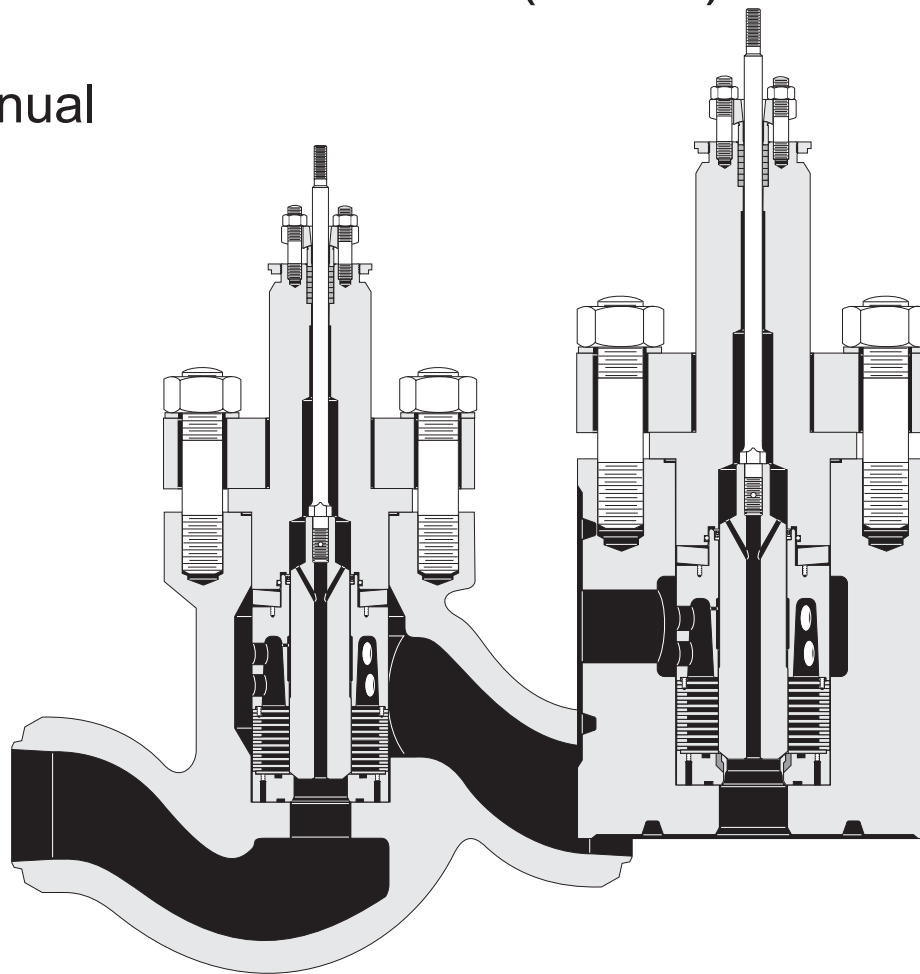


Masoneilan™ 79003 Series

Anti-Cavitation Control Valve
with Variable Resistance Trim (VRT™)

Instruction Manual



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Table Of Contents

Safety Information	1
Foreword	2
Helpful Hints	3
General	3
Unpacking	3
Installation	3
Air Piping	3
Body Disassembly.....	4
Valve Sizes : 1" & 1-1/2"	4
Valve Sizes : 2" to 6"	4
Maintenance and Repair	6
Packing Box	6
Plug Stem Pinning.....	6
Plug and Seat Ring	6
Stack Plate Assembly.....	6
Valve Body Assembly	7
Valve Sizes : 1" & 1-1/2".....	7
Valve Sizes : 2" to 6"	7
Actuator	8
Actuator removal	8
Spring(s) Adjustment.....	8
Actuator assembly and adjustment.....	9

Safety Information

Important - Please read before installation

These instructions contain **DANGER**, **WARNING**, and **CAUTION** labels, where necessary, to alert you to safety related or other important information. Read the instructions carefully before installing and maintaining your control valve. **DANGER** and **WARNING** hazards are related to personal injury. **CAUTION** hazards involve equipment or property damage. Operation of damaged **equipment can, under certain operational conditions, result in degraded process system performance that can lead to injury or death. Total compliance with all DANGER, WARNING, and CAUTION notices is required for safe operation.**



This is the safety alert symbol. It alerts you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



When used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Note: Indicates important facts and conditions.

About this Manual

- The information in this manual is subject to change without prior notice.
- The information contained in this manual, in whole or part, shall not be transcribed or copied without Baker Hughes's written permission.
- Please report any errors or questions about the information in this manual to your local supplier.
- These instructions are written specifically for the 79003 Series control valve, and do not apply for other valves outside of this product line.

Useful Life

The current estimated useful life period for the 79003 Series control valve is 25+ years. To maximize the useful life of the product, it is essential to conduct annual inspections, routine maintenance and ensure proper installation to avoid any unintended stresses on the product. The specific operating conditions will also impact the useful life of the product. Consult the factory for guidance on specific applications if required prior to installation.

Warranty

Items sold by Baker Hughes are warranted to be free from defects in materials and workmanship for a period of one year from the date of shipment provided said items are used according to Baker Hughes recommended usages. Baker Hughes reserves the right to discontinue manufacture of any product or change product materials, design or specifications without notice. This instruction manual applies to the 79003 Series Energy Management Control Valves.

The warranty for this product requires

- The 79003 Series Control Valves must be installed, put into service and maintained by qualified and competent professionals who have undergone suitable training.
- All surrounding pipe lines must be thoroughly flushed to ensure all entrained debris has been removed from the system.

Foreword

The following instructions are designed to assist maintenance personnel in performing most of the maintenance required on the 79003 Series Anti-Cavitation Valve with Variable Resistance Trim (VRT), and if followed carefully will reduce maintenance time.

Baker Hughes has a highly skilled After Sales Department available for start-up, maintenance and repair of our valves and components parts. Contact the nearest Baker Hughes Sales Office or Representative or, your After Sales Department.

Baker Hughes regularly holds training seminars for technicians. If you want to attend, please get in touch with your local Baker Hughes Representative or local Training Department.

Helpful Hints

1. Have spare parts on hand before starting. When performing maintenance, only use Masoneilan replacement parts. Parts can be ordered through your local Baker Hughes Representative or Spare Parts Department.

When ordering parts, always include Model, Serial and Tag Numbers of the unit being repaired. The Model, Serial Number, size and rating of the valve are shown on the serial plate. The Tag Number is shown on the tag plate. Serial plate and tag plate are located on the actuator.

