

**INSTALLATION
OPERATION
MAINTENANCE**
FOR
BUTTERFLY VALVE



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- INSTALLATION
- OPERATION
- MAINTENANCE

PREFACE

This Manual applies to the Excel Butterfly valves made of Cast carbon steel / Stainless Steel/ Cast Iron. To ensure safe and trouble free function and performance, please read all the contents of this manual before handling, transportation, mounting, operation and maintenance of valves. Keep this manual in convenient place for your valve operator's easy access

Caution indicates a "potentially hazardous situation which if not avoided could result in minor or major injuries and loss of life, properties etc."

This manual covers the normal usage of the product. Technical data and instructions for operation, maintenance and inspection of the product are prepared in consideration of safety. However they are good only to cover typical applications and provided as a general guideline to users. If technical assistance is required, Please contact manufacturer's Executive.

The illustrations given in this manual do not introduce all details. If more detailed data is needed, refer to the relevant valve assembly drawings.

Note: Any information this operation provided in this operation manual is subject to revision at any time without notice. This edition cancels all previous issues.

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1. INTRODUCTION

When properly installed in applications for which they were designed, EXCEL VALVES will give long reliable service. This instruction is only a guide for installation and operation on standard service and cover general maintenance and minor repairs.

Note: We recommend that this entire document be read prior to proceeding with any installation or repair. Take no responsibility for damage or injury to people, Property or equipment. It is the sole responsibility of the user to ensure only specially trained valve repair experts perform repairs under the supervision of a qualified supervisor.

2. RESPONSIBILITY FOR VALVE APPLICATION:

The User is responsible for ordering the correct valves. The user is responsible for ensuring valves are selected and installed in conformance with the current pressure rating and design temperature requirements. Prior to installation, the valves and nameplates should be checked for proper identification to ensure the valve is of the proper type, material and is of a suitable pressure class and temperature rating to satisfy the requirements of the service application.

CAUTION: Do not use valves in applications where either the pressure or temperature is higher than the allowable working values. Also valves should not be used in service media if not compatible with the valve material of construction, as this will cause chemical attacks, leakage and valve failure.

3. RECEIVING INSPECTION AND HANDLING:

Valves should be inspected upon receipt to ensure:

- * Conformance with all purchase order requirements.
- * Correct type, pressure class, size, body and trim materials and end connections.
- * Any damage caused during shipping and handling to end connections, hand wheel or stem.

CAUTION: The user is advised that specifying an incorrect valve for application may result in injuries or property damage. Selecting the correct valve type, rating, material and connections, in conformance with the required performance requirements is important for proper application and is the sole responsibility of the user.

3.1 SAFETY INFORMATION:

The following general safety information should be taken in account in addition to the specific warnings and cautions specified in this manual. They are recommended precautions that must be understood and applied during operation and maintenance of the equipment covered in this I.O.M.

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- CAUTION:**
- Never attempt to disassemble a valve while there is pressure in the line. Ensure both upstream and downstream pressures are removed. Disassemble with caution in case all pressures are not relieved. Even when replacing stem packing, caution is necessary to avoid possible injury.
 - To prevent valve bending, damage, inefficient operation, or early maintenance problems, support piping on each side of the valve. When handling gases/fluids that could cause damage to human health, the environment or property, the necessary safety precautions to prevent risk must be taken.
 - A valve is a pressurised mechanism containing energised fluids under pressure and consequently should be handled with appropriate care.
 - Valve surface temperature may be dangerously too hot or too cold for skin contact. Upon disassembly, attention should be paid to the possibility of releasing dangerous and or ignitable accumulated fluids. Ensure adequate ventilation is available for service.

4. STORAGE:

4.1 Temporary Storage:

If Valves are to be stored before installation, the following should be observed

- Keep valves wrapped and protected as shipped from the manufacture
- Do not remove the protective end covering until the valve is ready for installation. This will reduce possibility of foreign material damaging the internal valve components.
- C) Valves stored outdoors should be positioned such that water does not accumulate in the valve body.

