

CR4 Discrete Valve and Manifold Valve Repair or Replacement Procedure

Entegris CR4 valves and manifold valves can be repaired or replaced in the event of valve failure. This procedure should also be used to change the valve manifold configuration.

Carefully follow this procedure to ensure reliable valve performance.

VALVE REPLACEMENT PROCEDURE

1. Verify there is no pressure applied to the valve or manifold assembly and that any liquid entrapped within the manifold has been drained and the valve or manifold has been fully decontaminated from chemical applications.
2. Clean any external areas on the manifold block or valve assembly to remove external contamination.
3. Refer to Figure 1 (manifold [a], discrete pneumatic valve [b], discrete manual toggle valve [c], or discrete manual multi-turn valve [d]) and begin disassembly by removing four protective caps from top of CR4 valve or manifold (P1).
4. Loosen four mounting bolts (P2) using a $\frac{7}{64}$ " hex driver (S1). To access bolts on the manual multi-turn valves, first remove the handle by inserting two small pins in the slots on top of the handle. Then remove space ring and panel-mount hex nut (if applicable).

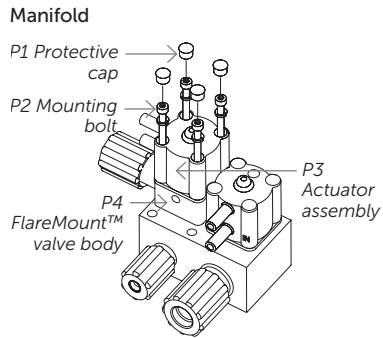


Figure 1a.

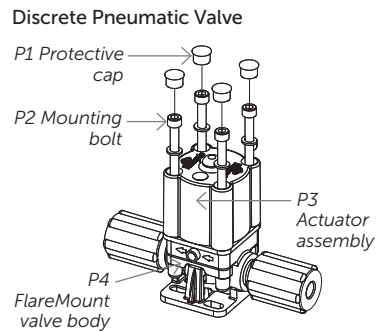


Figure 1b.

Discrete Manual Toggle Valve

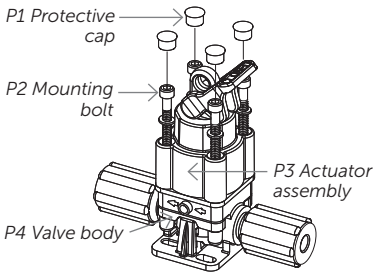


Figure 1c.

Discrete Manual Multi-turn Valve

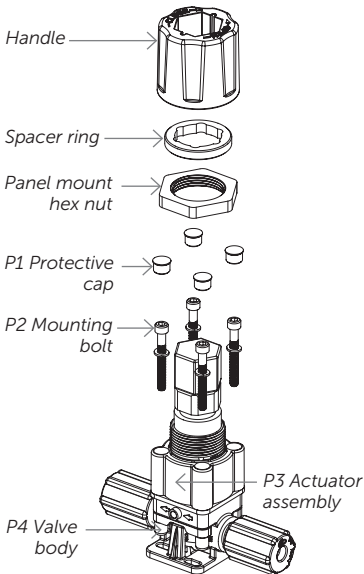
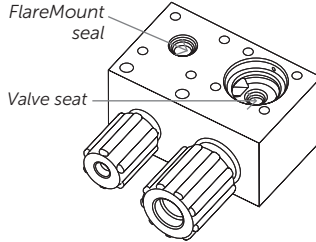


Figure 1d.

5. Remove the actuator assembly (P3) and FlareMount valve body (P4) (if applicable) from the valve or manifold by pulling up on valve body.
6. Remove bolts and lock washers from actuator assembly and save for reassembly.

7. Gently flush the valve seat or FlareMount seal detail within the valve manifold body (see Figure 2) with isopropyl alcohol (S6) and purge with CDA or nitrogen. Do not contact the sealing surface with a brush or a wipe, as resulting damage to the sealing surface may cause the manifold to leak.