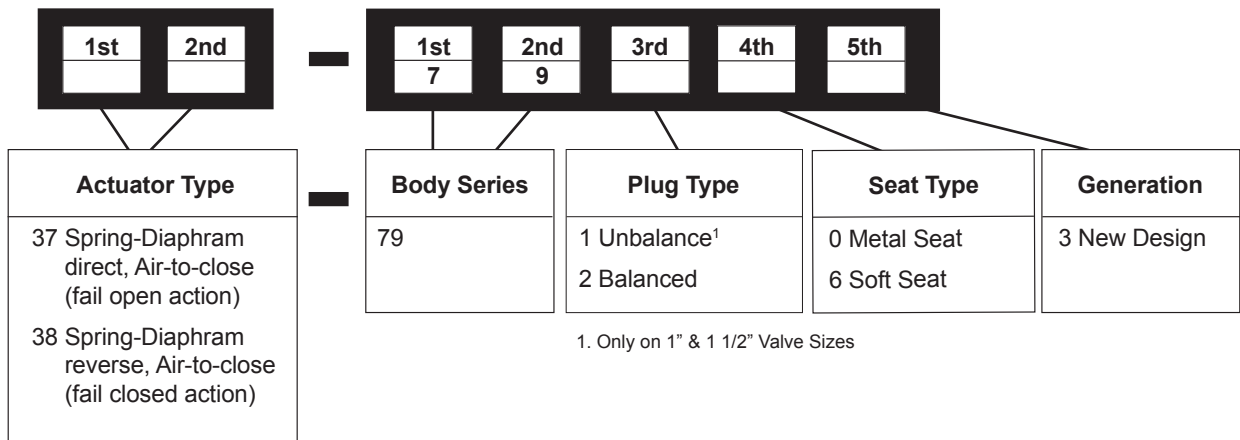
Recommended spare parts required for maintenance are listed in Parts reference of this instructions.

2. Read the instructions carefully.
3. Study the figures carefully and identify each parts.
4. Use the right tool for the job.
5. Be careful not to score the stem, plug and guiding surfaces.
6. Avoid rotating the plug on the seat ring.
7. Insure all lubricants, gaskets and packing are compatible with the service.
8. Don't overtighten nuts or bolts.
9. Clean the valve parts thoroughly before reassembling.
10. Work safely.

CAUTION

Valves are selected and supplied for specific service conditions and should not be transferred to other services without consulting up-to-date manufacturer literature and/or consulting with the manufacturer.

Numbering System



WARNING

Line must be cleaned prior to installation.

General

These installation and maintenance instructions, apply to all sizes of the Masoneilan 79003 Series Valve—which utilizes a Balanced Plug (except small sizes) and a Variable Resistance Trim (VRT) for cavitation prevention.

The Masoneilan 79003 VRT Standard Control Valves are currently designed with forged angle block body and connected to the line by flange face contoured ends. However, the 6" (150 mm) valve size can be also delivered with a cast design angle flanged body.

On request, some other sizes can be delivered with a cast design globe body and connected to the line by flanged or welded ends. Refer to Figure 12 for example.

CAUTION

Valve bodies are rated at ASME Class 2500, but the real rating is restricted by the class of the end connections.

For maintenance and adjustment of actuator, handwheel, positioner, air filter regulator, position transmitter, lock-up valve, etc. consult special instructions for these materials.

Unpacking

Care must be exercised when unpacking the valve to prevent damage. Should any problems arise, contact Masoneilan After Sales Department. Be sure to include Serial and Model numbers in all correspondence.

Installation

CAUTION

The 79003 Series valve must always be installed with flow tending to OPEN the plug. Where insulation of the valve body is required, do not insulate the valve bonnet.

Before installing the valve in the line, clean piping of all foreign materials such as welding chips, scale, oil, grease or dirt. Gasket surfaces must be thoroughly cleaned to insure leak-free joints.

To allow for in-line inspection, maintenance and removal of the valve without service interruption, provide a manually operated stop valve on each side of the control valve and a manually operated throttling valve in the by-pass line.

Air Piping

Masoneilan actuators are normally designed to accept 1/4" NPT air supply piping.

Use 1/4" O.D. (4 x 6 mm) tubing or equivalent for all air lines. If the line exceeds 25' (7,5 m) in length or if the valve is equipped with volume boosters, 3/8" (6 x 8 mm) tubing is preferred. All connections must be free of leaks.

CAUTION

Do not exceed loading pressure for actuator used. Refer to serial plate located on the actuator yoke.

Body Disassembly

(Figures 3 to 6)

CAUTION

Prior to performing maintenance on the valve, isolate the valve and vent the process pressure. In case of valve equipped with a PTFE soft-seat ring, precisely measure and note the full stroke made by the plug.

Access to the internal components of the body should be accomplished with actuator removed. To remove the actuator from the body, refer to Section Actuator Removal.

CAUTION

New seat ring and stack gaskets (15&22), tec-seal and back-up ring (16 & 18), back-up ring and O-ring (24 & 23), body gasket (14) and packing (6) should be on hand before disassembling the valve, since it is recommended that new seals, back-up ring, gasket and packings be installed during re-assembly. (The 1" and 1 1/2" valve sizes do not include parts ref. 16, 18, 23 & 24).

Valve Sizes : 1" & 1-1/2" (Figure 3)

- Remove packing flange nuts (2), packing flange (3) and packing follower (5).
- Insure exposed portion of stem (1) is clean and free of dirt to enable it to slide through the packing when removing the bonnet (11).
- Remove body stud nuts (9) and washers (7).
- Screw a solid pad eye on the threaded end of bonnet (11) and, by means of a hoist, lift vertically the bonnet.

Note: The pad eye can be made up of a yoke nut on which a strap in steel wire will have been welded and long enough to disengage the plug stem, (see Figure 1).

CAUTION

The stem and plug can be raised out of the body together with the bonnet. In this case, the bonnet should be raised slowly and pulled straight out of the body in order to do not bring about jamming between plug and cage.

- E. If desired, remove packing (6) from the bonnet.
- F. Remove body gasket (14). Remove plug and stem assembly (12-1) from the cage (17), (if this one have not already been removed in the same time of the bonnet).
- G. Remove cage (17) from the body.
- H. Remove the stack (19), seat ring (21) and gaskets (15 & 22) from the body.

Note: For ease of disassembly-reassembly, two tapped lifting holes No 8-32 UNC have been provided in the stack of the 1-1/2" valve size. Use two threaded rod long enough. In the same way, two smooth holes Dia. 2 mm have been laterally drilled in the upper edge of the seat ring (21) to allow introducing of two hooks made with steel wire.

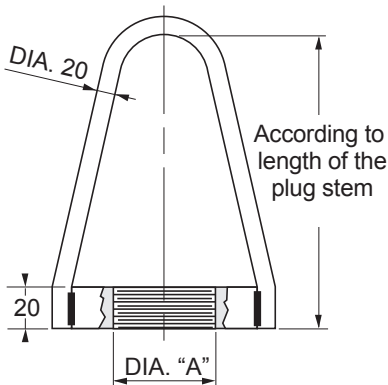
- I. Inspect all components for excessive damage and wear.

