INSTALLATION, OPERATING
AND MAINTENANCE INSTRUCTIONS
D SERIES

TABLE OF CONTENTS

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1 General Information

The following instructions are designed to assist in unpacking, installing and performing maintenance as required on Circor D-series control valves. Product users and Maintenance personnel should thoroughly review this bulletin prior to installing, operating or performing any maintenance on the valve.

To avoid possible injury to personnel or damage to valve parts, WARNING and CAUTION notes must be strictly followed. Modifying this product, substituting non-factory parts or using maintenance procedures other than outlined could drastically affect performance and be hazardous to personnel and equipment and may void existing warranties.

WARNING: Standard industry safety practices must be adhered to when working on this or any other process control product. Specifically, personal protective and lifting devices must be used as warranted.

2 Terms Concerning Safety

The safety terms **DANGER, WARNING**, **CAUTION** and **NOTE** are use in these instructions to highlight particular dangers and/or to provide additional information on aspects that may not be readily apparent.

DANGER: indicates that death, severe personal injury and/or substantial property damage will occur if proper precautions are not taken.

WARNING: indicates that death, several personal injury and/or substantial property damage can occur if proper precautions are not taken**.**

CAUTION: indicates that minor personal injury and/or property damage can occur if proper precautions are not taken.

NOTE: indicates and provides additional technical information, which may not be very obvious even to qualified personnel.

3 Unpacking

1. While unpacking the valve, check the packing list against materials received. Lists describing valve and accessories are in each shipping container.

2. When lifting the valve from shipping container, use the lifting lugs attached to the bonnet bolting. Take care to position lifting straps to avoid damage to the tubing and mounted accessories.

WARNING: When lifting a valve using the lifting lugs, be aware that the center of gravity may be above the lifting point. Therefore, support must be given to prevent the actuator from rotating. Failure to do so can cause serious injury to personnel, damage to the valve or nearby equipment.

3. Contact your shipper immediately if there is shipping damage.

4. Should any problem arise, contact your Circor representative.

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4 Installations

1. Before installing the valve, clean the line of dirt, welding chips, scale or other foreign material.

2. Whenever possible, the valve should be installed in an upright position. Vertical installation permits easier valve maintenance.

3. Be sure to provide proper overhead clearance for the actuator to allow for disassembly of the plug from the valve body

4. Double-check flow direction to be sure the valve is installed correctly. Flow direction is indicated by the arrow attached to the body.

5. If welding the valve into the line, use extreme care to avoid excess heat buildup in the valve.

6. Connect the air supply and instrument signal lines. Throttling control valves are equipped with a valve positioner. Refer to the appropriate positioner bulletin for connections, maximum air supplies, and maintenance instructions.

4.1 Quick-check

Prior to start-up, check the control valve by following these steps:

1. Stroke the valve and observe the plug position indicator on the stem clamp compared to the stroke indicator plate. The plug should change position in a smooth, linear fashion.
NOTE: Due to excessive friction, graphite packing can cause the plug stem to move in a jerky fashion.

2. Check for full stroke by making appropriate instrument signal change.

3. Check all air connections for leaks.

4. Check packing box bolting for the correct adjustment.

⚠ **CAUTION**: Do not over tighten packing. This can cause excessive packing wear and high stem friction that may impede plug movement.

5. Make sure the valve fails in the correct direction in case of air failure. This is done by turning off the air supply and observing the failure direction.

6. After a temperature excursion has occurred, bonnet flange bolting should be re-torqued to ensure bonnet gaskets do not leak. (Refer table 1)

Table 1

SIZE OF THE VALVE	CLASS	SIZE OF THE NUT (in)	NO. OF NUTS	TORQUE Nm
2"	150 ~ 600	0.75	6	152
	900 ~ 1500	0.875	8	220
3"	150 ~ 600	0.875	8	233
	900 ~ 1500	1.25	8	583
4"	150 ~ 600	0.875	8	307
	900 ~ 1500	1.5	8	922
6"	150 ~ 600	1	12	391
	900	1.25	12	856
	1500	1.75	8	1798
8"	150 ~ 600	1	12	573
	900	1.75	8	2631
	1500	1.625	12	1629
10"	150	1	8	879
	300	1	12	586
	600	1.25	16	550
12"	150	1	12	873
	300	1.25	12	1091
	600	1.5	16	982
16"	150	1.25	12	1605
	300	1.5	12	1926
	600	1.75	16	1685

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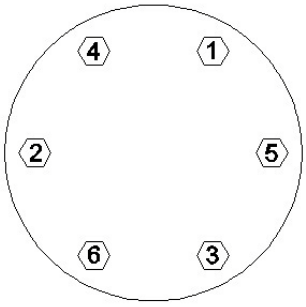
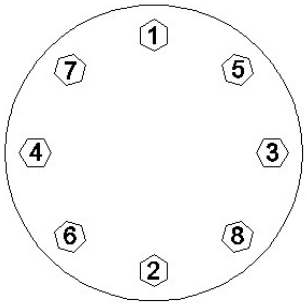
Typical Bolting torque sequence