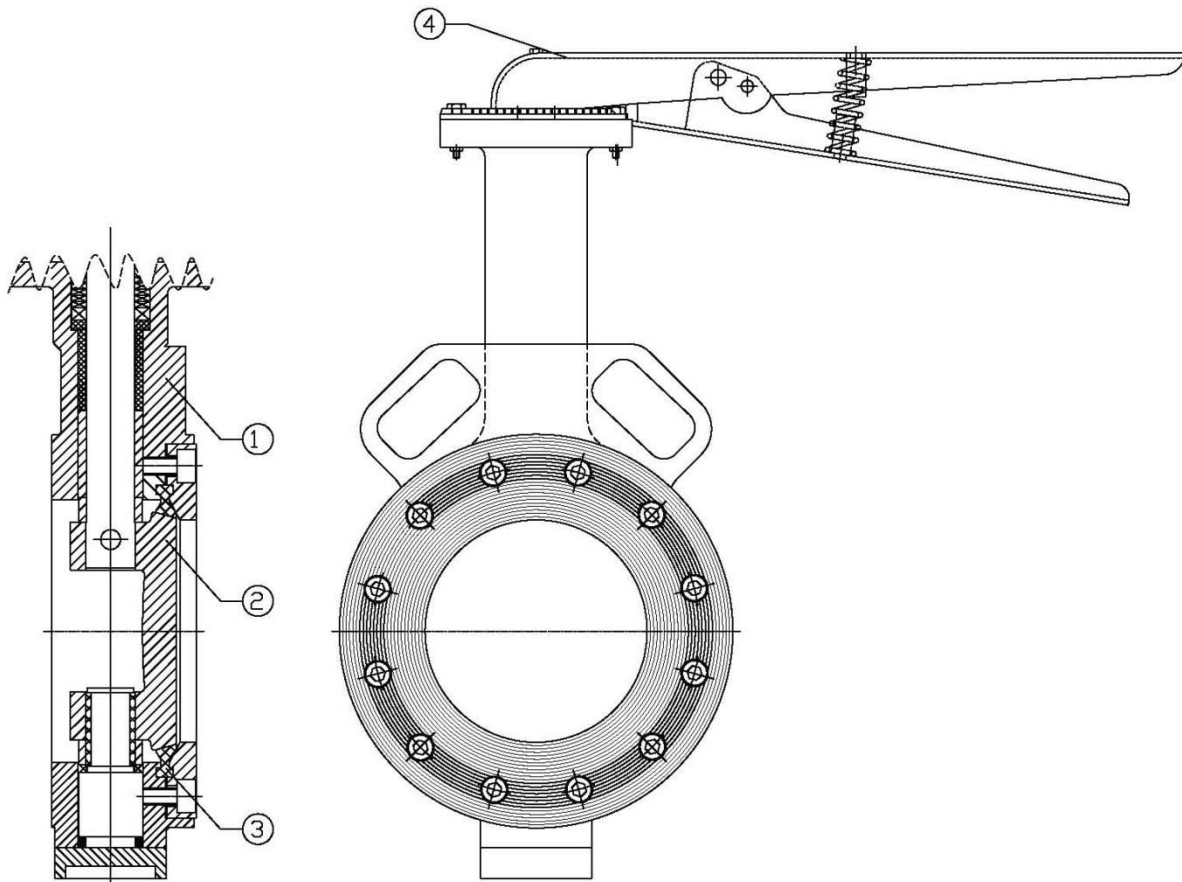
4.2 Long Term Storage:

If Valves to be stored more than a year, they should be prepared in the following manner

- Remove the packing and apply a preservative to the packing chamber.
- Do not remove the protective end covering.
- Do not store valves outside.

5. CONSTRUCTION:

The following is a typical assembled of an EXCEL Butterfly Valve Wafer Type. The number of parts will slightly vary in each size and class but the principal components are same as per Fig.:1.1



4	HAND LEVER	M.S.
3	SEAT	EPDM/PTFE/METAL
2	DISC	SG IRON/CF8/CF8M
1	BODY	CI/WCB/CF8/CF8M
NO.	DESCRIPTION	MATERIAL

Fig.: 1.1 General Sectional Drawing- Assembled

(The above is indicative only; design depends on size, class and trims etc., Refer to as-built drawing)

6. INSTALLATION:

Butterfly valves are bi-directional and can be installed in either direction.

Preparation for installation:

- Remove protective end caps or plugs and inspect valve ends for damage to threads, weld ends or flange faces

- Thoroughly clean adjacent piping systems to remove any foreign material that could cause damage to seating surfaces during valve operation.
- Verify that the space available for installation is adequate to allow the valve to be installed and to the operated.

