Integra® Manually Operated Diaphragm Valves

¾", 2-way, multi-turn manual design

REPAIR INSTRUCTIONS

For model:

2-way multi-turn: DS12-2M-*

REPAIR PROCEDURE – DISASSEMBLY

This procedure describes how to disassemble all manual valves.

1. To become familiar with the components in the valve assembly, refer to Figure 1.
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 operates the fixture and wrench in steps 3–6 (see Figure 2). Remove screw assembly from preload fixture (T2).
3. Place the valve body stop in the bottom position. Loosen the adjustment screws for both port stops. Assemble fitting nuts onto valves to protect the threads. Place valve in preload fixture with the body in contact with the body stop and the port stops in contact with the valve ports. Tighten adjustment screws on the port stops and secure valve in place by tightening the wingnuts on the port hooks.

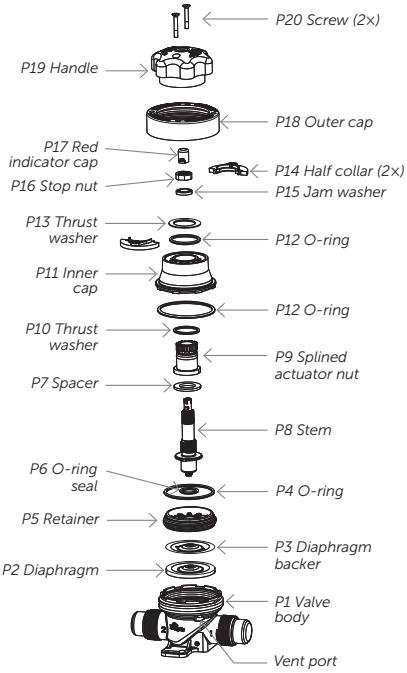

Figure 1.

4. Position the outer cap wrench (T1) onto the outer cap (P18). Align the pins on the outer cap wrench (T1) with the holes in the outer cap (P18).
5. Loosen the outer cap (P18) ½-turn by turning it counterclockwise with the outer cap wrench (T1) and the torque wrench (T4).

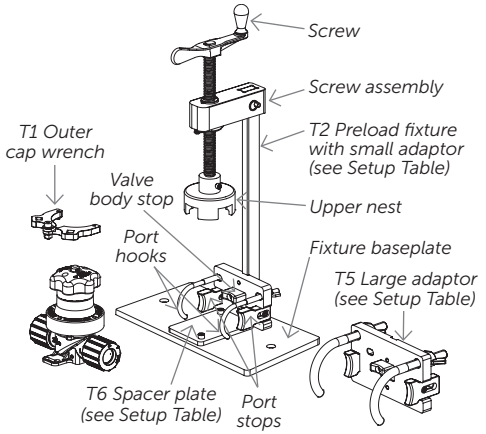

Figure 2.

6. Loosen the screw on the preload fixture (T2) by turning counterclockwise and remove the valve from the fixture.
7. Use a flat blade screwdriver (S1) to remove the two screws (P20) from the handle (P19).
8. Remove the handle (P19) from the valve.
9. Using the flat blade screwdriver (S1) pry apart the two half collars (P14) and remove the two half collars (P14) from the splined actuator nut (P9).
10. Turn the outer cap (P18) counterclockwise and remove.
11. Remove the thrust washer (P13), o-ring (P12) and inner cap (P11) from the valve.
12. Remove the red indicator cap (P17) from the stem (P8).
13. Using the 1.75 mm (11⁄16") wrench (T3), loosen and remove the stop nut (P16) from the stem (P8) by turning it counterclockwise.
14. Remove the jam washer (P15) and thrust washer (P10).
15. Remove the splined actuator nut (P9) from the stem (P8) by turning it clockwise.
16. Remove the spacer (P7) from the stem (P8).
17. Remove the stem (P8) from the diaphragm (P2) by turning it counterclockwise.
18. Remove the o-ring (P21) from the valve body (P1).
19. Remove the o-ring (P4) from the retainer (P5).
20. Position the retainer wrench (T5) on the retainer (P5) so the pins extend between the ribs in the retainer.
21. Unthread the retainer (P5) by turning the retainer and retainer wrench (T5) counterclockwise using a 9.53 mm (3⁄8") drive ratchet wrench (S2).
22. Remove the 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 valve to prevent possible chemical spray and point diaphragm away while applying pressure.

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

23. Discard diaphragm (P2), diaphragm backer (P3) and stem (P8) (part number DS12-MAN-RKIT-D-01 only).
24. Discard diaphragm (P2), diaphragm backer (P3), o-rings (P4, P12, P21), stem (P8), splined actuator nut (P9), thrust washers (P10, P13), half collars (P14), jam washer (P15), stop nut (P16), red indicator cap (P17) and screws (P20) (part numbers DS12-MAN-RKIT-C-01 and DS12-MAN-PKIT-C-01 only).

REPAIR PROCEDURE – ASSEMBLY

1. Thoroughly clean the valve body (P1).

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

2. Remove and discard the old retainer (P5) and o-ring seal (P6). Install the new o-ring seal (P6) into the new retainer (P5) (part number DS12-MAN-RKIT-C-01 only).
3. Place the new diaphragm (P2) into the 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 retainer (P5) into the valve body (P1) by hand one turn. The retainer ribs should be visible.
6. Set the valve body (P1) in the preload fixture (T2). (*See Repair Procedure–Disassembly*, step 3.)
7. Position the retainer wrench (T5) onto the retainer (P5) so the pins extend between the ribs in the retainer.
8. 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).
9. Apply a thin film of lubricant (P22) to the large diameter end of the stem (P8) (see Figure 3).
10. Push the large diameter end of the stem (P8) through the o-ring seal (P6) in the retainer (P5).
11. Thread the stem (P8) into the diaphragm (P2) so that it is finger tight. **Do not overtighten.**
12. Place a spacer (P7) onto the large threaded end of the stem (P8).
13. Apply a liberal amount of lubricant (P22) to the large thread on the stem (P8).