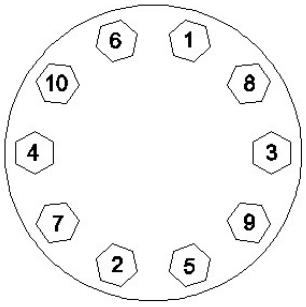
Figure 1



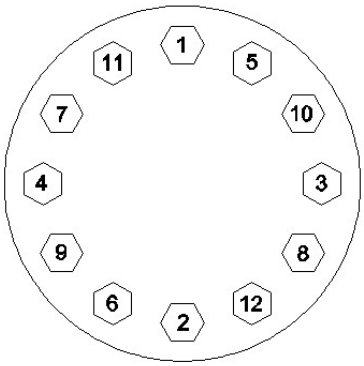
SIX BOLT PATTERN



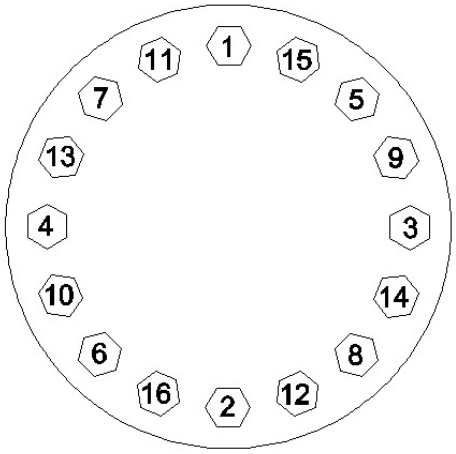
EIGHT BOLT PATTERN



TEN BOLT PATTERN



TWELVE BOLT PATTERN



SIXTEEN BOLT PATTERN

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5 Valve Maintenance

At least once every six months, check for proper operation by following the preventative maintenance steps outlined below. These steps can be performed while the valve is in-line and, in some cases without interrupting service. If an internal problem is suspected, refer to the "Valve Disassembly and Reassembly" section.

1. Look for signs of gasket leakage through the end flanges and bonnet. Re-torque flange and bonnet bolting (if required).

2. Check for fluid leakage to the atmosphere through the body drain plug, if applicable.

3. Examine the valve for damage caused by corrosive fumes or process drippings.

4. Clean valve and repaint areas of severe oxidation.

5. Check packing box bolting for proper tightness.

6. If the valve is supplied with a lubricator fitting, check lubricant supply and add lubricant if necessary.

7. If possible, stroke the valve and check for smooth, full-stroke operation. Unsteady stem movement could indicate an internal valve problem.

NOTE: Due to excessive friction, graphite packing can cause the plug stem to move in a jerky fashion.

WARNING: Keep hands, hair and clothing away from all moving parts when operating the valve. Failure to do so can cause serious injury.

8. Ensure all accessories, brackets and bolting is securely fastened.

9. If possible, remove air supply and observe actuator for correct fail-safe action.

10. Clean any dirt and other foreign material from the plug stem.

11. If an air filter is supplied, check and replace cartridge if necessary.

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Figure 2: Exploded Drawing

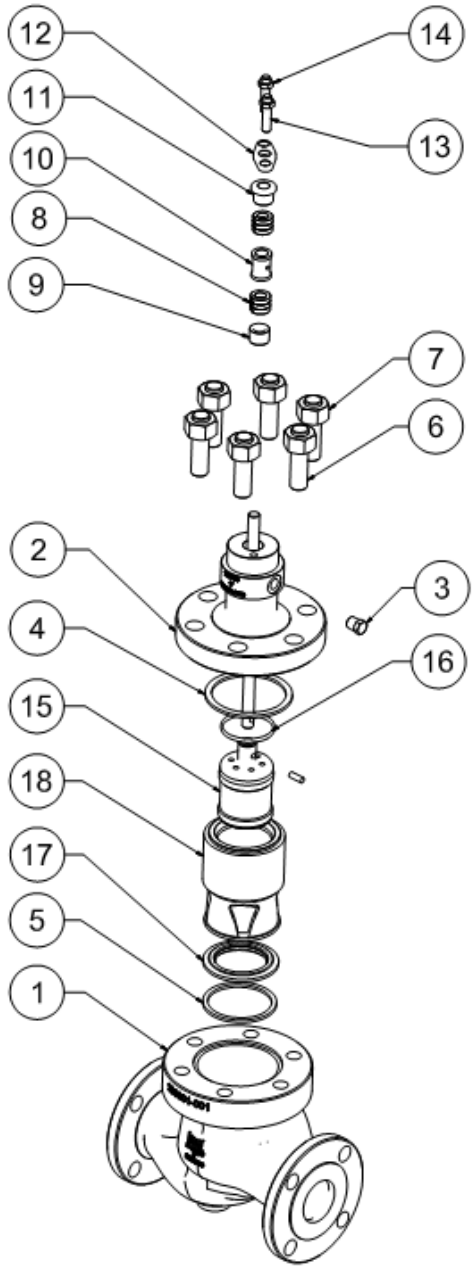

Table 2

Parts List	
Part	Item
Body	1
Bonnet	2
Seat ring	17
Plug stem assy	15
Cage	18
Seat Gasket	5
Bonnet Gasket	4
Seal ring	16
Gland flange stud	13
Nut	14
Bonnet studs	6
Heavy Hex nut	7
Packing Ring	8
Guide Bush	9
Lantern Ring	10
1/4 NPT Plug	3
Gland Bush	11
Gland Flange	12