Note: Inspect all guiding, seating, centering and sealing surfaces (see Figure 7).

Metal guiding and sealing surfaces must be free of scratches, dents, nicks, etc. Since new gaskets are to be used during reassembly, old seals should be discarded. Replace all excessively worn or damaged parts. After determining the maintenance required, refer to the appropriate section of this instruction manual.

Valve Sizes: 2" to 6" (Figures 4, 5 & 6)

- A. Remove packing flange nuts (2), packing flange (3) and packing follower (5).
- B. Insure exposed portion of stem (1) is clean and free of dirt to enable it to slide through the packing when removing the bonnet (11).
- C. Remove body stud nuts (9) and washers (7).
- D. Screw a solid pad eye on the threaded end of bonnet (11) and, by means of a hoist, lift vertically the bonnet [and its flange (10) in case of a 2", 3", 4" or 6" forged block body valve sizes, as well as bonnet spacer (26) in case of a 2" valve size].



Valve Size. in.	DIA. "A"
1, 1 1/2, 2	3 5/16"-16 UN 2A
3, 4, 6	3 3/4"-12 UN 2A

Figure 1 - Pad Eye for the Bonnet Lifting

Note: The pad eye can be made up of a yoke nut on which a strap in steel wire will have been welded and long enough to disengage the plug stem, (see Figure 1).

CAUTION

Precaution should be taken to remove only the bonnet. The stem and plug should remain in the body. The bonnet should be removed slowly and pulled straight out of the body.

- E. Remove the flange (10) [in case of a 2", 3", 4" or 6" forged block body valve sizes] as well as bonnet spacer (26) [in case of a 2" valve size], from the bon-net (11). Remove O-Ring and back-up ring (23 & 24) from the bonnet.
- F. If desired remove packing (6) from the bonnet.
- G. Remove body gasket (14) and flat spring (25) from the body.
- H. Remove cage (17) from the body. Remove Tec-seal (16) and back-up ring (18) from the cage. Remove plug and stem assembly from the stack(19).

Note: For ease of disassembly-reassembly, two tapped lifting holes 1/4"-20 UNC have been provided in the cage of the 3", 4" or 6" valve sizes.

- I. Remove the stack (19), seat ring (21) and gaskets (15 & 22) from the body.

Note: For ease of disassembly-reassembly, two tapped lifting holes 1/4"-20 UNC have been provided in the stack and the seat-ring of a 3", 4" or 6" valve sizes and two tapped lifting holes No 8-32 UNC have been provided on the same parts in case of a 2" valve size.

- J. Inspect all components for excessive damage and wear.

Note: Inspect all guiding, seating, centering and sealing surfaces (see Figure 7). Metal guiding and sealing surfaces must be free of scratches, dents, nicks, etc.. Since new gaskets and back-up rings are to be used during reassembly, old seals and back-up rings should be discarded. Replace all excessively worn or damaged parts. After determining the maintenance required, refer to the appropriate section of this instruction manual.

Maintenance and Repair

The purpose of this section is to assist maintenance personnel by suggesting methods of component maintenance, which is largely dependent on the tools and machine shop equipment available. Each section should be completely read and understood before proceeding.

Packing Box (Figures 3 to 6)

Packing box maintenance is one of the principle tasks during routine servicing.

Tightness of the packing is maintained by packing compression. Compression is achieved by evenly tightening packing flange nuts (2). Care must be taken not to over-tighten as this could prevent smooth operation of the valve. If all compression is used up and the valve leaks around the stem, new packing is required.

Proceed as follows:

CAUTION

Valve must be isolated, and the pressure vented, before performing packing box maintenance.

- A. Loosen and remove packing flange nuts (2).
- B. Raise packing flange (3) and packing follower (5) up the valve stem.

Note: They may be taped in place to keep them out of the way before proceeding.

- C. Using a packing hook, remove the packing (6).

Note: Only the top pieces of the old packing are removable by pulling them out of the top of the bonnet. Should it be necessary to replace all the packing, the bonnet must be removed from the valve body.

- D. Replace packing (6).

Note: Skive cuts in the packing must be placed 180 degrees apart.

- E. Replace packing follower (5) and packing flange (3).
- F. Replace and evenly tighten packing stud nuts (2).

Note: Do not overtighten.

- G. Place valve back in service and tighten the packing only as much as is necessary to stop any leakage.

Note: In an emergency, string packing may be used as a temporary repair only. It must be replaced with the correct packing as soon as possible.

Plug Stem Pinning (Figure 2)

Plug stem pinning during field assembly may be divided into two parts:

1. Replacing old plug and old stem,
2. Replacing only old stem.

The plug (12) and stem (1) assembly consists of a shouldered shaft threaded into the plug and pinned in place. To replace the stem, it is necessary to drill or drive out the pin (13) and unscrew the stem (1) from the plug.

Note: If it is necessary to replace the plug (12), it is recommended to replace plug stem (1) at the same time.

Indeed, the original pin hole in an old stem prevents satisfactory results and might seriously impair strength of the assembly.

Note: If it is necessary to replace only the stem, it is recommended that a new stem be used.

Replacing Plug and Stem

CAUTION

While pinning is being performed, care must be taken not to damage the seating surface or plug guide. Always use a soft metal or plastic vise jaws with a special machining to hold the guiding surface of the plug, (see Figure 2).

A. Screwing Stem into Plug

- Hold the guiding surface of the plug in a vise, (see Figure 2).
- Assemble new parts and screw the stem solidly into the plug.

Note: The plug stem has a shoulder for a better resistance of the plug and stem link and two handling flats to ensure tight securing of the two parts.

For proper assembly, ensure that the stem shoulder is firmly secured against the top of the plug .