6.1 PROCEDURE:

Position the connecting pipe flanges in the line to insure proper alignment prior to valve installation. Spread the pipe flanges apart enough to allow the valve body to be located between the flanges without actually contacting the flange surfaces (See Figure 1.) Exercise particular care in handling the valve so as to prevent possible damage to the disc or seat faces.

For Wafer style valves:

- a. Place the valve between the flanges.
- b. Loosely install the two upper and lower flange bolts that pass through the body alignment holes.
- c. Install the remaining flange bolts, shifting the valve as necessary to permit the bolts to pass by the valve body. Hand tighten all bolts as necessary

For Lug style valves:

- a. Place the valve between the flanges.
- b. Install all bolts between the valve and the mating flanges. Hand tighten bolts as necessary.

Fig. 6.1 INTIAL INSTALLATION OF VALVE

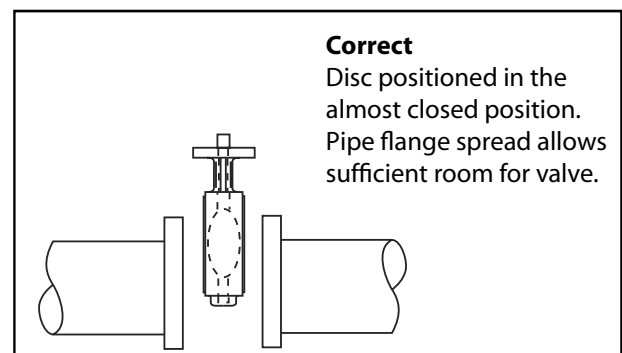
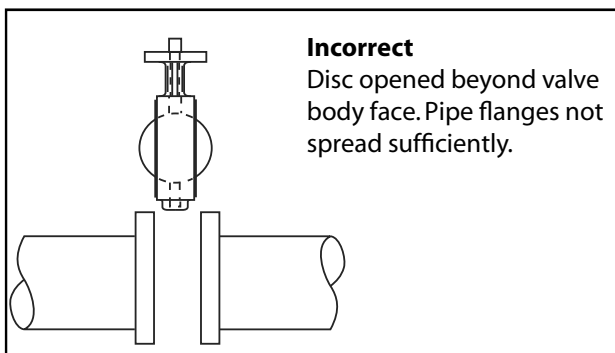


Fig. 6.2 CENTERING AND FLANGING OF VALVE

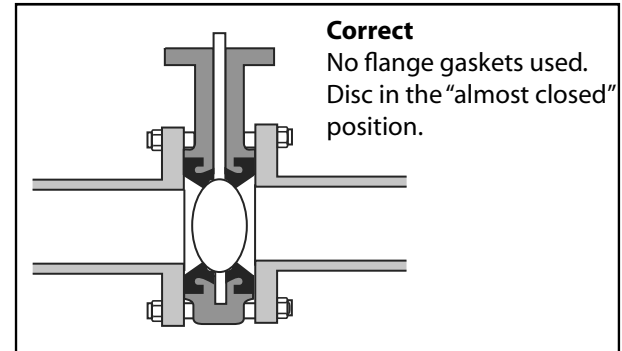
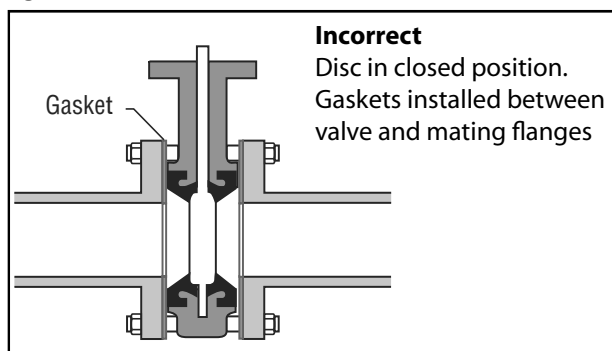
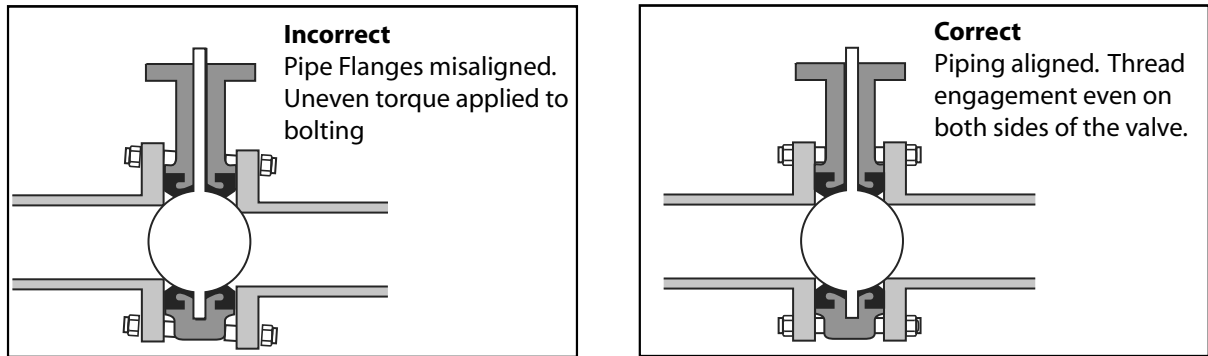