Plug stem assy has the following Integral parts (Refer section 7)

15- Plug
19- Pin
20- Stem

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6. Valve Disassembly and Reassembly

6.1 Disassembling the Body

To disassemble the valve body, refer to Figure 2 then proceed as follows:

WARNING: Depressurize line to atmospheric pressure and drain all fluids before working on the valve. Failure to do so can cause serious injury. Remove all compression from adjusting springs

For Normally open valve, relieve air pressure from the actuator. Remove the tubing from upper diaphragm case.
For Normally closed valve, apply sufficient air to the actuator diaphragm to keep valve plug from touching seat while disengaging valve plug stem from actuator stem

1. Loosen valve stem nut. Use wrench on plug stem flats and turn valve plug (15) put of actuator stem until stems separate. Remove the tubing from lower diaphragm case. Do NOT grasp the stem with pliers.

2. Remove cap screws holding actuator to bonnet (2) and lift off actuator. Use caution not damage the valve stem with yoke.

3. Remove the stem nut, travel indicator, packing flange Studs & nuts (13, 14), packing flange (12), and packing follower (11).

4. Remove bonnet nuts and lift bonnet (2) straight up until it clears valve plug stem (15) being careful not to damage threads. Take out bonnet gasket (4).

5. Lift out valve plug (15) assembly and cage (18).

6. Remove seat ring (17) and seat ring gasket (5)

7. Hold plug assy (15) with a wrench on stem flats and remove the pin holding the plug head. Loosen the plug stem from the plug head.

6.2 Cleaning

Remove the old packing from the bonnet and clean and polish the stuffing box. Clean all parts with solvent.
Polish the parts with a fine aluminium oxide cloth to remove any foreign matter. Replace any worn or damaged parts. Be sure all gasket seating surfaces are clean and smooth. If any of the gasket faces are steam cut and remachining is needed, it is recommended that the valve be sent to Leslie controls rebuilding department fro repair. ALL CRITICAL dimensions must be maintained during machining process.

6.3 Lapping-in of valve plug and seat ring

1. Place seat ring (17) in body recess with seating surface upward. Lower cage (18) into body with window opening downward. Make sure cage fits into body with window openings downward. Make sure cage fits over raised face of seat ring (17).

2. Use a small amount of Carborundum grade “CF” lapping compound (or equal) evenly spread around valve plug seating surface. Carefully insert valve plug (15) into body until plug contacts seat ring (17). Lower bonnet (2) over valve stem making sure stem threads are not damaged. Place one metal packing ring (8) over valve stem and into bottom of stuffing box to act as a guide while lapping plug. Lightly lap plug to seat ring (15) using weight of plug only and by rotating the plug in ¼ turn increments. Lift and rotate plug 90 deg., three or four times during lapping procedure. This will ensure even distribution of compound. DO NOT lap excessively- 10 to 12 turns should be sufficient. Remove the parts and clean them thoroughly after lapping. Plug (15) and seat ring (17) contact may be checked by the bluing method before assembly.

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6.4 Reassembling the Body

To reassemble the valve body, refer to Figure 2 then proceed as follows:

1. Install new bonnet (2) and seat gaskets (5) with the bevelled edge up
NOTE: All gaskets should be replaced whenever the valve is disassembled.

2. Relocate the seat ring (17). Carefully install the cage (18), taking care to ensure they installed with the correct ends up.

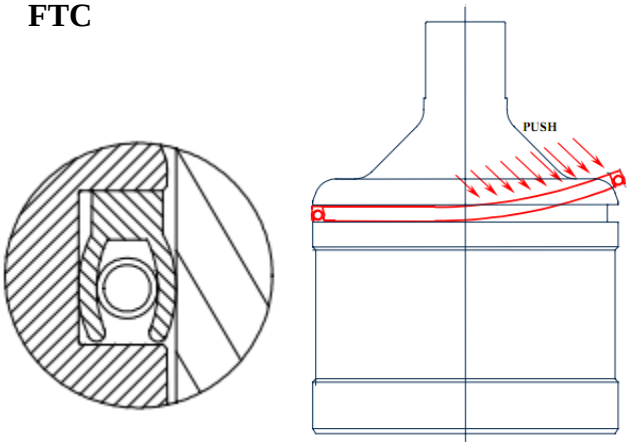
3. Replace the plug seals (16) on the plug, referring to **Figure 3** and observing the following directions:

WARNING: Gloves should be worn to protect the hands from being burned.

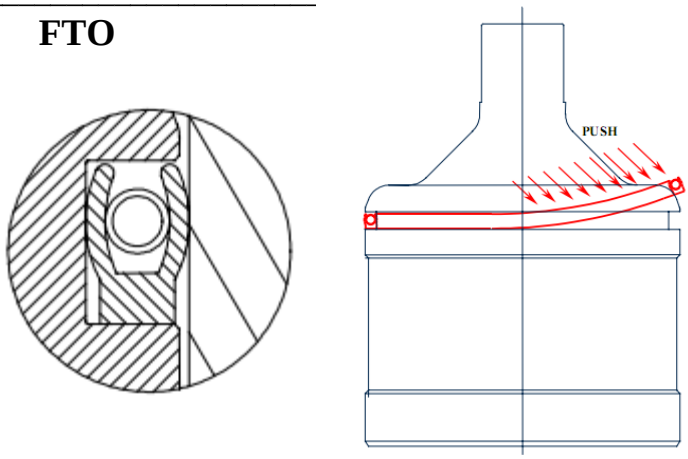
PTFE Seals: Heat the seal to 300°F (150°C) and slip it over the plug into the seal groove. Thermal expansion causes the ring to stretch, thereby making it relatively easy to slide over the plug head. Care must be taken to prevent the seal from rolling, rather than sliding over the plug.

