Integra® Pneumatically Operated Valves

¾", 2-way, normally open, normally closed pneumatic designs

REPAIR INSTRUCTIONS

For models:

2-way normally open: DS12-2U-*

2-way normally closed: DS12-2C-*

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.

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 (see Figure 3). For valves that are installed in line and cannot be removed, have one person hold the fixture while another operates the fixture and wrench in steps 3–6. 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).

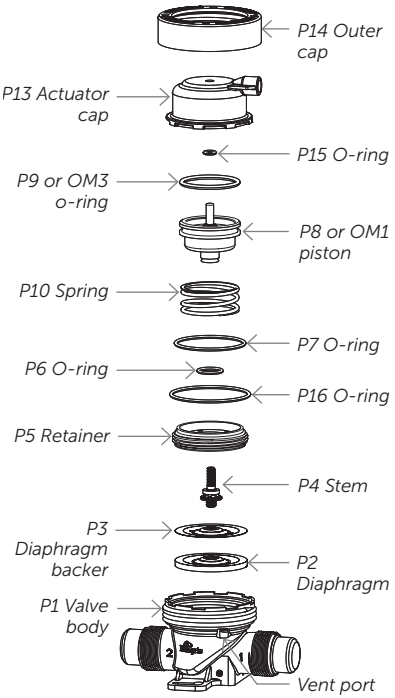

Figure 1. Normally open valve.

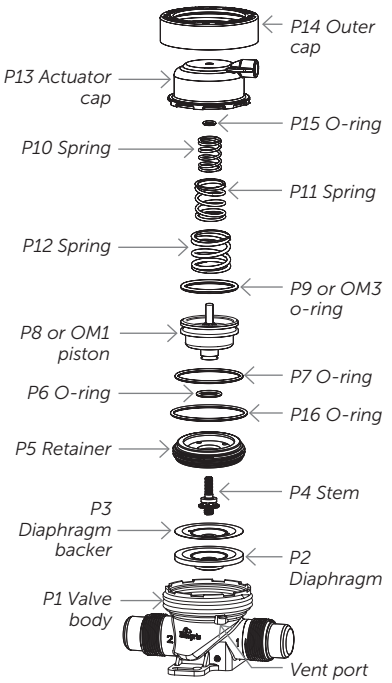

Figure 2. Normally closed valve.

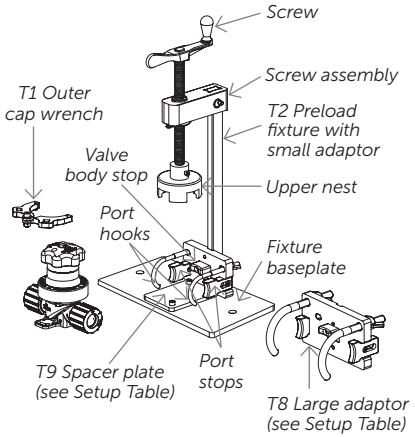

Figure 3.

3. Place the valve body stop in the bottom position. Loosen the adjustment screws for both port stops. Assemble fitting nuts onto valve ports to protect the threads. Place 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 valve in place by tightening the wingnuts on the port hooks.
4. Tighten the screw on the preload fixture (T2) by turning clockwise until the upper nest contacts the valve actuator body (P13). After contact with the actuator body (P13), turn the screw an additional ½-turn clockwise. **Do not overtighten.**
5. Position the outer cap wrench (T1) onto the outer cap (P14). Align the pins on the outer cap wrench (T1) with the holes in the outer cap (P14).
6. Loosen and unthread the outer cap (P14) completely by turning it counterclockwise with the outer cap wrench (T1) and the torque wrench (T4).
7. Loosen the screw on the preload fixture (T2) by turning counterclockwise and remove the screw assembly from the preload fixture (T2).
8. **IMPORTANT:** Note the actuator port orientation relative to port 1 for later reassembly.

   Remove the outer cap (P14) and actuator body (P13) from the valve.

⚠ CAUTION! Do not scratch or otherwise damage valve sealing surfaces.

9. Normally Closed Valve

   a. For Omron® kit only, remove the springs (P10, P11, and P12) and save for reassembly. Remove and discard piston (P8) with o-ring (P9) by completely unthreading it counterclockwise. Leave stem (P4) threaded into the diaphragm (P2). Skip to step 12a of *Assembly Repair* procedure.

b. Remove the springs (P10, P11 and P12).

c. Remove the piston (P8) by completely unthreading it counterclockwise. Stem (P4) may remain threaded into the piston (P8) or into the diaphragm (P2).

d. Remove the o-ring (P9) from the piston (P8).

e. Remove the o-ring (P7) from the retainer (P5).

f. Remove the o-ring (P16) from the valve body (P1).

g. Position the retainer wrench (T5) on the retainer (P5) so the pins extend between the ribs in the retainer.

h. Unthread the retainer (P5) by turning the retainer and retainer wrench (T5) counterclockwise using a 9.52 mm (3/8") drive ratchet wrench (S1).

i. Remove the stem (P4), diaphragm backer (P3) and diaphragm (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 diaphragm away while applying pressure.

