



# Repair Instructions for Gemini Series 89 Three Piece Valves

2 Otter Court, Raymond, New Hampshire 03077 •Tel. (603) 895-4761 •FAX (603) 895-6785 •www.geminivalve.com

Gemini Series 89 Three Piece Valves can be readily removed from service for inspection or repair. Repairs may be made on site and the repaired valve quickly returned to service, or a spare center section may be substituted to minimize downtime.

A few precautions should be observed before removing the valve center section: 1.) Be certain that the system is not under pressure. 2.) If spillage of media at the site of the valve would prove undesirable or dangerous, drain the system before beginning to repair. 3.) Make sure that the pipe is supported on both sides of the valve before the center section is removed.

## Removal of Center Section

1. Note handle or actuator position, i.e. opened / closed, on installed valve. When replacing complete center section match code designation of replacement center section valve center section to ensure that replacement has correct port and material code. Position handle, if provided, to correspond with installed valve.
2. If the valve is equipped with an actuator, remove the screws which secure the actuator bracket to the valve bracket and remove the actuator from the valve. If using a new replacement center section ensure that the drive key is in the same position, i.e. opened / closed, as that of the center section being replaced.
3. First loosen each assembly bolt one-half (1/2) turn. Then run bolts from flange threads and remove bolts. Set bolts aside.
4. Grasp center section by handle or bracket, push back each flange and lift center section clear.

## Disassembly of Center Section

- 1a.** Manual (handle-equipped) center sections: Remove the handle nut, handle, stem nut, stop, grounding spring, Belleville springs and follower.
- 1b.** Actuated center sections: Turn valve to open position, insert wooden dowel through the port to prevent rotation of the ball. Remove drive key nut, drive key, drive key spacer, Belleville springs and follower.
2. Turn ball to the closed position. Hold the center section so that the alignment key is at the 9:00 position with the stem at 12:00. With thumb pressure on the face of the ball, or by use of a soft dowel (wood, plastic, etc.) force the ball and insert from the valve.

3. Remove the stem by pushing it into the body. 0.5 Port actuated center sections: The pilot / spacer and thrustwasher must be removed before the stem can be withdrawn. Remove the stem. Remove the pilot / spacer (if provided) and thrustwasher. Remove the stem seal, which may have remained in the back recess of the body or which may have been carried from the body by the stem.
4. Remove the Viton Body Seals.
5. Remove the seat from the body. Remove the remaining seat from the insert.
6. Inspect all internal parts for damaged sealing surfaces and wear. Set aside those components which are to be replaced. Clean, if necessary, those parts which are to be reused.

## Reassembly of Center Section

1. Position new seat squarely in valve body recess. Press carefully into place, install second seat in insert.
2. Place new stem seal on stem, engage stem in body and through stem hole. Turn stem to 'closed' position.
3. Enter ball in body engaging ball slot and stem head. Put the insert with seat in place. Install the body seals. (Body seals may be reused repeatedly if they are found to be in good condition.)
4. Continue instructions for Manual or Actuated Valves

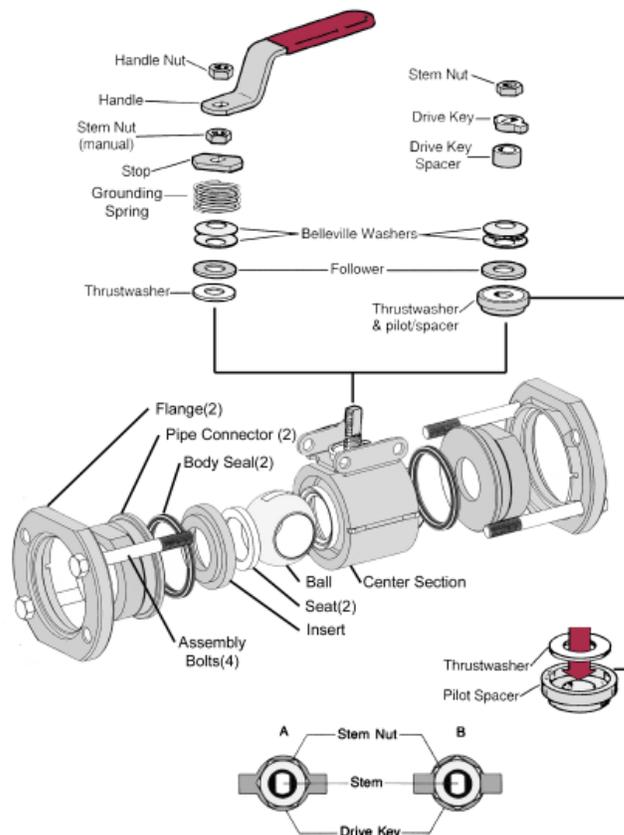
## Reassembly of Center Section - continued<sup>1</sup>