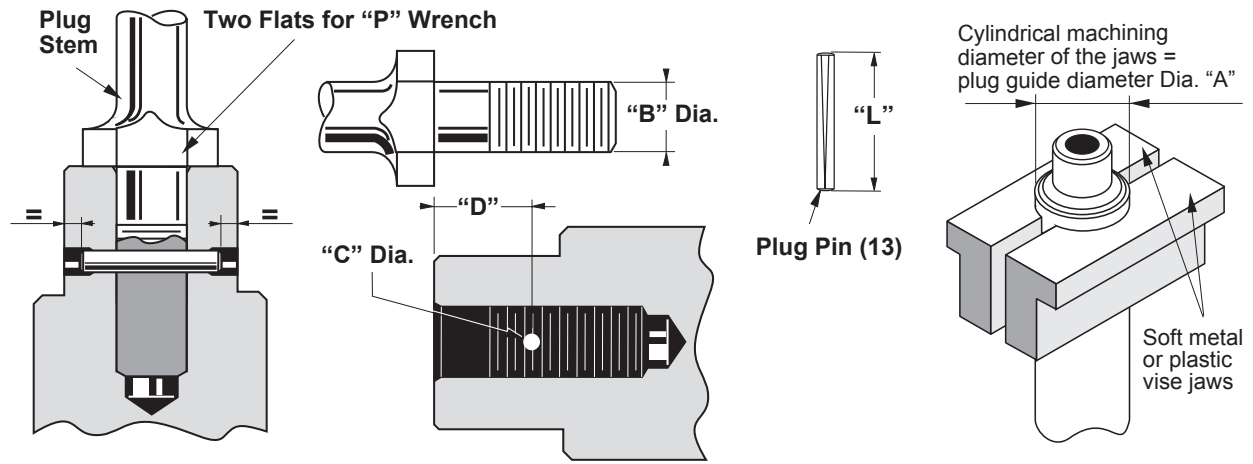
B. Drilling the New Parts

- **If the plug shank is already full drilled**, (in case of 440 C stainless steel, hardened material or solid stellite),
- **If the plug shank area has a center mark**, place the plug shank on a V-block and, using a size of drill bit suitable to either,
 - Match the hole size in the plug or,
 - Match the “C” diameter (see Figure 2), drill the stem or the plug-stem assembly.
- **If the plug shank area hasn't any hole or any center mark**,
 - Measure the “D” dimension, (see Figure 2).
 - Place the plug shank on a V-block and, by means of a center punch, make a center mark on the plug shank area.
 - Using a suitable size drill bit, drill the plug-stem assembly

In all cases: After drilling, remove any burrs from the plug shank by making a slight chamfer.

C. Pinning the Plug-stem Assembly

- Select the correct size pin (see Figure 2). Apply a small amount of grease on it, and hand place the pin to the hole inlet.
- By means of an hammer, introduce the pin into the hole. Complete the pinning operation, taking care to ensure that the pin is recessed by the same amount at both sides, (see Figure 2).
- 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. Alignment of plug stem can be performed by means of a soft faced mallet.



Valve Size.		Plug Guide Dia. "A"		Plug Guide Dia. "B"	Pin Hole Dia. "C"		Pin Length "L"		Distance "D"		Wrench "P"	
mm	in.	mm	in.		mm	in.	mm	in.	mm	in.	mm	in.
25	1	17,4	.69	1/2"-20 NF 3A	2,50	.099	16	5/8	28	1.10	14	9/16
40	1-1/2	25,4	1.00		5/8"-18 NF 3A	3,50	.138	24				
50	2	34,9	1.38	1"-14 NF 3A		4,00	.158	28	1 1/8	40	1.58	22
80	3	60,3	2.38		5,00	.197	45	1 3/4	45			
100	4	63,5	2.50	32						1 1/4		
150	6	92,1	3.62									

Figure 2 - Plug Stem Pinning

Replacing Only Old Stem

A. Removing Old Pin and Stem From the Plug

- Place the plug guide 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.

- Hold the plug guide in a vise.
- Using a wrench applied on the two handling flats of the stem, unscrew the stem from the plug. The stem is removed by turning it anti-clockwise.

B. Screwing Stem into Plug

Refer to paragraph A of the above chapter "REPLACING PLUG AND STEM".

C. Drilling the New Stem

Place the plug guide 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 guide 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 (see Figure 2). Apply a small amount of grease on it, and hand place the pin to the hole inlet.
- By means of an hammer, introduce the pin into the hole. Complete the pinning operation, taking care to ensure that the pin is recessed by the same amount at both sides, (see Figure 2).
- Ensure plug stem alignment as indicated in the previous chapter, (Replacing Plug and Stem).

Plug and Seat Ring

Inspection of the plug (12) and seat ring (21) seating surfaces must be accomplished to insure there are no scratches or dents.

Repair of damaged surfaces should be performed by dressing the parts in a lathe to the angles shown in Figure 8. However no more than .015" (0,4 mm) of material should be removed to attain the desired angles. If one part requires dressing, it is recommended that both parts be machined.

Note: Lapping of the plug and seat ring sealing surfaces is not recommended due to the close tolerance between the guide on the plug, and the presence of the stacked plate assembly and cage. Damage to the guiding surfaces could be incurred should any lapping compound work its way between them.

The better solution consists in replacing all excessively worn or damaged parts by new parts if degree of tightness of these seating surfaces requires it.

Seat ring replacement

If the seat ring seating surface is damaged, replace it according following to Section 9 "VALVE BODY ASSEMBLY". In this case, it is recommended to install too a new plug-stem subassembly.

Continue to page 12.

