) so it doesn't rotate.**

5. Pry the top piston (P10) loose with the flat-blade screwdriver (S4) and remove the piston.
6. Remove the O-ring (P2) and pneumatic diaphragm (P3) and discard both of these parts.
7. Remove the snap-ring (P4) with the snap-ring pliers (S10) and discard.
8. Remove the other O-ring (P2) and discard.
9. Remove the lower piston (P10) by prying it up with two flat blade screwdrivers (S4).
10. Remove and discard washer (P5).
11. Refer to Figure 1. Make sure the diaphragm preload tool adjusting screw is out 19.1 mm (¾") before placing the diaphragm preload tool (T2) onto the retainer nut (P11).
12. Place the diaphragm preload tool (T2) onto the retainer nut (P11) and screw on the outer cap (P9) to hold it in place. (See Figure 3.)
13. With the 1¼" socket (S8) and torque wrench (S2), turn the external hex on the diaphragm preload tool (T2) counterclockwise to remove the retainer nut (P11).

- Remove the outer cap (P9) and then the diaphragm preload tool (T2).
- Hold the stainless steel diaphragm stem with a pliers (S3) and pull out the diaphragm/retainer assembly (P6) and discard.

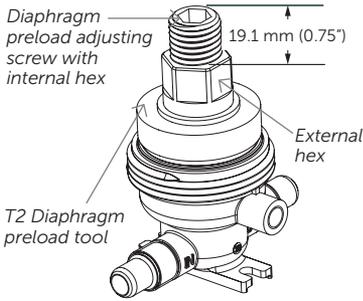


Figure 1.

## REPAIR PROCEDURE—ASSEMBLY

- Before beginning assembly, clean the internal body surfaces and the customer supplied items as listed, with isopropyl alcohol (S9).
- Begin assembly by applying a light coating of lubricant (S1) to the diaphragm/retainer assembly (P6) O-ring. (See Figure 2.)

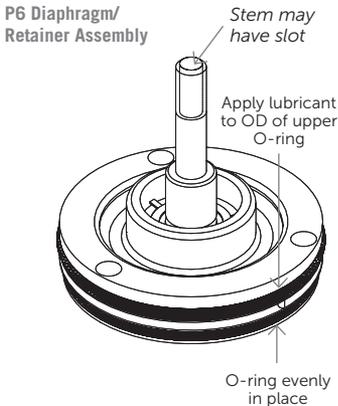


Figure 2.

- Make sure the O-ring between the diaphragm and retainer is evenly in place (See Figure 2) and then install the diaphragm/retainer assembly (P6) in the valve body and push the retainer all the way down.
- Thread the retainer nut (P11) by hand into the valve body until it contacts the diaphragm/retainer assembly (P6).
- Place the washer (P5) on the diaphragm stem.
- Make sure the diaphragm preload tool (T2) adjusting screw is out 19.1 mm ( $\frac{3}{4}$ ") before placing the diaphragm preload tool (T2) onto the retainer nut (P11).
- Secure the diaphragm preload tool (T2) in place with the outer cap (P9). (See Figure 3.)
- With an adjustable wrench (S6), hold the diaphragm preload tool (T2) external hex from rotating and turn the internal hex from top of the diaphragm preload tool (T2) with the  $\frac{1}{2}$ " allen wrench (S7) clockwise until it is flush with the top surface of the tool. (See Figure 3.)

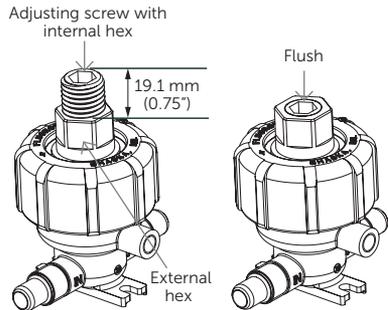


Figure 3.

- Torque the external hex on the diaphragm preload tool (T2) to 5.65 N•m (50 in•lb) with a torque wrench (S2) and a  $1\frac{1}{8}$ " socket (S8).