Figure 3: Installation of Carbon filled Teflon energised seal ring

FTC



FTO



By hand, evenly exert a sufficient thrust to constrain seal ring to slide until its groove. Take care not to damage seal ring during this step. Ensure seal ring is completely and correctly inserted before perform next assembly step.
NOTE: To easy introducing plug with its seal ring into the cage, it is recommended to apply a small amount of grease such as Bardhal® (or equivalent) around the seal ring (17).

Figure 4: Installation of Grafoil seal ring

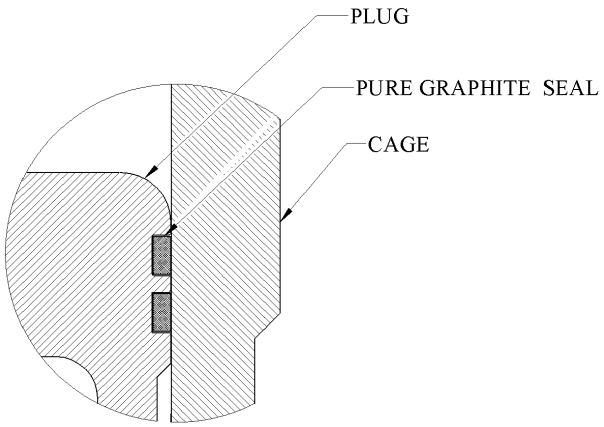


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Figure 4.1 Grafoil seal ring

CAUTION: **Graphite seal rings are brittle parts, so care must be taken to avoid damage during following steps.**

- Using a sharp knife, score the graphite ring in one location.
- Hold each side of the ring around the score mark between thumbs and forefingers and bend the ring to break at the scribe mark.
- By means of a very fine file, adjust each broken end so that the external ring circumference equal the proper internal circumference of the cage (18).
- Remove seal ring from the cage. Open the seal ring sufficiently to place it around the top of the plug. Slide the ring along the plug and insert into groove.

Graphite seal ring:
The seal ring cut location shall be placed at 180° apart when both the seal rings are inserted into plug groove.

4. Lower the plug (15) into the body and cage (18). Care should be taken with the plug (16) seals to avoid scoring or galling the sealing surface while fitting them into the cage bore.
5. Lower the bonnet (2) onto the plug (15) and body, taking great care to avoid scoring the plug stem.

6. Once the bonnet is resting squarely in the valve body, finger tighten the bonnet flange bolting.

7. Reinstall the packing (8), guide bush (9) and Lantern ring (10) referring to the appropriate packing installation manual and reinstalling new packing exactly as shown. Make sure at least 1⁄8" is left at the top of packing box for the top guide to enter

8. Replace and tighten the packing gland (12) and bolting (13, 14).

9. Turn actuator back onto the body assembly, without turning the plug inside the bonnet. Leave a 3⁄32" to 1⁄8" (2 mm to 3 mm) gap between the mating surfaces of the bonnet and yoke. Tighten
Yoke bolting to close this gap. Firmly tighten the yoke bolting.

10. Using the actuator, seat the plug two or three times to centre the seat ring (17) using pressure on the top of the actuator.

11. Tighten the body bolting, following the bolting sequence outlined in Figure 1. Use a minimum of four steps to reach the suggested bolt torque values shown in Table 1. Never exceed more than 30% of the suggested bolt torque value in a single step.