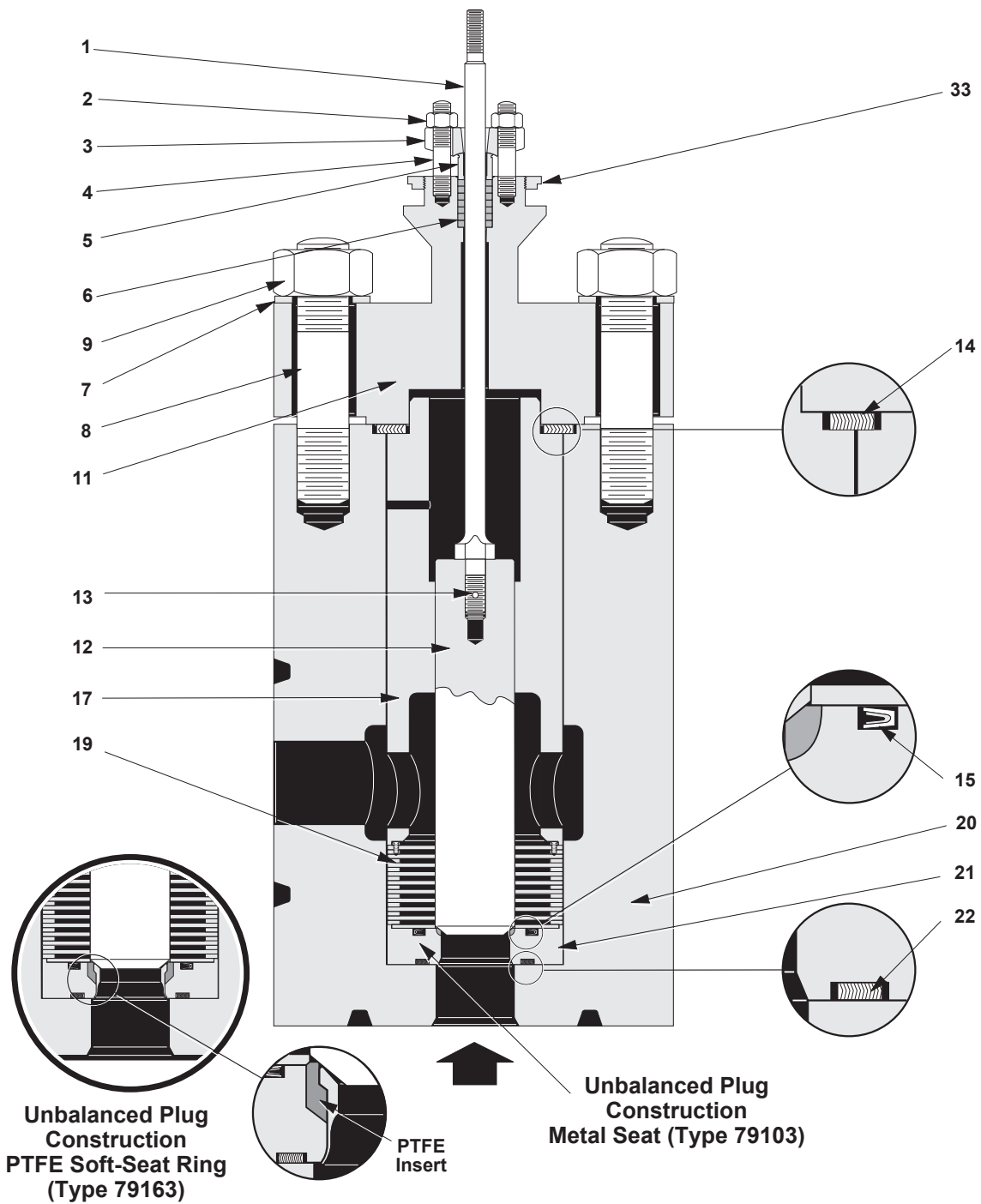


Figure 3 - Cross Section of the Type 79003 VRT Valve
1" & 1-1/2" Sizes, Forged Block Body Construction

Parts Reference

Ref. No	Parts Name	Ref. No	Parts Name	Ref. No	Parts Name
1	Plug Stem	8	Body Stud	17	Cage
2	Packing Flange Nut	9	Body Stud Nut	19	Plate Stack S/A
3	Packing Flange	11	Bonnet	20	Valve Body
4	Packing Flange Stud	12	Plug	21	Seat Ring
5	Packing Follower	13	Plug Pin	● 22	Seat Ring Gasket
● 6	Packing	● 14	Body Gasket	33	Drive Nut
7	Washer	● 15	Plate Stack Gasket		

● Recommended Spare Parts

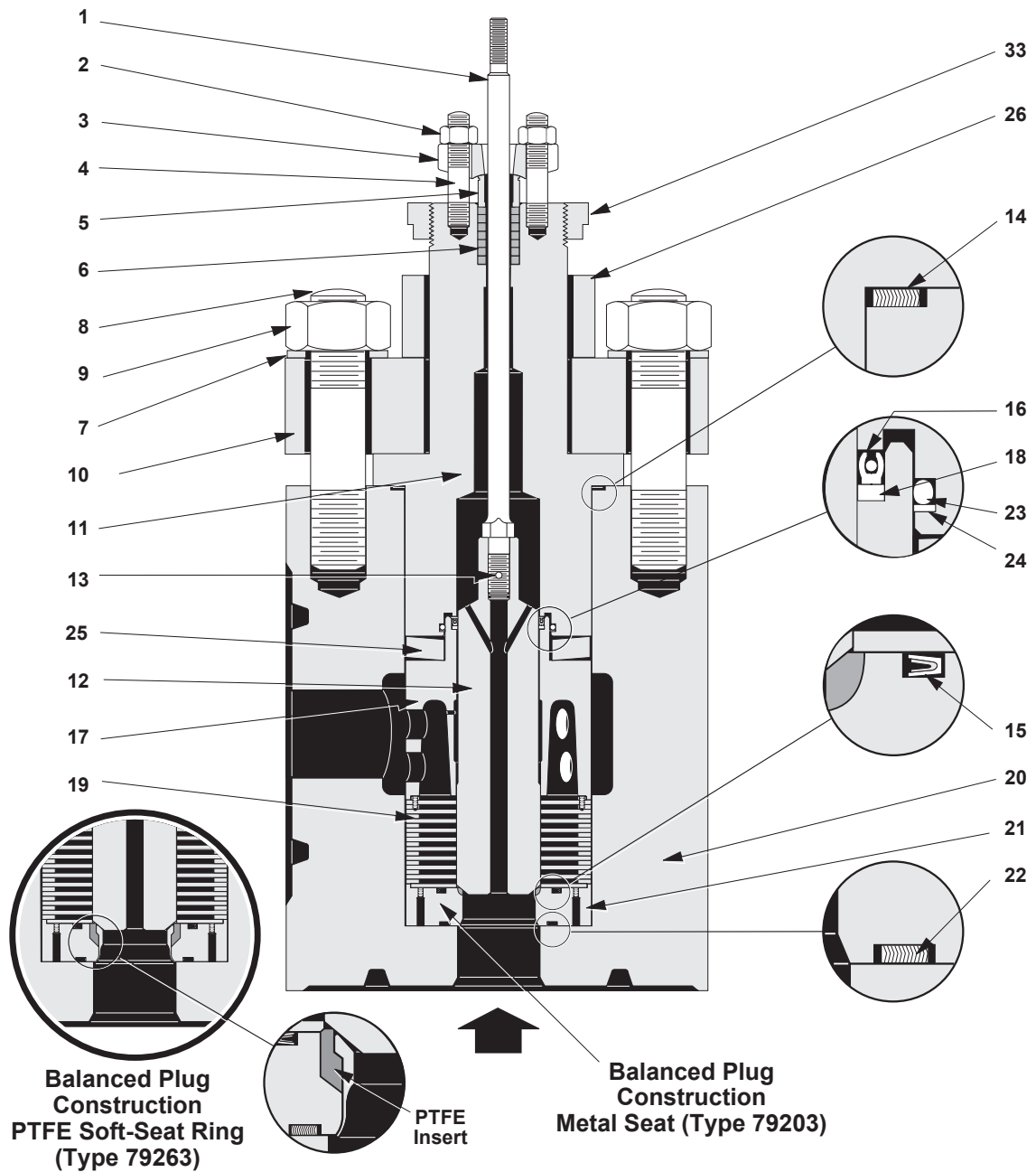


Figure 4 - Cross Section of the Type 79003 VRT Valve 2" Size Forged Block Body Construction

Parts Reference

Ref. No	Parts Name	Ref. No	Parts Name	Ref. No	Parts Name
1	Plug Stem	10	Bonnet Flange	19	Plate Stack S/
2	Packing Flange Nut	11	Bonnet	20	Valve Body
3	Packing Flange	12	Plug	21	Seat Ring
4	Packing Flange Stud	13	Plug Pin	● 22	Seat Ring Gasket
5	Packing Follower	● 14	Body Gasket	● 23	O-Ring
● 6	Packing	● 15	Plate Stack Gasket	● 24	Back-up Ring
7	Washer	● 16	Tec-Seal Ring	25	Flat Spring
8	Body Stud	17	Cage	26	Bonnet Spacer
9	Body Stud Nut	● 18	Back-up Ring	33	Drive Nut