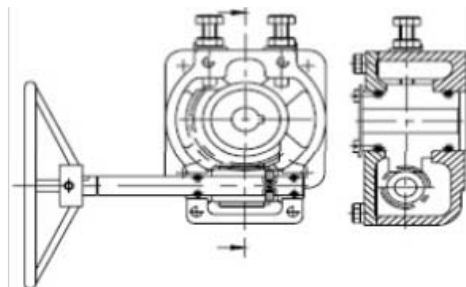
Fig. 6.3 FINAL INSTALLATION & TIGHTENING OF FLANGE BOLTS



For gear operated valves, THE GEAR OPERATOR OPEN / CLOSE ADJUSTMENT HAS BEEN DONE PRIOR TO SHIPMENT AND MUST NOT BE CHANGED. Rotation of hand wheel in the clockwise direction closes the valve and counter clockwise rotation opens it. (Looking from hand wheel end) The Details of gear operator are shown in the fig. 6 . 4

For lever operated valves, the hand lever is either assembled with the valve or shipped loose depending upon the size of valve/ hand lever.

Fig.: 6.4 Details of Gear Operator



EXCEL Butterfly valve always close in a clockwise direction. Valve should always be rotated through 90° to the fully opened or fully closed position. Valve should be opened and closed slowly to avoid hammering effect on the valve and pipeline.

Once the flushing is complete, valve should be operated 3-4 times and then kept in the fully open Position. If the valve is not operating to fully open or fully closed position, and/or leaking, do not apply excessive force to operate the valve. This can damage the seats or stem.

CAUTION:

- Apply gradual force on the hand wheel of the gear operator and do not give impacts.
- Do not apply extra leverage (using pipe/bar), when the end stops of the gear operator are reached.

7. MAINTENANCE:

7.1 PREVENTIVE MAINTENANCE:

In order to avoid valve failure during operation, all valves in a process plant should be periodically inspected thoroughly to detect the wear of disc, seats, seals and even body. It is recommended that on such occasion seats, seals and bushings should be replaced. The type of process, fluids involved, working conditions and location of the valves in the process plants, will determine the frequency of periodic inspection / maintenance which in fact will be made at the time of partial or total shutdown of the plant. Preventive maintenance is absolutely essential as the failure due to lack of the same may cause an emergency shutdown of the plant. Section 8 describes the procedure for disassembly, repair and assembly of the valve. The procedure will be the same for a valve failing during operation due to lack of preventive maintenance. Once a valve is repaired, it should undergo a complete set of tests to make sure that the valve is adequate for the original working conditions. Hydro/Pneumatic tests should be carried out as per the specifications relevant to the valve (Refer General Arrangement Drawing).

7.2 LUBRICATION OF WORM GEAR OPERATOR.

Worm gear operators are packed with grease. Normally the grease is suitable for -20°C (-4°F) to 80°C (176°F). For other applications, consult the nearest branch office / factory. Grease should be changed as following. If operated frequently, after approx 3 years. If operated rarely, after approx. 5 years. Recommended greases are Servogem EP2 (Extreme Pressure), Mobilux EP2, Valvoline EP2, Chevron EP2.

8. DISASSEMBLY AND ASSEMBLY INSTRUCTIONS:

8.1 DISASSEMBLY INSTRUCTIONS:

Before disassembling, please ensure that all spare parts as detailed in Table 1 of Section 9, are available. For below mentioned procedure, the numbers in the bracket refer to the part numbers of the components as indicated in exploded view (Fig no 10.1)

- In case the valve is in operation, release the pressure from the line.
- Rotate the valve stem (09) manually to keep the Valve in the half-open position. This will remove pressure in the pipeline.
- Always fully close the valve before removing from line to avoid damage to disc.
- Valve can be repaired by removing the entire valve from pipeline. Use mounting holes to lift the valve (Wherever Applicable).

