

Integra® Pneumatically Operated Valves

1", 2-way, normally open, normally closed, sampling pneumatic designs; 1¼" 2-way, normally open, normally closed designs

REPAIR INSTRUCTIONS

For models:

1" 2-way normally open: DS16-2U-*

1" 2-way normally closed: DS16-2C-*

1" Sampling normally open: DS16-SU-*

1" Sampling normally closed: DS16-SC-*

1¼" 2-way normally open: DS20-2U-*

1¼" 2-way normally closed: DS20-2C-*

REPAIR PROCEDURE – DISASSEMBLY

This procedure describes how to disassemble both normally open and normally closed valves.

⚠ WARNING: Pneumatic distribution valves contain strong springs that could cause injury if the disassembly or assembly procedure is not followed. Please read and understand all instructions before beginning.

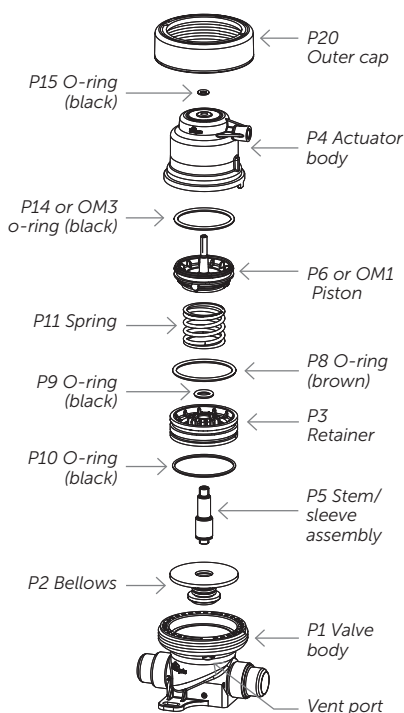


Figure 1. Normally open valve.

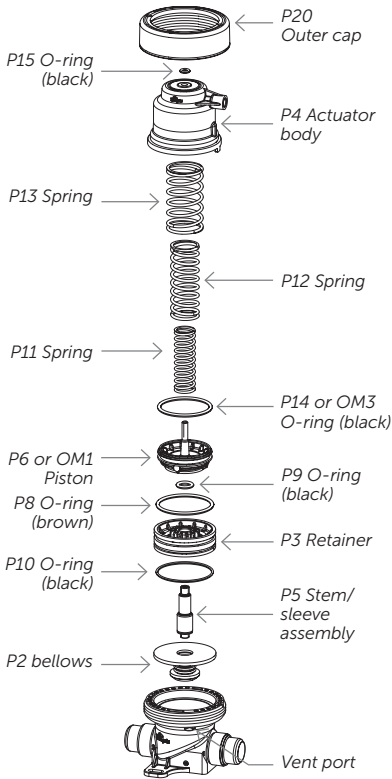


Figure 2. Normally closed valve.

1. To become familiar with the components in the valve assembly, refer to Figure 1 (normally open valve) and Figure 2 (normally closed valve).
2. For valves that can be removed from the line, mount the preload fixture (T2) into a vise or fasten to work bench. For valves that are installed in-line and cannot be removed, have one person hold the fixture while another torques the wrench (see Figure 3). If the valve is mounted to a base plate and cannot be removed, remove fixture base plate and have one person hold the fixture while another removes the screw assembly from the preload fixture (T2).
3. Place the valve body stop in the upper position. Loosen the adjustment screws for both port stops. Assemble the fitting nuts onto the valve ports to protect the threads. Place the valve in the preload fixture with the body in contact with the body stop and the port stops in contact with the valve ports. Tighten the adjustment screws on the port stops and secure the valve in place by tightening the wingnuts on the port hooks.
4. Tighten the screw on the preload fixture (T2) until it contacts the valve actuator body (P4). After contact with the actuator body (P4), turn the screw an additional 1/2-turn.
Do not overtighten.

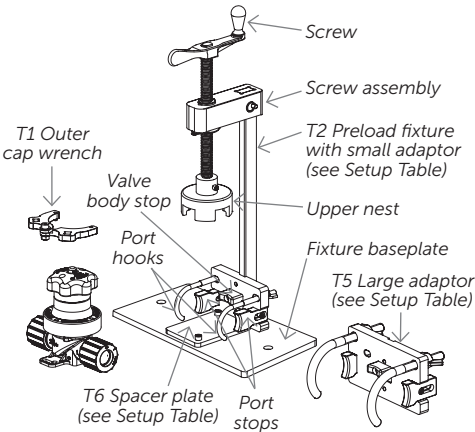


Figure 3.