● Recommended Spare Parts

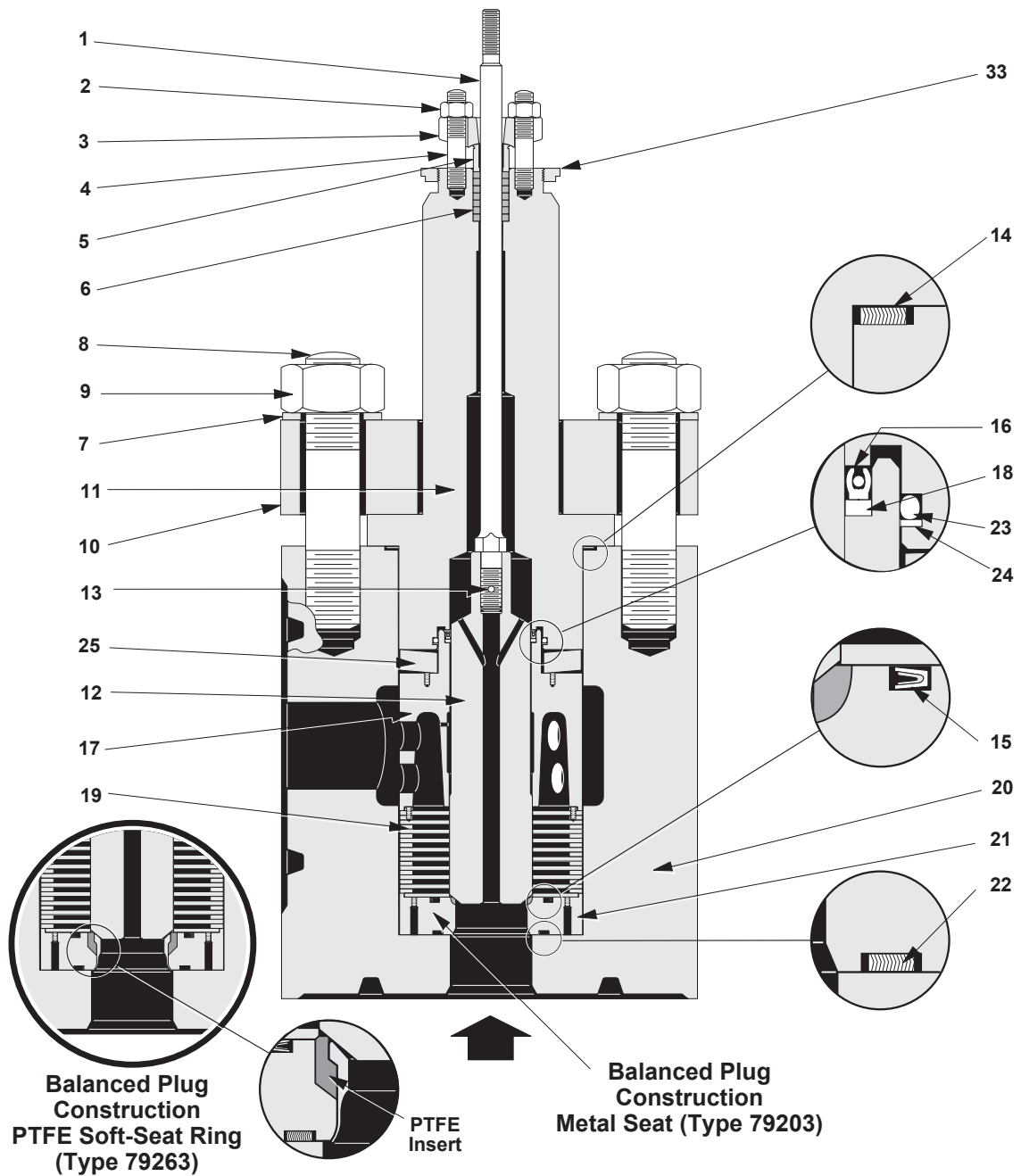


Figure 5 - Cross Section of the Type 79003 VRT Valve 3", 4" & 6" Sizes
Forged Block Body Construction

Parts Reference

Ref. No	Parts Name	Ref. No	Parts Name	Ref. No	Parts Name
1	Plug Stem	10	Bonnet Flange	19	Plate Stack S/
2	Packing Flange Nut	11	Bonnet	20	Valve Body
3	Packing Flange	12	Plug	21	Seat Ring
4	Packing Flange Stud	13	Plug Pin	● 22	Seat Ring Gasket
5	Packing Follower	● 14	Body Gasket	● 23	O-Ring
● 6	Packing	● 15	Plate Stack Gasket	● 24	Back-up Ring
7	Washer	● 16	Tec-Seal Ring	25	Flat Spring
8	Body Stud	17	Cage	33	Drive Nut
9	Body Stud Nut	● 18	Back-up Ring		