12. Slowly stroke the plug up and down to check the alignment of the plug with the cage.

13. Perform a Quick Check as described in section 4.1.

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7. Plug Stem Pinning

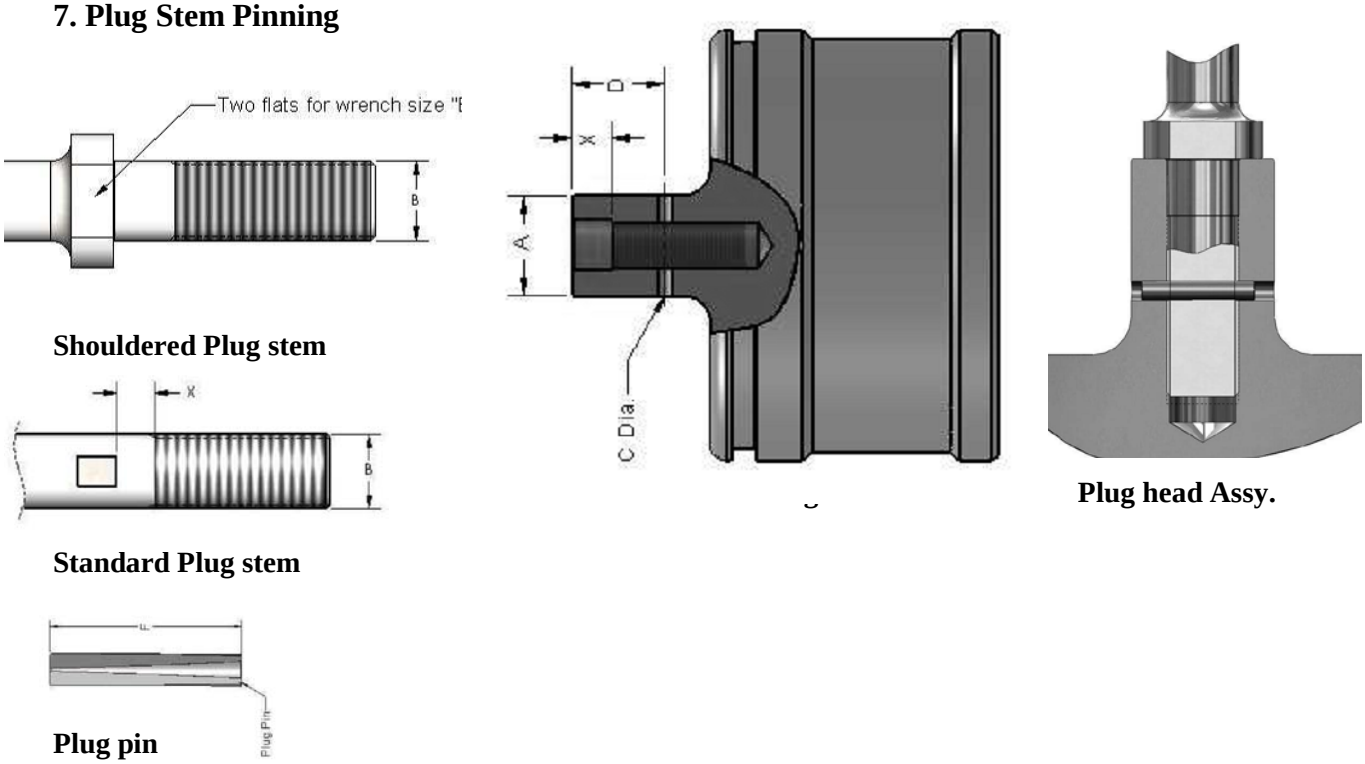

Figure 5- Plug stem pinning

Table 3

Valve size		Plug Shank Dia. "A"		Plug Stem Dia. "B"		Pin Hole Dia. "C"		Pin Length "F"		"D"		"X"		Torque on Plug Stem		Wrench Size "E"	
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	Ft.Lbs	daN.M	in	mm
2"	50	0.79	20	1/2	12.7	0.248	6.3	0.75	19.05	0.63	16	0.24	6	44	6	11/16	17
3"	80	0.98	25	5/8	15.87	0.248	6.3	1	25.4	0.87	22	0.31	8	118	16	7/8	22
																1 1/16	27
4"	100	1.06	27	5/8	15.87	0.248	6.3	1	25.4	0.87	22					1 1/16	27
6"	150	1.5	38	3/4	19.05	0.248	6.3	1.5	38.1	1.38	35	0.59	15			1 1/16	27
8" & 10"	200 & 250	1.97	50	1	25.4	0.248	6.3	2	50.8	1.38	35	0.79	20	184	25	1 1/4	30
																1 7/16	36
12" & 16"	300 & 400	2.76	70	1 1/4	1.25	0.394	10	2.56	65	1.97	50					1 7/16	36

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Plug stem pinning during field assembly may be divided into two parts:
— Replacing old plug and old stem,
— Replacing only old stem.

Replacing Plug and Stem

The plug (15) and stem (20) assembly consists of a shaft threaded into the plug and pinned in place. To replace the stem (20) it is necessary to drill or drive out the pin (19) and unscrew the stem (20) from the plug (15).
If it is necessary to replace the plug, it is necessary to replace the plug stem at the same time. Indeed, the original pin hole in an old stem prevents satisfactory results and might seriously impair strength of the assembly.

A. Reference Marking on the Plug Stem
Measure the depth of the pilot recess in the plug (X in Figure 5) and make a reference mark to the plug stem at the same distance, from the thread.

B. Screwing Stem into Plug
1. Hold the plug in a vise.

2. Apply a small amount of grease such as Gripcott® (or an equivalent compatible with the fluid process) on the threaded part of the plug stem.

3. Lock one nut against another one to the end of the new plug stem and, using a wrench on the upper nut, screw the stem solidly into the plug. When properly assembled, the reference mark should be flush with the end of the plug shank.

C. Drilling the New Parts
1. Measure the “D” dimension,
(See Table 3).

2. Place the plug shank on a V-block and, by means of a centre punch, make a centre mark on the plug shank area.

3. Using a suitable size drill bit, drill the plug-stem assembly. After drilling, remove any burrs from the plug shank by making a slight chamfer.

D. Pinning the Plug-Stem Assembly
1. Select the correct size pin according to plug shank diameter and stem diameter, (see Table 3). Apply a small amount of grease on it, and hand place the pin to the hole inlet.

2. By means of an hammer, introduce the pin into the hole. Use a flat-ended punch to ensure the pin is recessed by the same amount at both sides, (see Figure 5).