5. Position the outer cap wrench (T1) onto the outer cap (P20). Align the pins on the outer cap wrench (T1) with the holes in the outer cap (P20).
6. Loosen and unthread the outer cap (P20) completely by turning it counterclockwise with the outer cap wrench (T1).
7. Loosen the screw on the preload fixture (T2) and remove the screw assembly from the preload fixture (T2).
8. Remove the outer cap (P20) and actuator body (P4) from the valve.
9. **Normally closed valve**
 - a. Remove the springs (P11, P12 and P13). Save for assembly if only installing the Omron® sensor kit.
 - b. Remove the piston (P6), stem (P5) and bellows (P2) assembly by carefully applying air pressure to one of the media ports on the valve body while blocking the other. The applied air pressure will force this assembly out of the valve body. Cover the valve to prevent possible chemical spray and point piston away while applying pressure. **Do not exceed 68.9 kPa (10 psig).**
 - c. For Omron kit only, disassemble and discard the piston (P6) and its o-ring (P14), and skip to step 9 of Assembly repair procedure.
 - d. Disassemble the piston (P6) and retainer (P3) from the stem (P5) and bellows (P2) assembly by unthreading the piston (P6) counterclockwise while firmly holding the poppet of the bellows (P2).
 - e. Slide the retainer (P3) off the stem (P5).
 - f. Discard bellows (P2), stem (P5) and springs (P11, P12 and P13).
10. **Normally open valve**
 - a. Remove the piston (P6), stem (P5), spring (P11) and bellows (P2) assembly by carefully applying air pressure to one of the media ports on the valve body while blocking the other.

The applied air pressure will force this assembly out of the valve body. Cover the valve to prevent possible chemical spray and point piston away while applying pressure. **Do not exceed 68.9 kPa (10 psig).**

- b. For Omron kit only, disassemble and discard the piston (P6) and its o-ring (P14), and skip to step 9 of Assembly repair procedure.
- c. Disassemble the piston (P6), spring (P11) and retainer (P3) from the stem (P5) and bellows (P2) assembly by unthreading the piston (P6) counterclockwise while firmly holding the poppet of the bellows (P2).
- d. Slide the retainer (P3) off the stem (P5).
- e. Discard bellows (P2), stem (P5) and spring (P11).

REPAIR PROCEDURE – ASSEMBLY

1. Thoroughly clean the valve body (P1) with isopropyl alcohol (S1) and allow it to dry.
2. Apply a thin film of lubricant (P21) to the inside diameter of the bellows (P2). Do not get lubrication on the bellows thread or the flat area surrounding it.
3. Being careful not to damage the gland, remove each o-ring from the following components and replace with the o-ring indicated:
 - a. Actuator body (P4)
O-ring (P15) black
 - b. Piston (P6)
O-ring (P14) black
 - c. Retainer (P3)
O-ring (P8) brown
O-ring (P9) black
O-ring (P10) black
4. Place the new bellows (P2) into valve body (P1) and push the external seal of the bellows into the groove in the body.

5. Thread the smaller flanged end of the stem/sleeve assembly (P5) into the bellows (P2) so that it is just tight. **Do not overtighten.**
6. Lubricate all the o-rings (P8, P9 and P10) on the retainer (P3) with lubricant (P21).
7. Place the retainer (P3) onto the stem/sleeve assembly (P5) so the black o-ring (P10) is facing the bellows (P2) and push it down in place.
8. For normally open valves only, place the spring (P11) into the retainer (P3). (Skip this step for normally closed valves.)
9. Thread the piston (P6 or OM1 for Omron kit) onto the stem/sleeve assembly (P5). The piston should just contact the stem. **Do not overtighten.**
10. Lubricate piston o-ring (P14 or OM3 for Omron kit) with lubricant (P21).
11. For normally closed valves only, place the springs (P11, P12 and P13) into the piston (P6 or OM1). (Skip this step for normally open valves.)
12. Install the actuator body (P4) so that the pilot port is positioned over port 1 or desired location around valve.
13. Install the outer cap (P20) over the actuator body (P4).
14. Place the screw assembly on the pre-load fixture (T2) and secure with pin. Fully tighten the screw on the fixture. Lift the outer cap (P20) and make sure the two tabs protruding from the bottom of the actuator body (P4) enter the slots in the valve body (P1).
15. Position the outer cap wrench (T1) onto the outer cap (P20). Align the pins on the outer cap wrench (T1) with the holes in the outer cap (P20).
16. Zero the torque wrench (T1) and tighten the outer cap (P20) to 39 N•m (29 ft•lb) using the outer cap wrench (T1) and the torque wrench (T4).
17. Remove the valve from the fixture.
18. After one hour, reinstall the valve into the fixture. Zero the torque wrench (T4) again and reapply 39 N•m (29 ft•lb) torque to the outer cap (P20) using the outer cap wrench (T1) and the torque wrench (T4).
19. Remove the valve from the fixture.
20. For Omron kit only, install the Omron sensor mounting bracket (OM4) using 2X #8-32 mounting screws (OM5). Refer to Figure 4.