● Recommended Spare Parts

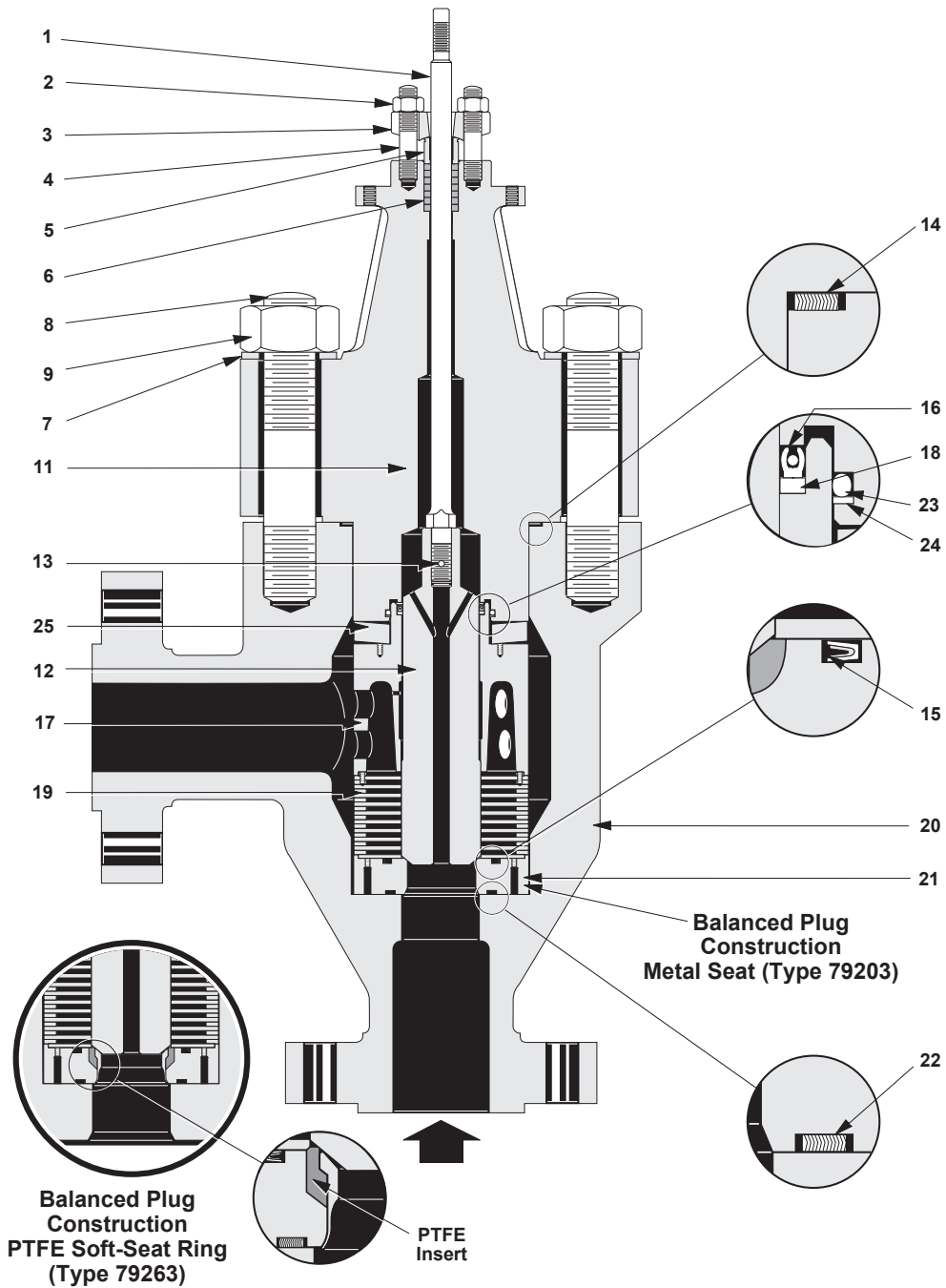


Figure 6 - Cross Section of the Type 79003 VRT Valve 6" Size
Cast Body Construction

Parts Reference

Ref. No	Parts Name	Ref. No	Parts Name	Ref. No	Parts Name
1	Plug Stem	11	Bonnet	20	Valve Body
2	Packing Flange Nut	12	Plug	21	Seat Ring
3	Packing Flange	13	Plug Pin	● 22	Seat Ring Gasket
4	Packing Flange Stud	● 14	Body Gasket	● 23	O-Ring
5	Packing Follower	● 15	Plate Stack Gasket	● 24	Back-up Ring
● 6	Packing	● 16	Tec-Seal Ring	25	Flat Spring
7	Washer	17	Cage	33	Drive Nut
8	Body Stud	● 18	Back-up Ring		
9	Body Stud Nut	19	Plate Stack S/A		