Manifold



Discrete Valve Seat

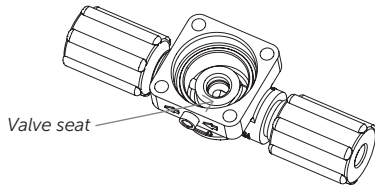


Figure 2.

8. Install bolts and lock washers into the new actuator/FlareMount valve body assembly.
9. Place new valve actuator/FlareMount valve body assembly onto manifold block, aligning bolts (P2) with four holes on the block. For pneumatic valves, make sure outlet port and actuator pilot ports are in the desired orientation. For manual toggle valves, make sure the toggle is in the open position and in the desired orientation. For manual multi-turn valves, rotate the actuator nut counterclockwise to move to the open position.

NOTE: If valve actuator completely separates from FlareMount valve body during assembly or handling, carefully center the valve poppet (Figure 3) with valve body seat (Figure 4) and push together by hand, fully engaging the valve actuator secondary containment O-ring into valve body. Do not touch valve poppet or valve body seat.

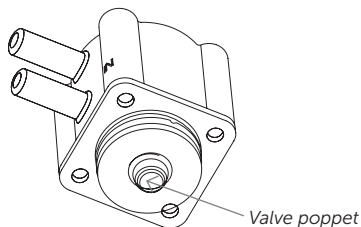


Figure 3.

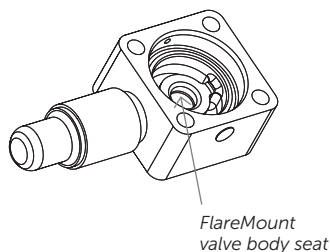
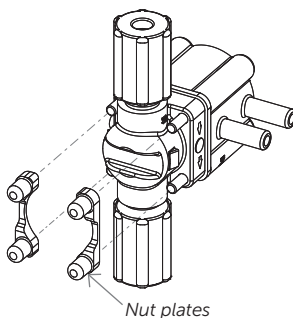


Figure 4.

10. Install the nut plate(s) by pushing them into the manifold block or hold the nut plate in place while turning each mounting bolt (P2) until it engages the nut plate threads (Figure 5).
11. Lightly tighten all four bolts (P2) in diagonal order to properly seat valve assembly to the manifold block.
12. Continue to tighten in a diagonal pattern until each bolt (P2) is torqued to 64 in•oz (0.45 N•m). To avoid damaging the manifold block, do not overtighten.

Discrete Valve



Manifold

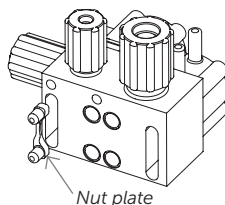


Figure 5.

13. For manual multi-turn valves, finish valve assembly (Figure 6).
 - a. Install panel mount nut (if applicable) by threading until full engagement
 - b. Install spacer ring
 - c. Tighten actuator nut with $\frac{3}{4}$ " socket to 40 in•oz (0.28 N•m).
 - d. Thread stop nut clockwise until it contacts actuator nut. Move stop nut slightly backwards (counter-clockwise) to align with hex on the actuator nut.
 - e. Install handle onto assembly, making sure stop nut does not turn.

Manual Multi-turn Valve

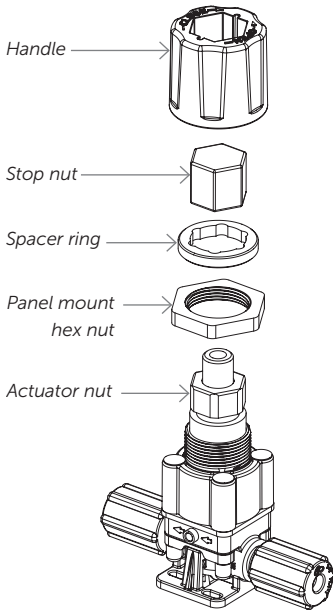


Figure 6.

