

Integra® Manually Operated Distribution Valves

1", 2-way, multi-turn and sampling manual designs; 1¼" 2-way, multi-turn manual designs

REPAIR INSTRUCTIONS

For models:

1" 2-way multi-turn: DS16-2M-*

1" Sampling: DS16-SM-*

1¼" 2-way multi-turn: DS20-2M-*

REPAIR PROCEDURE – DISASSEMBLY

This procedure describes how to disassemble both manual 2-way multi-turn and sampling 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 the preload fixture (T2).

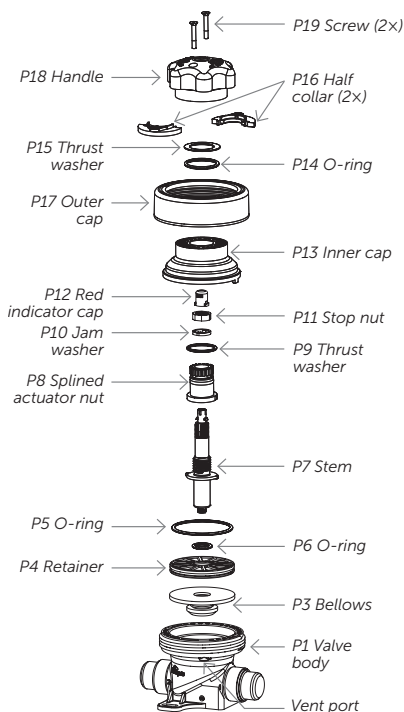


Figure 1.

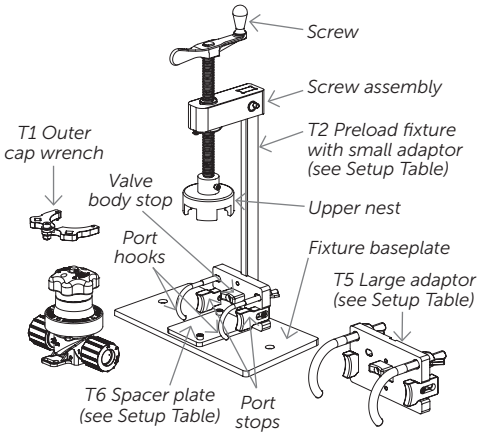


Figure 2.

3. Place the valve body stop in the upper 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. 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) 1/2-turn by turning it counterclockwise with the outer cap wrench (T1) and the torque wrench (T4).
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 (P19) from the handle (P18).
8. Remove the handle (P18) from the valve.
9. Using the flat blade screwdriver (S1), pry apart the two half collars (P16) and remove the two half collars (P16) from the splined actuator (P8).
10. Turn the outer cap (P17) counterclockwise and remove.
11. Remove the thrust washer (P15), o-ring (P14) and inner cap (P13) from the valve.

12. Remove the red indicator cap (P12) from the stem (P7).
 13. Using the 1.75 mm ($1\frac{1}{16}$ ") wrench (T3), loosen and remove the stop nut (P11) from the stem (P7) by turning it counterclockwise.
 14. Remove the jam washer (P10) and thrust washer (P9).
 15. Remove the splined actuator nut (P8) from the stem (P7) by turning it clockwise.
 16. Remove stem (P7) and bellows (P3) assembly by carefully applying air pressure to one of the media ports on the valve body while blocking the others. The applied air pressure will pop this assembly out of the valve body. Cover valve to prevent possible chemical spray and point piston away while applying pressure. **Do not exceed 68.9 kPa (10 psig).**
 17. Disassemble the stem (P7) and bellows (P3) assembly by unthreading the stem (P7) counterclockwise while firmly holding the poppet of the bellows (P3).
 18. Discard the stem (P7) and bellows (P3).
2. Being careful not to damage the gland, remove o-rings (P5, P6) from the retainer (P4) and replace with the o-rings indicated (part number DS16-MAN-RKIT-COMP only).
 3. Clean off the body (P1) with isopropyl alcohol (S2) and allow it to dry.
 4. Apply a light film of lubricant (P21) to the inside diameter of the o-ring (P6) in the retainer (P4).
 5. Install the retainer (P4) onto the larger diameter end of the stem (P7). The small through-hole in the retainer (P4) should be towards the end with the smaller external male thread.
 6. Thread the bellows (P3) clockwise into the stem (P7).
 7. Apply lubricant (P21) onto the larger diameter threads of the stem (P7).
 8. Thread the splined actuator (P8) all the way onto the stem (P7) by turning counterclockwise, so the splined actuator just contacts the stem. **Do not overtighten.**
 9. Place the thrust washer (P9) onto the splined actuator (P8).

REPAIR PROCEDURE—ASSEMBLY

1. Apply a thin film of lubricant (P21) to the inside diameter of the bellows (P3). Do not get lubrication on the thread portion of the bellows (P3) or flat area surrounding it.
10. Apply a thin film of lubricant (P21) to the outside diameter of the o-ring (P5) on the retainer (P4).
 11. Install the bellows assembly (P3) into the body (P1).