10. **While holding the external hex to keep it from rotating**, turn the internal hex on top of the diaphragm preload tool (T2) counterclockwise until it is 19.1 mm (¾") above the top surface of the diaphragm preload tool (T2). Remove the outer cap (P9) and then the diaphragm preload tool (T2).
  11. Put lower piston (P10) in place on the pneumatic diaphragm stem. Orient the ribs facing away from the pneumatic diaphragm (P3) as shown in Figure 4.
  12. Lubricate O-ring (P2) with lubricant (S1) and install.
  13. Install snap-ring (P4) with snap-ring pliers (S10), being careful to just spread the snap-ring enough to install over the stem. The snap-ring does not fit in a groove. Make sure the lower piston (P10) is pushed all the way down.
  14. Place the pneumatic diaphragm (P3) onto the diaphragm stem with the concave side facing up. (See Figure 4.) Make sure the bead on the outside of the pneumatic diaphragm (P3) fits evenly within the groove on the body.
  15. Lubricate O-ring (P2) with lubricant (S1) and install.
  16. Put upper piston (P10) in place. Orient the ribs facing away from the pneumatic diaphragm (P3) as shown in Figure 4.
  17. **While making sure the diaphragm stem does not rotate**, torque the nut (P1) to 2.3 N•m (20 in•lb) with a ⅜" open-end wrench (S13).
  18. Put a drop of Loctite® (S11) in coupling of red indicator subassembly (P13) and tighten with open-end wrench (S13) until it touches nut.
  19. For Omron kit only, install new indicator (OM1) into existing coupling.
  20. Place the spring (P7) on the upper piston (P10). If only installing Omron sensor bracket kit, reuse existing spring.
  21. Place the inner cap (P8) on the spring (P7). Make sure the keyed part of inner cap and red indicator subassembly are aligned with the pilot port, and that the bead on the outside of the pneumatic diaphragm (P3) fits evenly within the groove on the body.
  22. Place the outer cap (P9) on the inner cap (P8).
  23. Push down on the inner cap (P8) and prevent it from rotating while threading the outer cap (P9) onto the body. It is important to hold the inner cap (P8) from rotating to prevent damage to the valve diaphragm (P3).
- IMPORTANT: To prevent damage to the valve diaphragm, hold the inner cap (P8) so it doesn't rotate.**
24. **Hold the inner cap (P8) from rotating** and torque the outer cap (P9) to 22.6 N•m (200 in•lb) with the outer cap wrench (T1) and torque wrench (S2).
  25. Do not trim the indicator until testing is complete.
  26. For Omron kit only, install mounting bracket (OM3) using #8-32 screws (OM4). (See Figure 6.)
  27. Assembly is now complete. See testing procedures.

## ORDERING INFORMATION

Repair parts kit part number 202-152  
(See part numbers listed below.)\*

| ITEM | DESCRIPTION                     | QUANTITY |
|------|---------------------------------|----------|
| P1   | Nut                             | 1        |
| P2   | O-ring (pistons)                | 2        |
| P3   | Pneumatic diaphragm             | 1        |
| P4   | Snap-ring                       | 1        |
| P5   | Washer                          | 1        |
| P6   | Diaphragm/<br>retainer assembly | 1        |
| P7   | Spring                          | 1        |
| P13  | Red indicator<br>subassembly    | 1        |
| P14  | Plug                            | 2        |

\*202-57-01, 202-60-SO-01, 202-58-01,  
202-66-SI-01, 202-59-01, 202-66-SO-01,  
202-60-01, 202-128-01, 202-66-01,  
202-129-01, 202-60-SI-01

Repair tool kit part number 213-103-01

| ITEM | DESCRIPTION                             |
|------|---|
| T1   | Outer cap wrench                        |
| T2   | Diaphragm Preload tool                  |
| T3   | ¼" Valve indicator stem<br>trim fixture |

Omron sensor bracket kit part number  
202-8-OMRON-RKIT

| ITEM | DESCRIPTION               | QUANTITY |
|------|---------------------------|----------|
| OM1  | Indicator                 | 1        |
| OM2  | Indicator trim<br>fixture | 1        |
| OM3  | Sensor bracket            | 1        |
| OM4  | #8-32 screws              | 2        |

Customer supplied items

| ITEM | DESCRIPTION   |
|------|---|
| S1   | Lubricant (Nye Fluorocarbon Gel 807 or equivalent) and brush for applying   |
| S2   | Torque wrench, ½" drive, 6" extension, 22 N•m (200 inch•lbs) scale minimum  |
| S3   | Pliers  |
| S4   | (2) Screwdrivers, flat blade style, one must have a blade that is less than 0.73 mm (.029") thick and 3.6 mm (.145" wide) |
| S5   | Socket (⅜")   |
| S6   | Adjustable wrench adjustable to 39mm (1 ½") or larger   |
| S7   | Allen wrench (½")   |
| S8   | Socket (1 ⅛") ½" drive  |
| S9   | Isopropyl alcohol   |
| S10  | Snap-ring pliers  |
| S11  | Loctite 430   |
| S12  | Blade for trimming  |
| S13  | ⅜" open-end wrench  |