TESTING

The valve must be tested in the following ways:

Actuator

1. Apply and remove 483 kPa (50 psig) pilot pressure to the 3.175 mm (1/8") FNPT port. Verify that the red indicator moves up and down.
2. Increase the pilot pressure to 552 kPa (80 psig) and repeat step 1.
3. In both cases, make sure there is no audible air leakage from the actuator.

Inlet to Outlet Leakage

4. Connect 552 kPa (80 psig) pilot pressure to the 3.175 mm (1/8") FNPT pilot port and cycle the valve several times.
5. On normally closed valves, apply 552 kPa (80 psig) air to port 1 with zero psig pilot pressure. No leakage should be seen at the outlet when the outlet port is submerged in water.

6. On DS16 normally open valves, apply 345 kPa (50 psig) and on DS20 normally open valves apply 413 kPa (60 psig) pilot pressure to the pilot port and apply 552 kPa (80 psig) air to port 1 with zero psig pilot pressure. No leakage should be seen at the outlet when the outlet port is submerged in water.

External media leakage

NOTE: Do not have pilot pressure applied when performing this test.

1. Apply 552 kPa (80 psig) air pressure to both ports. No leakage from the vent port should be observed when the vent port is submerged in water.
2. Testing is now complete.

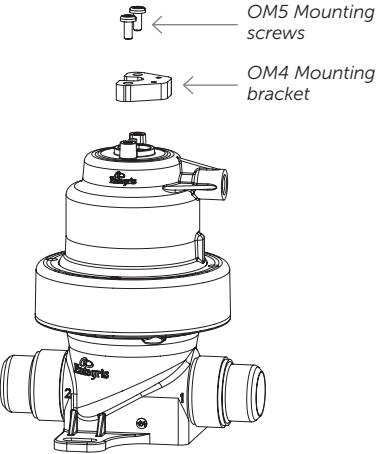


Figure 4. Omron sensor bracket mounting.

ORDERING INFORMATION

Repair Parts Kit Part Number DS16-NO-RKIT is for the following 1" normally open 2-way valve designs: DS16-2U-*, DS16-SU-*

Part Number DS16-SU-RKIT is for the following 1" normally open sampling valve designs: DS16-SU-*

Part Number DS20-NO-RKIT is for the 1¼" normally open 2-way and normally open sampling valve designs: DS20-2U-*

ITEM	DESCRIPTION	QUANTITY
P2	Bellows	1
P5	Stem/sleeve assembly	1
P8	O-ring (brown)	1
P9	O-ring (black)	1
P10	O-ring (black)	1
P11	Spring	1
P14	O-ring (black)	1
P15	O-ring (black)	1
P21	Lubricant	1

Repair Tool Kit Part Number DS-TOOL-KIT

ITEM	DESCRIPTION	QUANTITY
T1	Outer cap wrench	1
T2	Preload fixture with small adaptor	1
T3	1.75 mm (11/16") wrench	1
T4	Torque wrench	1
T5	Adapter (large)	1
T6	Spacer plate	1

Customer supplied items

ITEM	DESCRIPTION	QUANTITY
S2	Isopropyl alcohol	1

Repair Parts Kit Part Number DS16-NC-RKIT is for the following 1" normally closed 2-way and normally closed sampling valve designs: DS16-2C-*, DS16-SC-*

Part Number DS16-SC-RKIT is for the following 1" normally closed sampling valve designs: DS16-SC-*

Part Number DS20-NC-RKIT is for the 1¼" normally closed 2-way and normally closed sampling valve designs: DS20-2C-*

ITEM	DESCRIPTION	QUANTITY
P2	Bellows	1
P5	Stem/sleeve assembly	1
P8	O-ring (brown)	1
P9	O-ring (black)	1
P10	O-ring (black)	1
P11	Spring	1
P12	Spring	1
P13	Spring	1
P14	O-ring (black)	1
P15	O-ring (black)	1
P21	Lubricant	1

DS16 Omron Kit
(Part Number DS16-OMRON-RKIT)

ITEM	DESCRIPTION	QUANTITY
OM1	Piston, DS16 Omron	1
OM2	Lubricant	1
OM3	O-ring	1
OM4	Omron sensor bracket	1
OM5	#8-32 screws	2

Fixture setup table

VALVE	END CONNECTION	T5 ADAPTOR (LARGE OR SMALL)	T6 SPACER (YES OR NO)
DS16	½" Flaretek®	Small	No
DS16	1" Flaretek	Small	No
DS16	1" Pillar®	Large	Yes
DS16	¾" PureBond®	Small	No
DS16	1" PureBond	Small	No
DS16	¾" PrimeLock®	Small	No
DS16	1" PrimeLock	Large	Yes
DS20	1¼" PrimeLock	Large	No
DS20	1" PureBond	Large	No

FOR MORE INFORMATION

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