8.1.1 Unscrew the lever lock bolt (15). Lift the lever (16) by pressing the latch of the lever out of the stem (9) in case of hand lever operated valve.

8.1.2 Lift the gear operator (17) out of the stem (9) by removing the bolts in case of gear operated valve.

8.1.3 Remove the notch plate bolts (12, 13, and 14) and remove the notch plate (11).

8.1.4 Remove the circlip (8) (fig 8.1) and pull the stem out with delrin bush (7).

8.1.5 Pull the disc (3) from the body (1) as shown in fig 8.2

8.1.6 Remove the stem bushing (4) and O ring seal (5) from the body (1).

8.1.7 Compress the seat as shown and pull it out from the body (Refer to the fig 8.3).

Note: After the complete disassembly of the valve, all the components should be stored in a clean place to avoid damage.

8.2 REPAIR OF COMPONENTS

8.2.1 The metallic parts should be cleaned.

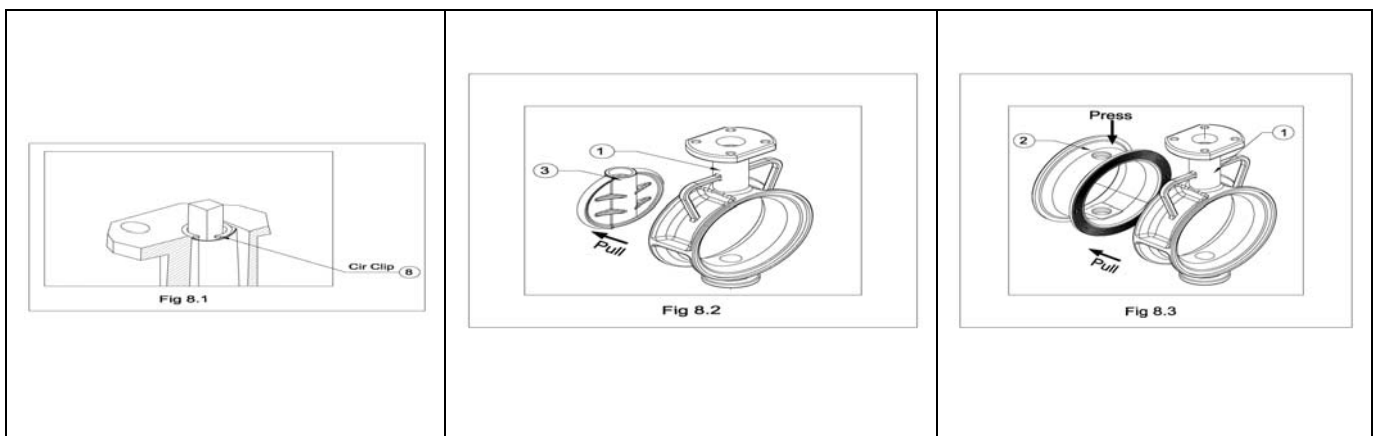
8.2.2 To clean the seats and seals use a dry clean cloth.

8.2.3 After cleaning components examine for damaged parts. Ensure that there are no scoring marks on the metallic sealing surfaces. Check the seals for scratches / wear.

8.2.4 Replace the damaged parts. The parts such as seal, bushings are recommended to be replaced with new ones whenever the valve is disassembled: refer to Table 1 of Section – 9 for further details.

Note: When the gear operator or hand lever or actuator is re-assembled on the valve, it may be necessary to adjust gear operator or hand lever or actuator travel stops to ensure proper setting of the butterfly in the open and closed position

Fig.: Disassembly of the Stem, Disc and Seat



8.3 ASSEMBLY INSTRUCTIONS.

(Refer to exploded view No. 10.1)

8.3.1 VALVES OPERATING WITH LEVER.

8.3.1.1 Place the body (1) on a clean work surface.

8.3.1.2 Start assembly by pressing the seat as shown & pushing it into the valve body with seat stem holes aligned to the body stem holes as shown in the fig (8.4) and work the seat into the groove provided on the body.

8.3.1.3 Position the disc (2) as shown in fig (8.2) taking care that double D is at the bottom of the valve body. Special care must be taken not to damage the seat surface.