3. After the plug has been pinned, it should be placed in a lathe to insure it is running “true.” The stem should be placed in a collet with the plug shank against it and the plug should be struck on the non guiding surface of the plug using a mallet / nylon hammer without causing mechanical damage to the surface. Alignment of plug stem can be performed using appropriate means.

Note: While pinning is being performed, care must be taken not to damage the seating surface or plug guide. In holding plug in order to tightening the plug stem, always tighten the jaws of the vise on a non-guiding surface of the parts. Always use a soft metal vise jaw with a special machining to hold the shank of the plug (see Figure 5.1).

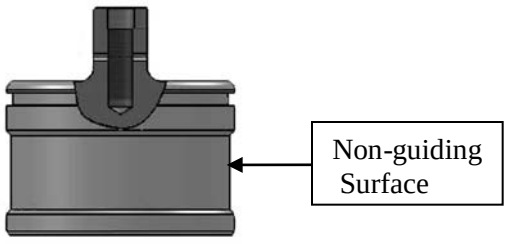

Figure 5.1 – Plug

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Replacing Only Old Stem

A. Removing Old Pin and Stem from the Plug

1. Place the plug shank on a V-block, and using a drift punch, drive out the old pin.
Note: If it is necessary to drill out the pin, a drill bit somewhat smaller than the pin should be used and the remainder of the pin driven out.

2. Hold the plug shank in a vise, (see bordered note in the paragraph A on previous page).

3. Lock one nut against another one to the end of the plug stem and, using a wrench on the lower nut, unscrew the stem from the plug. The stem is removed by turning it anti-clockwise.
Note: In case of great sizes and/or high temperature service and some other cases, the plug stem has a shoulder which allows to unscrew plug stem without using of the two nuts, (see Table 3 for the required Wrench sizes).

B. Screwing Stem to Plug

Refer to paragraph B of the above section "REPLACING PLUG AND STEM".

C. Drilling the New Stem

Place the plug shank on a V-block and, using a suitable size drill bit, drill the stem using the hole in the plug as a guide.

Note: If the hole in the plug shank has been slightly damaged while removing of the old pin, choose a drill bit and a pin with a diameter somewhat larger than the normal Pin.

D. Pinning

Select the correct size pin according to plug shank diameter and pin hole diameter, (see Figure 5). Proceed as described in the above paragraph D2, taking care not to damage the plug shank area.

Ensure plug stem alignment as indicated in the above paragraph D3.

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Assembly Dimensional Details