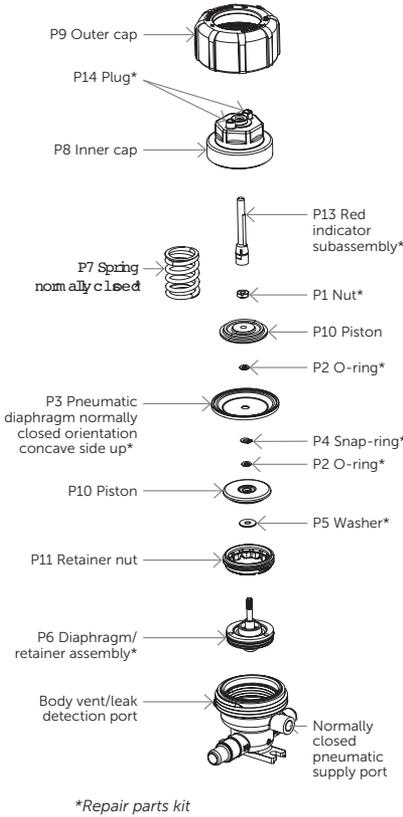


Figure 4.

## TESTING

The valve must be tested in the following ways:

### External operator leakage

Apply 483 kPa (70 psig) air pressure to the pneumatic supply port. No leakage at the outlet should be seen from the body vent hole, or from the top of the operator when the valve is submerged in water.

### Inlet to outlet leakage

Apply 552 kPa (80 psig) air pressure to the inlet. No leakage at the outlet should be seen when the outlet port is submerged in water.

### External media leakage

Plug the inlet with a taped pipe plug or Flaretek® fitting cap and apply 552 kPa (80 psig) air pressure to the outlet. No leakage at the body vent port should be observed.

Testing is now complete. Remove the two plugs (P14) and continue to the Indicator Stem Trim procedure.

### Indicator stem trim procedure

1. For Omron kit only, trim indicator (OM1) as shown in Figure 6, removing the larger portion (not shown) at the top of the indicator but leaving as much of the smaller diameter as possible. Place the larger hole of the trim fixture (OM2) around the indicator as shown in Figure 7, and use a blade (S12) to trim the indicator flush with the thicker portion of the trim fixture.

**IMPORTANT: Make sure to use the larger hole on the thicker section of the trim fixture to ensure the indicator gets trimmed to the proper height.**

2. For all other valves, refer to Figure 5. Attach the indicator stem trim fixture (T3) to the inner cap (P8) using the two 8-32 screws provided. The trim fixture must be firmly attached, but take special care not to overtighten the screws and strip the plastic threads.
3. Apply 483 kPa (70 psig) to the pneumatic supply port. With the valve in the actuated, opened position, cut off the indicator stem flush with the top of the trim fixture (T3).
4. If the valve does not have Espy position sensing, remove the trim fixture. Install the two plugs (P14) in the inner cap.

**Position sensing**

1. If the valve is equipped with Espy position sensing, refer to installation instructions 1030-205.

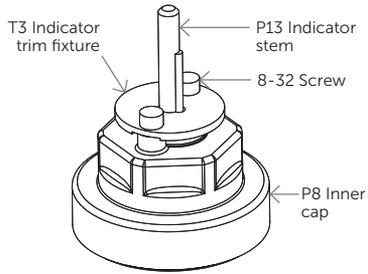


Figure 5.

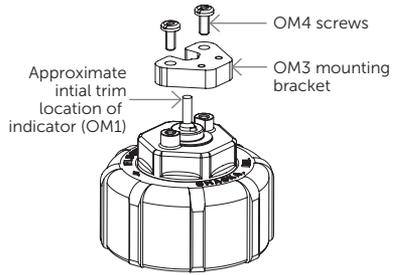


Figure 6.

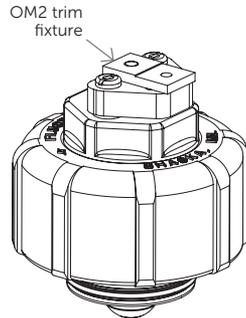


Figure 7.

## FOR MORE INFORMATION

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