8.3.1.4 Insert O ring seal (5), bushing (6) refer fig no 8.6.

8.3.1.5 For 2"-12 insert the stem (4) in to the body ensuring that double D of stem aligns with double D of the disc. Insert the retaining ring (7) in to the stem and then install the retaining circlip (8) refer fig no 8.6.

8.3.1.6 Fit the notch plate (11) on the mounting flange with the notches in the first quadrant of the valve top plate with the stop tabs at the 12 'O' clock and 3'O' clock position (fig 8.7).

8.3.1.7 Fit the lever (16) so that the lever fully engages in the notches when the lever latch is released and tighten the handle lock bolt (15).

8.3.1.9 Press the handle lever latch and position the disc so that the valve is in the fully closed position. Align the last notch on the notch plate at the 3-o clock position with the handle lever and tighten the notch plate screws (12,13,14).

8.3.1.10 Press the handle lever latch and position the disc so that the valve is in the fully open position and release the lever. The lever should line up with the last notch on the notch plate at the 12-o clock position.

8.3.2 VALVES OPERATING WITH GEAR OPERATOR.

(Refer Table 1 of Section -9 & Exploded View No. 10.1)

8.3.2.1 Follow the points from 8.3.1.1 to 8.3.1.6.

8.3.2.2 Rotate the valve disc to the fully open position.

8.3.2.3 Rotate the gear operator to the fully open position. 8.3.2.4 Line the valve stem with gear operator bore and slide the gear operator (17) onto the valve with the hand wheel (18) to the right of the valve name plate.

8.3.2.5 Position the gear operator so that the tapped holes in the bottom of the gear operator line up with the valve top mounting holes and install the mounting bolts.

8.3.2.6 Loosen the gear operator travel stops and rotate the hand wheel until the valve is in the fully closed position. Tighten the travel stop on the right hand side of the gear operator.

8.3.2.7 Rotate the hand wheel until the valve is in fully open position. Tighten the travel stop on the lefthand side of the gear operator.

8.3.2.8 Make 2-3 cycles of the valve from fully open position to the fully closed position to make sure that the stops are set correctly.