CAUTION! Do not exceed 68.9 kPa (10 psig).

j. Discard diaphragm (P2), diaphragm backer (P3), stem (P4), retainer (P5), o-ring seal (P6), o-rings (P7, P9 and P16) and springs (P10, P11 and P12).

k. If stem (P4) is attached to the piston (P8), remove by turning the stem (P4) counterclockwise and discard.

CAUTION! Do not scratch or otherwise damage valve sealing surfaces.

10. Normally Open Valve

a. For Omron kit only, remove and discard piston (P8) with o-ring (P9) by completely unthreading it counterclockwise. Leave stem (P4) threaded into the diaphragm (P2). Skip to step 13b of *Assembly Repair* procedure.

b. Remove the piston (P8) by completely unthreading it counterclockwise.

c. Remove the o-ring (P9) from the piston (P8).

d. Remove the spring (P10).

e. Remove the o-ring (P7) from the retainer (P5).

f. Remove the o-ring (P16) from the valve body (P1).

g. Position the retainer wrench (T5) on the retainer (P5) so the pins extend between the ribs in the retainer.

h. Unthread the retainer (P5) by turning the retainer and retainer wrench (T5) counterclockwise using a 9.52 mm (3/8") drive ratchet wrench (S1).

i. Remove the stem (P4), diaphragm backer (P3) and diaphragm (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 diaphragm away while applying pressure.

CAUTION! Do not exceed 68.9 kPa (10 psig).

j. Discard diaphragm (P2), diaphragm backer (P3), stem (P4), retainer (P5), o-ring seal (P6), o-rings (P7, P9 and P16) and spring (P10).

k. If stem (P4) is attached to the piston (P8), remove by turning the stem (P4) counterclockwise and discard.

CAUTION! Do not scratch or otherwise damage valve sealing surfaces.

REPAIR PROCEDURE – ASSEMBLY

1. Thoroughly clean the valve body (P1).

CAUTION! Do not scratch or otherwise damage valve sealing surfaces.

2. If the o-ring (P15) looks degraded, remove and replace it.
3. Place the new diaphragm (P2) into body (P1) and push the sealing rim of the diaphragm into the perimeter groove.
4. Place a new diaphragm backer (P3) on top of the diaphragm (P2).
5. Thread the short end of the stem (P4) clockwise into the diaphragm (P2) so that it just touches the diaphragm backer (P3). **Do not overtighten.**
6. Install o-ring seal (P6) into retainer (P5).
7. Thread the retainer (P5) into the valve body (P1) by hand one turn. The ribs of the retainer (P5) should be visible.
8. 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).
9. Place the valve body stop in the bottom position. Loosen the adjustment screws for both port stops. Assemble fitting nuts onto valve ports to protect the threads. Place 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 valve in place by tightening the wingnuts on the port hooks.
10. Position the retainer wrench (T5) onto the retainer (P5) so the pins extend between the ribs in the retainer.
11. Tighten the retainer (P5) clockwise into the valve body (P1) using the retainer wrench (T5) and a torque wrench (T4) to 17 N•m (150 in•lb).
12. Normally Closed Valve
    a. Install new o-ring (P9 or OM3) into groove on piston (P8 or OM1).
    b. Apply a thin film of the lubricant (P17 or OM2) to the lower boss on piston (P8 or OM1).
    c. Thread the piston (P8 or OM1) onto the stem turning clockwise and tighten to 0.56 N•m (80 in•oz) using a torque screwdriver (T6) and the 0.5 mm (½") deep socket (T7). For Omron kit only, skip to step g.
    d. Install a new o-ring (P7) onto the groove on the retainer (P5).
    e. Install a new o-ring (P16) into the groove on the valve body (P1).
    f. Apply a thin film of lubricant (P17) to the o-ring (P7) on the retainer.
    g. Apply a liberal amount of lubricant (P17 or OM2) to the o-ring (P9 or OM3) on the piston.
    h. Place the springs (P10, P11 and P12) into the piston.
13. Normally Open Valve
    a. Install a spring (P10) on top of the retainer (P5).
    b. Install o-ring (P9 or OM3) into groove on piston (P8 or OM1).
    c. Apply a thin film of the lubricant (P17 or OM2) to the lower boss on the piston (P8 or OM1).
    d. Thread the piston (P8 or OM1) onto the stem turning clockwise and tighten to 0.56 N•m (80 in•oz) using a torque screwdriver (T6) and the 0.5 mm (½") deep socket (T7). For Omron kit only, skip to step h.
    e. Install a new o-ring (P7) onto the groove on the retainer (P5).
    f. Install a new o-ring (P16) into the groove on the valve body (P1).
    g. Apply a thin film of lubricant (P17) to the o-ring (P7) on the retainer
    h. Apply a liberal amount of lubricant (P17 or OM2) to the o-ring (P9 or OM3) on the piston.