### Manual Valves

1. For 0.5 - 0.8 port valves, place thrustwasher atop the valve in the body counterbore. For 1.0 - 1.5 port valves, place the thrustwasher in the pilot spacer counterbore then place the Pilot Spacer in the valve body counterbore.
2. Place the follower in position atop the thrustwasher (0.5-0.8 port) or atop the Pilot Spacer (1.0 - 1.5 port) valves.
3. Place the Belleville washers on the follower. The Belleville washers must be installed with their concave (cupped) surfaces facing each other.
4. Place the Stop on the Belleville washers.
5. Assemble the stem nut. Tighten the stem nut until the Belleville washers beneath the  
Tighten until the Belleville washers are fully compressed (flattened) signaled by an abrupt increase in resistance to further tightening.
6. Assemble the Handle and secure the Handle Nut.

### Actuated Valves

1. Place thrustwasher in pilot spacer counterbore.
2. Place pilot spacer in position on stem. Be sure that the raised face of the pilot spacer engages the hole in the stop bracket.
3. Place the follower in position atop the thrustwasher. Note: The follower used on manually operated 0.5 port valves must be replaced with the follower from the mounting kit. These parts may be distinguished by their thickness: The follower on the manual valve is .103" (2.6mm) thick; whereas the follower for the actuated valve is .060" (1.5mm) thick.
4. Place the Belleville washers on the follower. The Belleville washers must be installed with their concave (cupped) surfaces facing each other.
5. Place the drive key spacer on the Belleville washers.
6. Place the drive key in position on the drive key spacer. The drive key has a rounded edge on one side (the 'draw' side) and a square edge on the opposite side (the 'shear' side). Install the drive key 'draw' side down.
7. Assemble the stem nut. The proper nut for actuated valves is 1/2" across the flats. The 0.5 port uses the same nut for actuated valves as for manual.
8. Install a wooden or plastic dowel through the valve to prevent turning as the stem nut is tightened. Tighten the stem nut until the Belleville washers beneath the drive key spacer have fully compressed (flattened) signaled by an abrupt increase in resistance to further tightening.
9. Check the orientation of the stem nut to the drive key. In order to achieve desired orientation, loosen



the nut until the nut / drive key relationship corresponds to Illustration A or B above. This should not require more than one-twelfth (1/12) turn of the nut.

### Reinstallation of Center Section

1. Place center section in position between pipe adaptors. Slide flanges over ends of body. Enter and engage tie-bolts.
2. Snug tie-bolts evenly. As bolts are tightened, be sure that the alignment key (fixed to the center section) is engaged in the pipe connector flange notches.
3. Rotate center section to intended final position.
4. Complete the installation by securely and uniformly tightening the tie-bolts. Begin by tightening each bolt in succession, following a diagonal pattern, until even contact is achieved between the center section and pipe connectors. Continue tightening each bolt, a small amount at a time following the diagonal pattern, until each is brought within the torque range shown in the chart below.

Port Size	Bolt Thread	Hex Size	Torque Range Inch-Pounds
0.5	5/16-24	1/2	50-100 (115)
0.6	5/16-24	1/2	50-100 (115)
0.8	5/16-24	1/2	50-100 (115)
1.0	3/8-24	9/16	75-150 (200)
1.2	3/8-24	9/16	75-150 (200)
1.5	7/16-20	5/8	100-200 (330)

**Note:** The torque figure given in parentheses must not be exceeded.