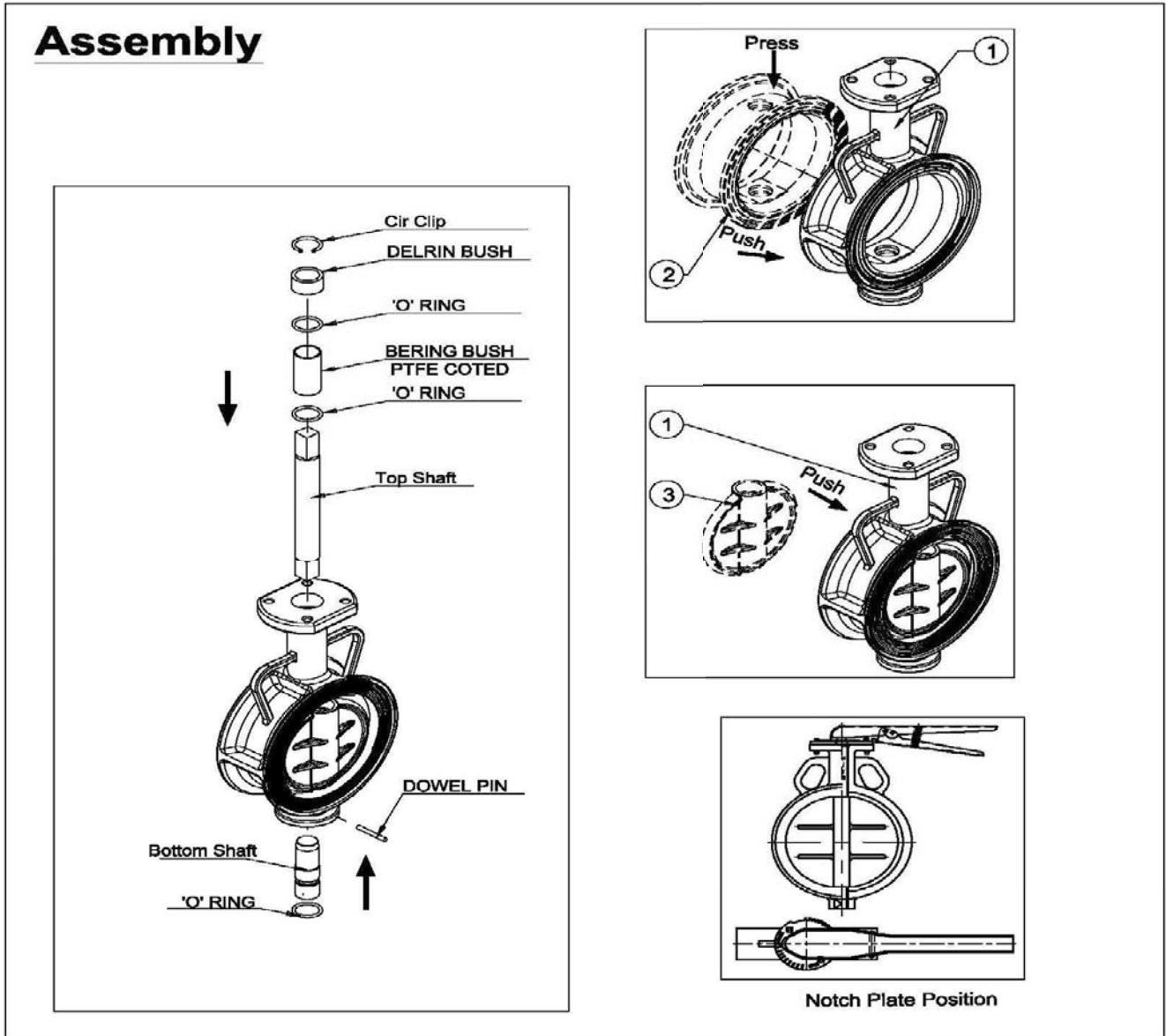
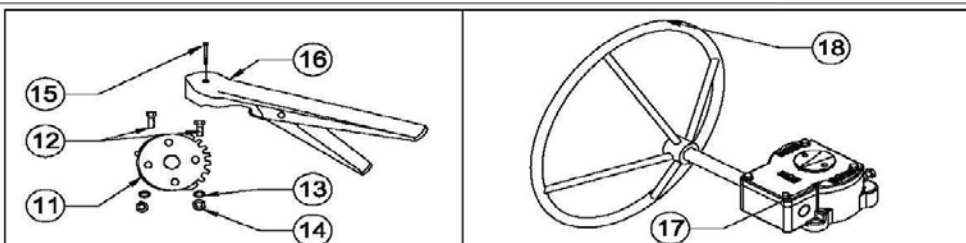


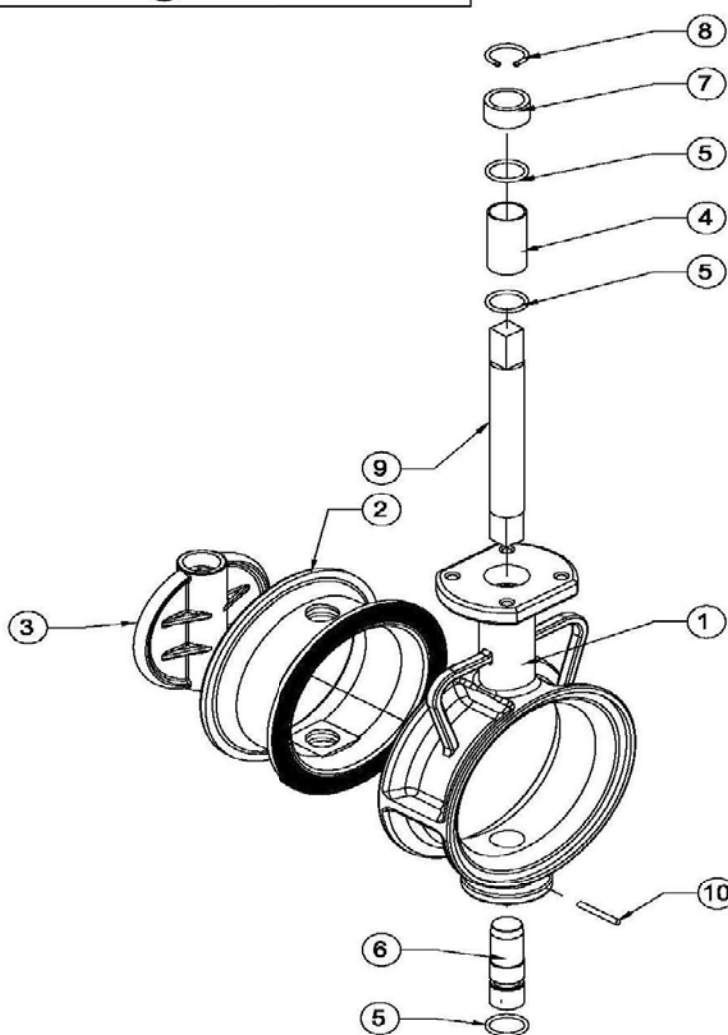
Fig.:8.4 Assembly of the Stem, Disc and Seat