12. Tilt the bellows (P3) so the sealing groove is inserted into the mating groove. Then set the remainder of the bellows into the groove. **Do not** seat the bellows into the groove until the stem (P7) is aligned with the inlet and outlet ports.
- a. Align the bosses on the stem (P7) with the slots in the top of the body (P1) so that the bosses are in line with the inlet and outlet ports of the body (see Figure 3).
 - b. Press the sealing groove on the bellows into the mating groove on the body. Press it in by hand.
13. Set the valve body (P1) in the preload fixture (T2). (See *Repair Procedure Disassembly*, Step 3.)

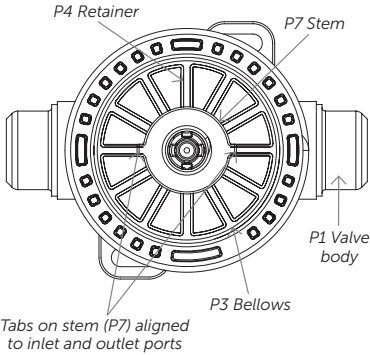


Figure 3.

14. Place the valve body stop in the upper 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.
15. Install the inner cap (P13) so that the bosses are aligned with the slots in the top of the body (P1).
16. Place the outer cap (P17) over the inner cap (P13).
17. Push down on the inner cap (P13) and hand-tighten the outer cap (P17) by turning it clockwise.
18. Place the handle (P18) on the inner cap (P13) and set the wrench (T1) on the outer cap (P17) so that it aligns with the holes in the outer cap (P17).
19. Place the screw assembly back on the preload fixture (T2) and retain with pin.
20. Tighten the screw on the preload fixture (T2) until it contacts the valve handle (P18). After contact with the valve handle (P18), turn the screw an additional turn. **Do not overtighten.**

21. Zero the torque wrench (T4) and tighten the outer cap (P17) to 39 N•m (29 ft•lb) using the outer cap wrench (T1) and the torque wrench (T4).
 22. Loosen the screw on the preload Fixture (T2) and remove the valve from the fixture.
 23. After one hour, zero the torque wrench (T4) again and reapply 39 N•m (29 ft•lb) torque to the outer cap (P17) using the outer cap wrench (T1) and the torque wrench (T4).
 24. Turn the splined actuator (P8) clockwise, first by hand and then with the handle (P18), 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 plus an additional ¼-turn. Do not disturb the stem position for steps 25 to 33.
- NOTE: The port seal can be checked by applying 552 kPa (80 psig) to the inlet port and submerging the outlet port in water. The valve is sealed when no leakage from the outlet port is observed.**
25. Remove handle (P18) and install the o-ring (P14) into the top of the inner cap (P13) and place the thrust washer (P15) on top of the o-ring (P14).
 26. With the vent port on the valve body facing the operator, snap the two half collars (P16) onto the groove on the splined actuator (P8).
 27. Place a jam washer (P10) onto the stem (P7) so that the tabs on the jam washer (P10) rest in the grooves of the stem (P7).

28. Thread on the stop nut (P11) until it contacts the jam washer (P10).
29. Using the 1.75 mm (11/16") wrench (T3), tighten the stop nut (P11) so it is just tight. **Do not overtighten.**
30. Install the red indicator cap (P12) on the stem (P7).
31. Install the handle (P18). Make sure the screw holes line up to the half collars (P16) below.
32. Install the two screws (P19) through the handle (P18) and into the half collars (P16).
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 1. No leakage should be seen when port 2 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 Number DS16-MAN-RKIT-BELL is for replacing the bellows/stem for the following 1" 2-way, multi-turn valve designs: DS16-2M-*, DS16-SM-*

Part Number DS16-SM-RKIT-BELL is for the following 1" multi-turn sampling valve designs: DS16-SM-*

Part Number DS20-MAN-RKIT-BELL is for replacing the bellows/stem for the 1¼" 2-way, multi-turn valve designs: DS20-2M-*

ITEM	DESCRIPTION	QUANTITY
P3	Bellows	1
P7	Stem	1

Repair Parts Kit Part Number DS16-MAN-RKIT-COMP is the complete rebuild kit for the following 1" 2-way, multi-turn valve designs: DS16-2M-*, DS16-SM-*

Part Number DS16-SM-RKIT-COMP is for the following 1" multi-turn sampling valve designs: DS16-SM-*

Part Number DS20-MAN-RKIT-COMP is the complete rebuild kit for the 1¼" 2-way, multi-turn valve designs: DS20-2M-*

ITEM	DESCRIPTION	QUANTITY
P3	Bellows	1
P5	O-ring	1
P6	O-ring	1
P7	Stem	1
P9	Thrust washer	1
P10	Jam washer	1
P11	Stop nut	1
P12	Red indicator cap	1
P14	O-ring	1
P15	Thrust washer	1

ITEM	DESCRIPTION	QUANTITY
P16	Half collars	2
P19	Screw	2
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	DS20 Adaptor (large)	1
T6	Spacer plate	1

Customer supplied items

ITEM	DESCRIPTION	QUANTITY
S1	Flat blade screwdriver	1
S2	Isopropyl alcohol	1

Fixture setup table

VALVE	END CONNECTION	T5 ADAPTOR (LARGE OR SMALL)	T6 SPACER (YES OR NO)
DS16	¾" 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

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