Figure 6

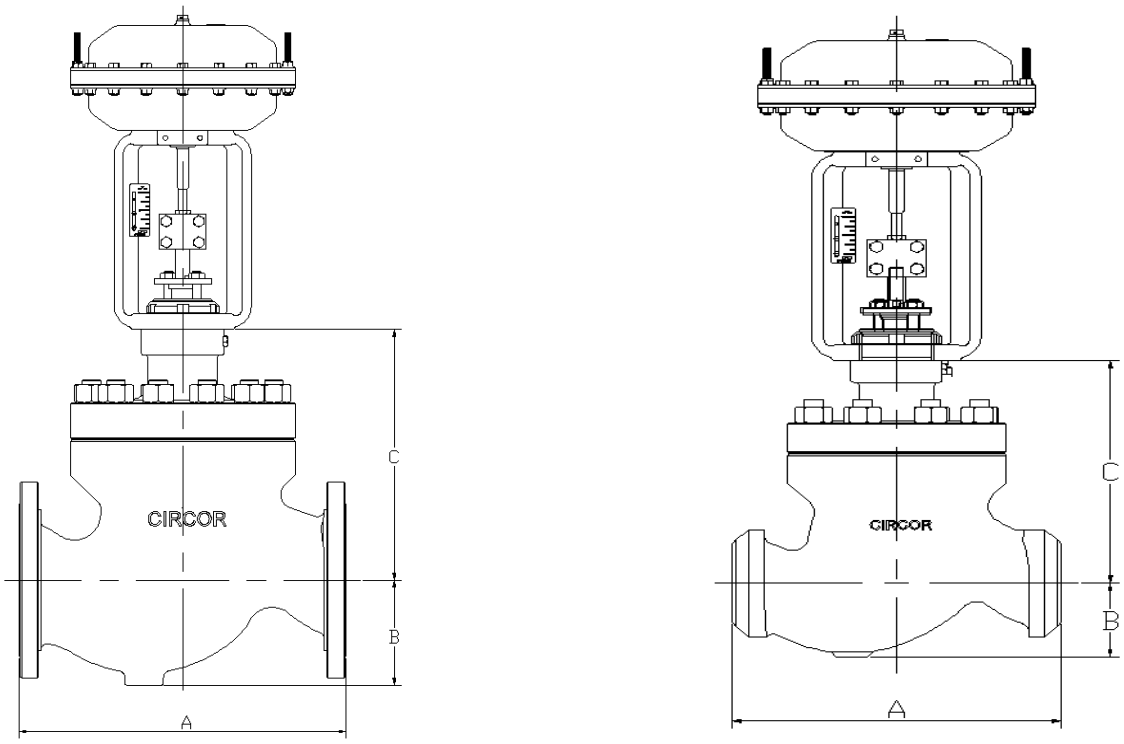

Table 4

Size	Raised Face (A)						B					C				
	NPT	150	300	600	900	1500	150	300	600	900	1500	150	300	600	900	1500
2 (50)	11.26 (286.0)	10.0 (254)	10.51 (267)	11.26 (286)	14.76 (375)	14.76 (375)	2.76 (70)	2.76 (70)	2.76 (70)	2.87 (73)	2.87 (73)	8.84 (224.5)	8.84 (224.5)	8.84 (224.5)	8.84 (224.5)	8.84 (224.5)
2½ (65)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 (80)	-	11.732 (298)	12.52 (318)	13.27 (337)	17.36 (441)	18.11 (460)	3.54 (90)	3.54 (90)	3.54 (90)	30.54 (90)	3.77 (96)	11.14 (283)	11.14 (283)	11.14 (283)	11.14 (283)	11.14 (283)
4 (100)	-	13.86 (352)	14.49 (368)	15.51 (394)	20.11 (511)	20.86 (530)	3.94 (100)	3.94 (100)	3.94 (100)	4.64 (118)	5.31 (135)	11.89 (302)	11.89 (302)	11.89 (302)	11.89 (302)	11.89 (302)
6 (150)	-	17.76 (451)	18.62 (473)	20.0 (508)	28.11 (714)	30.23 (768)	5.91 (150)	5.91 (150)	5.91 (150)	6.77 (172)	7.28 (185)	14.10 (358)	14.10 (358)	14.10 (358)	14.10 (358)	14.10 (358)
8 (200)	-	21.34 (543)	22.36 (568)	24.02 (610)	35.98 (914)	38.26 (972)	7.60 (193)	7.60 (193)	7.60 (193)	8.66 (220)	9.50 (241)	16.78 (426)	16.78 (426)	16.78 (426)	16.78 (426)	16.78 (426)
10 (254)	-	26.5 (673)	27.9 (708)	29.6 (752)	-	-	9.7 (245)	9.7 (245)	9.3 (235)	-	-	22.7 (576)	22.7 (576)	23.0 (586)	-	-
12 (305)	-	29.0 (737)	30.5 (775)	32.2 (819)	-	-	10.6 (270)	10.6 (270)	10.6 (270)	-	-	23.9 (606)	23.9 (606)	24.0 (611)	-	-
16 (406)	-	40.0 (1016)	41.6 (1057)	43.6 (1108)	-	-	13.2 (334)	13.6 (344.5)	13.8 (350)	-	-	23.5 (599)	23.5 (599)	23.5 (599)	-	-

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Table 5

Size	Ring type joint (A)						B					C				
	NPT	150	300	600	900	1500	150	300	600	900	1500	150	300	600	900	1500
2 (50)		10.50 (267)	11.14 (283)	11.37 (289)	14.88 (378)	14.88 (378)	2.76 (70)	2.76 (70)	2.76 (70)	2.87 (73)	2.87 (73)	8.84 (224.5)	8.84 (224.5)	8.84 (224.5)	8.84 (224.5)	8.84 (224.5)
2½ (65)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 (80)	-	12.244 (311)	11.14 (334)	13.40 (340)	17.50 (444)	18.22 (463)	3.54 (90)	3.54 (90)	3.54 (90)	30.54 (90)	3.77 (96)	11.14 (283)	11.14 (283)	11.14 (283)	11.14 (283)	11.14 (283)
4 (100)	-	14.37 (365)	15.10 (384)	15.62 (397)	20.23 (514)	21.00 (533)	3.94 (100)	3.94 (100)	3.94 (100)	4.64 (118)	5.31 (135)	11.89 (302)	11.89 (302)	11.89 (302)	11.89 (302)	11.89 (302)
6 (150)	-	18.26 (464)	19.25 (489)	20.11 (511)	28.22 (717)	30.50 (774)	5.91 (150)	5.91 (150)	5.91 (150)	6.77 (172)	7.28 (185)	14.10 (358)	14.10 (358)	14.10 (358)	14.10 (358)	14.10 (358)
8 (200)	-	21.90 (556)	23.00 (584)	24.13 (613)	36.10 (917)	38.70 (982)	7.60 (193)	7.60 (193)	7.60 (193)	8.66 (220)	9.50 (241)	16.78 (426)	16.78 (426)	16.78 (426)	16.78 (426)	16.78 (426)
10 (254)	-	27.0 (686)	28.5 (724)	29.7 (755)	-	-	9.7 (245)	9.7 (245)	9.3 (235)	-	-	22.7 (576)	22.7 (576)	23.0 (586)	-	-
12 (305)	-	29.5 (750)	31.1 (791)	32.4 (822)	-	-	10.6 (270)	10.6 (270)	10.6 (270)	-	-	23.9 (606)	23.9 (606)	24.0 (611)	-	-
16 (406)	-	40.5 (1029)	42.2 (1073)	43.7 (1111)	-	-	13.2 (334)	13.6 (344.5)	13.8 (350)	-	-	23.5 (599)	23.5 (599)	23.5 (599)	-	-