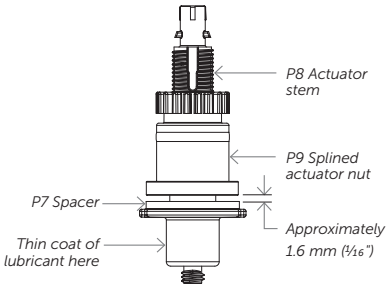

Figure 3.

14. Rotating counterclockwise, thread the splined actuator nut (P9) onto the large thread on the stem (P8) until it stops. Rotate back clockwise ½-turn to create ~1.6 mm (1/16") gap between the splined actuator nut (P9) and the spacer (P7) (see Figure 3).
15. Place a thrust washer (P10) onto the splined actuator nut (P9) so it rests on the large bottom flange of the splined actuator nut (P9).
16. Using fingers, pull the stem assembly up until the stem (P8) stays up.
17. Install an o-ring (P4) onto the retainer (P5) top groove.
18. Apply a thin film of lubricant (P22) to the outside diameter of the o-ring (P4).
19. Install an o-ring (P21) into the groove on the top of the valve body (P1).
20. Align the inner cap (P11) over the actuator stem assembly.
    a. With the leak detection hole on the valve body (P1) facing the operator and to the right, align the splines on the inside of the inner cap (P11) so they engage the tabs on the lower portion of the stem (P8).
    b. Rotate the inner cap (P11) clockwise so the lower alignment tabs on the inner cap locate into the locating slots on the top of the valve body (P1).

21. Install the outer cap (P18) over the inner cap (P11) and thread the outer cap (P18) onto the valve body (P1) by hand.
22. Place the handle (P19) on the inner cap (P11) and set the wrench (T1) on the outer cap (P18) so it aligns with the holes in the outer cap (P18).
23. Zero the torque wrench (T4) and tighten the outer cap (P18) to 11 N•m (100 in•lb) using the outer cap wrench (T1) and the torque wrench (T4).
24. Remove the valve from the fixture (T2).
25. Using the handle (P19), turn the splined actuator nut (P9) clockwise until the valve is closed and port seal is made. The valve should be closed slowly so the actual point of seal is just made and then turn an additional ¼-turn. Do not disturb the stem position through step 33.

    NOTE: The port seal can be checked by applying 552 kPa (80 psig) to port 2 and submerging port 1 in water. The valve is sealed when no leakage from port 1 is observed.
26. Remove handle (P19) and install the o-ring (P12) into the top of the inner cap (P11) and place the thrust washer (P13) on top of the o-ring (P12).
27. Place a jam washer (P15) onto the stem (P8) so the tabs on the inside of the jam washer locate in the slots on the top of the stem (P8).
28. Thread a stop nut (P16) onto the stem and tighten using the 1.75 mm (11⁄16") wrench (T3).
29. Snap the two half collars (P14) onto the groove on the splined actuator nut (P9).
30. Install the red indicator cap (P17) on the stem (P8). Make sure to locate the slots in the red indicator cap (P17) with the tabs on the top of the stem (P8).
31. Install the handle (P19). Make sure the screw holes line up to the threaded holes in the half collars (P14) below.
32. Install the two screws (P20) through the handle and into the half collars (P14).
33. Tighten the two screws using a flat blade screwdriver (S1). **Do not overtighten.**

TESTING

The valve must be tested as follows:

Port 1 to port 2 leakage

1. With the valve fully closed, apply 552 kPa (80 psig) air pressure to port 2. No leakage should be seen when port 1 is submerged in water.

External media leakage

1. Apply 552 kPa (80 psig) air pressure to ports 1 and 2. No leakage from the vent port should be observed when the vent port is submerged in water.
2. Testing is now complete.
3. Store the valve with the handle open one full turn from the closed position.

ORDERING INFORMATION

Repair Parts Kit Part Numbers DS12-MAN-RKIT-D-01
For replacing the diaphragm/stem for the following ¾" manual 2-way Integra valve, designs DS12-2M-*

ITEM	DESCRIPTION	QUANTITY
P3	Diaphragm	1
P3	Diaphragm backer	1
P8	Stem	1

Repair Parts Kit Part Numbers DS12-MAN-RKIT-C-01 and DS12-MAn-PKIT-C-01

The complete rebuild kits for the ¾" manual 2-way Integra valve, designs DS12-2M-**

ITEM	DESCRIPTION	QUANTITY
P2	Diaphragm	1
P3	Diaphragm backer	1
P4	O-ring	1
P5	Retainer	1
P6	Viton® o-ring seal	1
P8	Stem	1
P9	Splined actuator nut	1
P10	Thrust washer	1
P12	O-ring	1
P13	Thrust washer	1
P14	Half collar	2
P15	Jam washer	1
P16	Stop nut	1
P17	Red indicator cap	1
P20	Screw	2
P21	O-ring	1
P22	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
S1	Flat blade screwdriver	1
S2	9.52 mm (⅜") drive ratchet wrench	1

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

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