14. Assembly is complete. See Testing Procedures.
15. Reinstall protective caps (P1).

VALVE TESTING

1. Verify pilot pressure seal.
 - a. Connect a pneumatic air supply (S5) to the valve actuator IN pilot port.
 - b. Actuate the valve a minimum of five times with 344.75 kPa (50 psig) air.
 - c. With pressure applied to the valve actuator, monitor valve actuator for audible air leakage. No audible air leakage should be evident. Remove air pressure from the actuator.
2. Verify port-to-port seal (normally closed valve actuator only).
 - a. Remove all air pressure from the IN pilot port.
 - b. Connect air supply to inlet valve port.

- c. Connect $\frac{1}{32}$ " ID tube to the outlet port with other end submerged in water to about 12.7 mm ($\frac{1}{2}$ ") depth.
 - d. Apply 551.6 kPa (80 psig) to the inlet port and verify the port-to-port seal by counting air bubbles from submerged $\frac{1}{32}$ " ID tube. Four bubbles or less in one minute is acceptable.
3. Verify port-to-port seal (normally open valve actuator only).
 - a. Apply 344.75 kPa (50 psig) to the IN pilot port on the valve actuator to close valve.
 - b. Connect air supply to inlet valve port.
 - c. Connect $\frac{1}{32}$ " ID tube to outlet port with the other end submerged in water to about 12.7 mm ($\frac{1}{2}$ ") depth.
 - d. Apply 551.6 kPa (80 psig) to the inlet port and verify the port-to-port seal by counting air bubbles from submerged $\frac{1}{32}$ " ID tube. Four bubbles or less in one minute is acceptable.
4. Verify port-to-port seal (manual toggle only).
 - a. Close toggle.
 - b. Connect $\frac{1}{32}$ " ID tube to outlet port with the other end submerged in water to about 12.7 mm ($\frac{1}{2}$ ") depth.
 - c. Apply 551.6 kPa (80 psig) to the inlet port and verify port-to-port seal by counting air bubbles from submerged $\frac{1}{32}$ " ID tube. Four bubbles or less in one minute is acceptable.
5. External media seal (normally closed valve actuator only).
 - a. Remove the air pressure from the actuator IN pilot port.
 - b. Plug media inlet port.
 - c. Apply 551.6 kPa (80 psig) to the valve outlet port.
 - d. Apply Snoop or other leak detection fluid (i.e., soapy water [S4]) to valve leak detection port or to manifold body and valve module seal areas. No bubbles should be observed.

6. External media seal (normally open valve actuator only).
 - a. Plug media inlet port.
 - b. Apply 551.6 kPa (80 psig) applied to the valve outlet.
 - c. Apply Snoop or other leak detection fluid (i.e. soapy water [S4]) to valve leak detection port or to manifold body and valve module seal areas. No bubbles should be observed.
7. External medial seal (manual toggle only).
 - a. Plug media inlet port.
 - b. Apply 551.6 kPa (80 psig) to the valve outlet.
 - c. Apply Snoop or other leak detection fluid (i.e., soapy water [S4]) to valve leak detection port or to manifold body and valve module seal areas. No bubbles should be observed.

If there is port-to-port leakage or an external media leak observed, loosen mounting bolts, re-center the valve assembly on valve body or manifold block FlareMount/ valve port and diagonally re-torque valve assembly mounting bolts to 64 in•oz (0.45 N•m). Repeat test procedures 1–7. If leak persists, then the valve seat or media seal surfaces may be damaged and will require replacement.

If pilot pressure seal, port-to-port seal, and external media seals pass, then testing is complete. Remove all connected tubes from valve or manifold and install into equipment.

CUSTOMER SUPPLIED ITEMS

ITEM	DESCRIPTION
S1	7/64" hex driver
S2	Torque wrench with 7/64" hex driver attachment
S3	Small blade screwdriver
S4	Snoop or other leak detection fluid
S5	413.7 kPa (60 psig) pneumatic pressure supply and associated tube adapters to connect to CR4 valve
S6	Isopropyl alcohol

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