14. Apply a liberal amount of lubricant (P17 or OM2) onto the o-ring (P15) in the actuator body (P13).
15. Place the actuator body (P13) over the springs and the piston so the actuator port is once again oriented relative to port 1 as noted in disassembly step 7. The actuator port must be located in any of the positions allowed by upper nest of the preload fixture (T2).
16. Place the outer cap (P14) over the actuator body (P13).
17. Place the valve assembly in the preload fixture (T2) and fully tighten the screw. Lift up the outer cap (P14) and make sure the tabs protruding from the bottom of the actuator body (P13) enter the slots in the body (P1).
18. Thread the outer cap (P14) onto the valve body (P1) by hand, turning clockwise.
19. Position the outer cap wrench (T1) onto the outer cap (P14). Align the pins on the outer cap wrench (T1) with the holes in the outer cap (P14).
20. Zero the torque wrench (T4) and tighten the outer cap (P14) to 11 N•m (100 in•lb) with the outer cap wrench (T1) and the torque wrench (T4).
21. Remove the valve from the fixture.
22. For Omron kit only, install mounting bracket (OM4) using 2X #8-32 mounting screws (OM5). Refer to Figure 4.

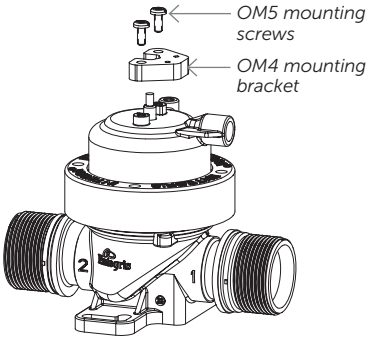

Figure 4.

TESTING

The valve must be tested as follows:

Port 2 to port 1 leakage

1. With port 1 open, connect 552 kPa (80 psig) to the 3.18 mm (⅛") FNPT pilot port and 552 kPa (80 psig) to port 2 and cycle the valve several times.
2. On normally closed valves apply 552 kPa (80 psig) air to port 2 with zero kPa (psig) pilot pressure. No leakage should be seen when port 1 is submerged in water.
3. On normally open valves apply 448 kPa (65 psig) to the pilot port and test the same as the normally closed valve described above.

External media leakage

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

ORDERING INFORMATION

Repair Parts Kit Part Numbers DS12-NO-RKIT-01 and DS12-NO-PKIT-01
For the following ¾" normally closed 2-way designs: DS12-2U-*

ITEM	DESCRIPTION	QUANTITY
P2	Diaphragm	1
P3	Diaphragm backer	1
P4	Sleeve	1
P5	Retainer	1
P6	Viton® o-ring	1
P7	O-ring	1
P9	O-ring	1
P10	Spring	1
P15	O-ring	1
P16	O-ring	1
P17	Lubricant	1

Repair Parts Kit Part Numbers DS12-NC-RKIT-01 and DS12-NC-PKIT-01
For the following ¾" normally closed 2-way designs: DS12-2C-*

ITEM	DESCRIPTION	QUANTITY
P2	Diaphragm	1
P3	Diaphragm backer	1
P4	Sleeve	1
P5	Retainer	1
P6	Viton o-ring	1
P7	O-ring	1
P9	O-ring	1
P10	Spring	1
P11	Spring	1
P12	Spring	1
P15	O-ring	1
P16	O-ring	1
P17	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 (Used with manual valve only)
T4	Torque wrench	1
T5	Retainer wrench	1
T6	Torque screwdriver	1 (Used with pneumatic valve only)
T7	0.5 mm (½") deep socket	1 (Used with pneumatic valve only)
T8	Adaptor (large)	1
T9	Spacer plate	1

Customer supplied items

ITEM	DESCRIPTION	QUANTITY
S2	9.52 mm (⅜") drive ratchet wrench	1

Omron Sensor Bracket Kit
Part Number DS12-OMRON-RKIT

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

Fixture setup table

VALVE	END CONNECTION	T8 ADAPTOR (LARGE OR SMALL)	T9 SPACER (YES OR NO)
DS12	¾" Flaretek®	Small	Yes
DS12	1" Flaretek	Small	No
DS12	¾" Pillar®	Small	Yes
DS12	1" Pillar	Large	Yes
DS12	¾" PureBond®	Small	Yes
DS12	1" PureBond	Small	No
DS12	¾" PrimeLock®	Small	No
DS12	1" PrimeLock	Large	Yes

FOR MORE INFORMATION

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Entegris
PURE ADVANTAGE

Corporate Headquarters
129 Concord Road
Billerica, MA 01821
USA

Customer Service
Tel +1 952 556 4181
Fax +1 952 556 8022
Toll Free 800 394 4083

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