Fig.:10.1 Exploded View



Part List

Item No.	Part Description	Qty
1	BODY	1
2	SFAT	1
3	DISC	1
4	METAL BUSH	1
5	O-Ring	3
6	Bottom Shaft	1
7	Delrin Bush	1
8	Cir Clip	1
9	Top Shaft	1
10	Dowel Pin	1
11	Notch Plate	1
12	L.N. Key Bolt	2
13	Plain Washer	2
14	Hex.Nut	2
15	Hand Lever Locking Screw	1
16	Hand Lever	1
17	Gear Operator	1
18	Hand Wheel	1



ASSEMBLY FOR CENTRIC DISC BUTTERFLY VALVE

9. RECOMMENDED SPARES KIT:

Before the start of the repair operations, we recommend that one set of spares as given in the table below should be available. For normal operation (2 years), we recommend one set of spares be available at site.

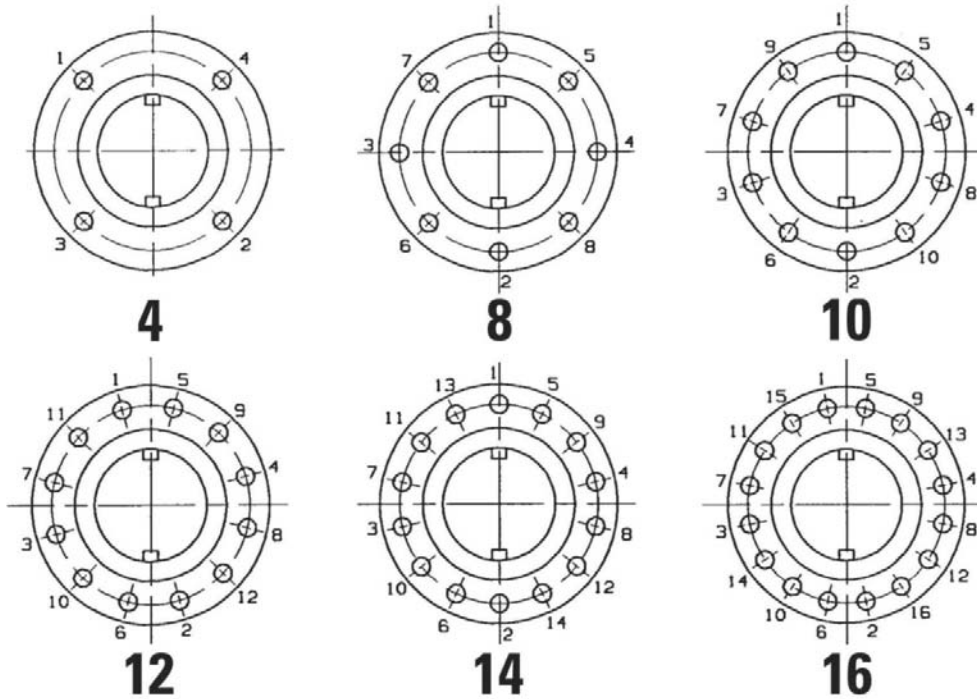
9.1 List of Recommended Spare Parts		
Table no.1		
PART NAME	QTY. NOS.	
SEAT	01	
BUSHING	02	
O RING SEAL	01	
CIRCLIP	01	

11. TROUBLESHOOTING:

Symptoms	Cause	Corrective Action
Stem Leaks	Stem seal in seat is leaking	Replace stem sealing as described in disassembly & assembly.
Valve leaks at closed position	Seat is worn or damaged	Replace seat as described in disassembly & assembly.
	Disc edge is worn or damaged.	Consult factory for potential application problem.

ANNEXURE - I

Bolt Tightening Sequence



- INSTALLATION
- OPERATION
- MAINTENANCE

NOTES