Table 6

Size	Butt Weld end (A)						B					C				
	NPT	150	300	600	900	1500	150	300	600	900	1500	150	300	600	900	1500
2 (50)		11.25 (286)	11.25 (286)	11.25 (286)	14.80 (375)	14.80 (375)	2.76 (70)	2.76 (70)	2.76 (70)	2.87 (73)	2.87 (73)	8.84 (224.5)	8.84 (224.5)	8.84 (224.5)	8.84 (224.5)	8.84 (224.5)
2½ (65)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 (80)	-	13.26 (337)	13.26 (337)	13.26 (337)	18.11 (460)	18.11 (460)	3.54 (90)	3.54 (90)	3.54 (90)	30.54 (90)	3.77 (96)	11.14 (283)	11.14 (283)	11.14 (283)	11.14 (283)	11.14 (283)
4 (100)	-	15.50 (394)	15.50 (394)	15.50 (394)	20.90 (530)	20.90 (530)	3.94 (100)	3.94 (100)	3.94 (100)	4.64 (118)	5.31 (135)	11.89 (302)	11.89 (302)	11.89 (302)	11.89 (302)	11.89 (302)
6 (150)	-	20.00 (508)	20.00 (508)	20.00 (508)	30.23 (768)	30.23 (768)	5.91 (150)	5.91 (150)	5.91 (150)	6.77 (172)	7.28 (185)	14.10 (358)	14.10 (358)	14.10 (358)	14.10 (358)	14.10 (358)
8 (200)	-	24.00 (610)	24.00 (610)	24.00 (610)	32.75 (832)	32.75 (832)	7.60 (193)	7.60 (193)	7.60 (193)	8.66 (220)	9.50 (241)	16.78 (426)	16.78 (426)	16.78 (426)	16.78 (426)	16.78 (426)
10 (254)	-	29.6 (752)	29.6 (752)	29.6 (752)	-	-	9.7 (245)	9.7 (245)	9.3 (235)	-	-	22.7 (576)	22.7 (576)	23.0 (586)	-	-
12 (305)	-	32.2 (819)	32.2 (819)	32.2 (819)	-	-	10.6 (270)	10.6 (270)	10.6 (270)	-	-	23.9 (606)	23.9 (606)	24.0 (611)	-	-
16 (406)	-	43.6 (1108)	43.6 (1108)	43.6 (1108)	-	-	13.6 (344.5)	13.6 (344.5)	13.8 (350)	-	-	23.5 (599)	23.5 (599)	23.5 (599)	-	-

- **Dimensions are in Inches (mm).**

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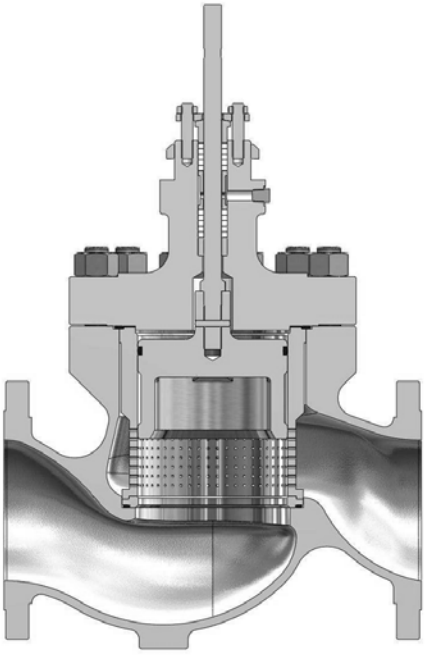
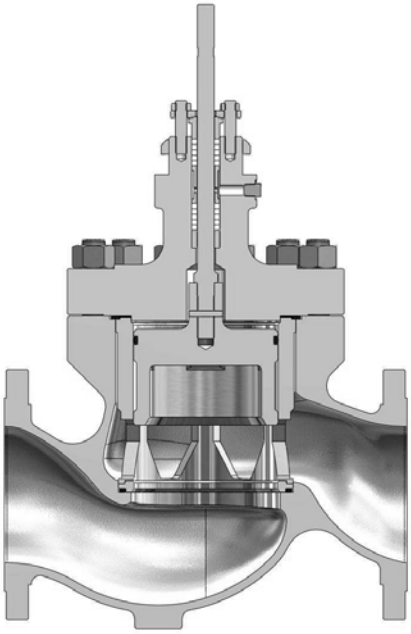
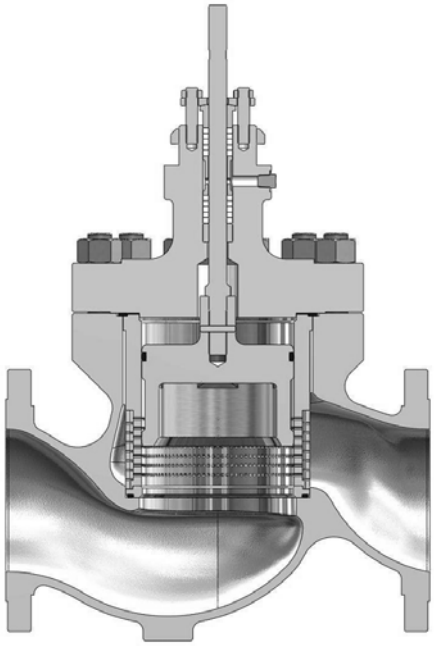
Trim Types



Single stage Balanced Trim
Figure 7.1



Standard Trim
Figure 7.3



Two stage Balanced Trim
Figure 7.2

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