● Recommended Spare Parts

1 SEATING SURFACE

2 SEALING SURFACE

3 GUIDING SURFACE

4 CENTERING SURFACE

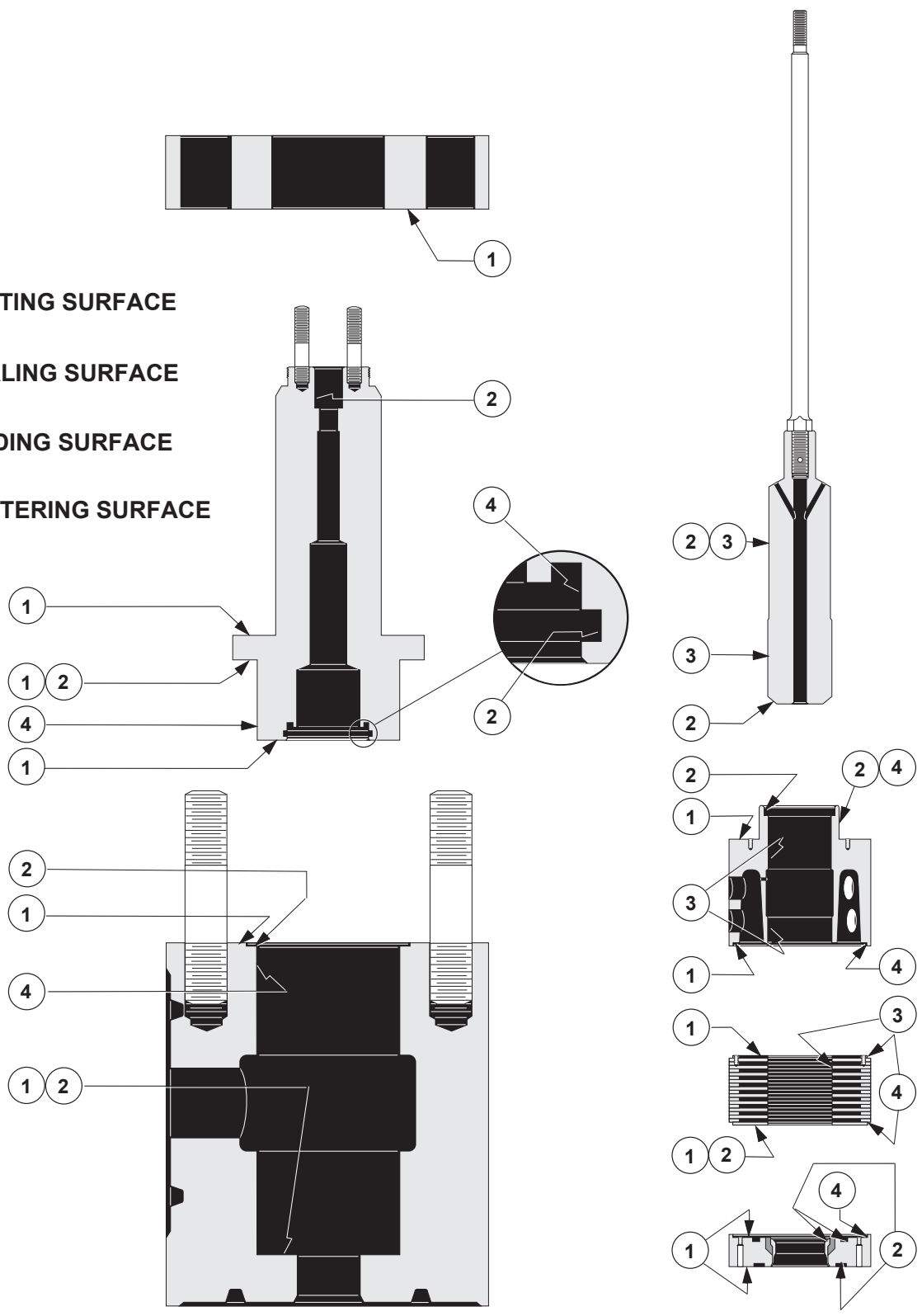


Figure 7

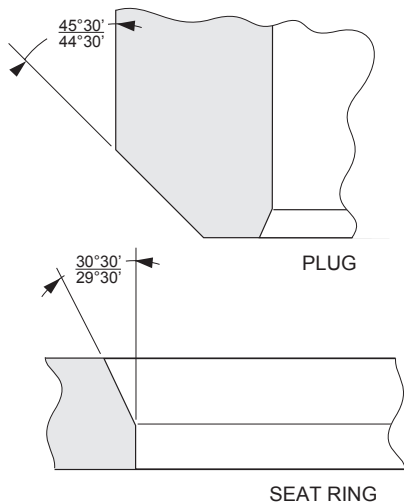


Figure 8 - Plug and Seat Ring Seating Angles

Continued from page 6

PTFE Soft-seat Ring

In order to get a higher tightness, the 79003 Series valves are equipped with a seat-ring with PTFE insert (“Soft-seat”) — see Figures 3 to 6. The assembly and disassembly operations of valve body does not present particular difficulties and must be achieved in the same order that hard seat valves.

Meanwhile it is recommended to take supplementary precautions for the mounting of this special seat-ring in order to have it done in exceedingly clean conditions (total absence of foreign material).

Stack Plate Assembly

Maintenance required on the stack plate assembly (19) is limited to inspection for any foreign objects being caught in the stack and insuring there are no burrs which could damage the plug guide. The stack is a one piece assembly and must not be disassembled.

Valve Body Assembly

(Figures 3 to 6)

Valve Sizes : 1” & 1-1/2” (Figure 3)

- Refer to Figure 7 and insure that all surfaces indicated are clean and free of dirt, scale or burrs.
- Apply several spots of a sealant or lubricant to one side of lower seat ring gasket (22) and stick the gasket in the lower groove of the seat ring (21).

CAUTION

Insure that lubricant or sealant compound is compatible with the process fluid.

- Place the stack gasket (15) in the upper groove of the seat ring.
- Install the seat-ring (21) with gaskets (15 & 22) into the body.
- Install the plate stack assembly (19) into the body, insuring that the side with fewest holes is installed toward the seat ring.

Note: For ease of disassembly-reassembly, two tapped lifting holes No 8-32 UNC have been provided in the stack of the 1-1/2” valve size. Use two threaded rod long enough.

In the same way, two smooth holes Dia. 2 mm have been laterally drilled in the upper edge of the seat ring (21) to allow introducing of two hooks made with steel wire.

- Carefully lower the plug and stem assembly into the body and plate stack.
- Carefully install the cage (17) over the plug and stem subassembly.

Note: One of the two holes of the cage must be in front of the outlet connection of the body. Ensure that seat ring, stack and cage are correctly installed ; i.e., that they are self aligned.

- Install the body gasket (14) astride cage (17) and body (20).
- Carefully place the bonnet (11) over the plug stem (1) and slowly lower it on the body.

CAUTION

Do not use excess force to push the bonnet.

- Install washers (7) on the bonnet flange.
- Screw body stud nuts (9) until metal-to-metal contact between bonnet and body is achieved and refer to Figure 9 for proper bolt torque and tightening sequence.

CAUTION

It is very important that the body stud nuts be tightened evenly and in criss-cross fashion as indicated in Figure 9. During the body stud nut tightening sequence, the distance between the plug stem and the bonnet in the stuffing box should remain constant. Using the packing follower (5) to measure and insure clearance, should assist in insuring that the valve bonnet is being tightened evenly. Also, using of feeler gauges slided between the body and the integral flange of bonnet (around integral flange), during tightening, allows to achieve required results. Failure to follow this procedure specifically will result in damage to internal components.

- Replace packing (6), packing follower (5), packing flange (3) and screw packing flange stud nuts (2).

Note: Finger tighten packing flange stud nuts at this time. When valve is placed in service, tighten evenly until leaking around the stem stops.

- Replace actuator to body. (Refer to Section 10.3—ACTUATOR ASSEMBLY AND ADJUSTMENT).

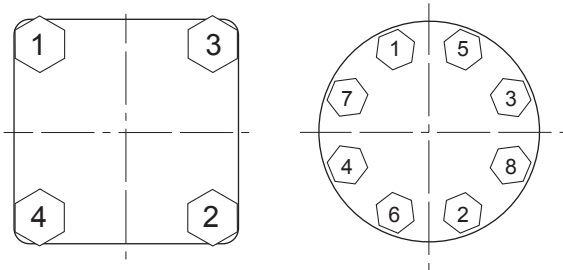
Valve Sizes: 2” to 6” (Figures 4, 5&6)

- Refer to Figure 7 and insure that all surfaces indicated are clean and free of dirt, scale or burrs.
- Apply several spots of a sealant or lubricant to one side of lower seat ring gasket (22) and stick the gasket in the lower groove of the seat ring (21).

CAUTION

Insure that lubricant or sealant compound is compatible with the process fluid.

Valve Dia.		ANSI Class	Stud (8)		Req'd. Torque (only for studs in carbon steel)			
					Min.		Max.	
mm	in.		Size	Qty	mm	in.	mm	in.
25	1	2500	1" - 8 UN - 2A	4	265	36	295	40
40	1 1/2		1 3/8" - 8 N - 2A	4	737	100	811	110
50	2		1 3/8" - 8 N - 2A	8	848	115	922	125
80	3		1 3/4" - 8 NS - 2A	8	1586	215	1770	240
100	4		2" - 8 UN - 2A	8	2360	320	2655	360
150	6		2 1/2" - 8 UN - 2A	8	4794	650	5311	720



Note: In case of stainless steel bolting parts, consult Baker Hughes for torque tightening of nuts (9).

Figure 9 - Sequence and Torque Tightening for Body Nuts (9), (Only for Carbon Steel Bolting Parts)

- C. Place the stack gasket (15) in the upper groove of the seat ring.
- D. Install the seat-ring (21) with gaskets (15 & 22) into the body.
- E. Install the plate stack assembly (19) into the body insuring that the side with fewest holes is installed toward the seat ring.

Note: For ease of disassembly-reassembly, two tapped lifting holes 1/4"-20 UNC have been provided in the stack and the seat-ring of a 3", 4" or 6" valve sizes and two tapped lifting holes No 8-32 UNC have been provided on the same parts in case of a 2" valve size.

- F. Apply a liberal amount of heavy silicone lubricant to the area of the plug which will mate to the Tec-seal ring (16).
- G. Carefully lower the plug and stem assembly into the body and plate stack.
- H. Carefully install the cage (17) over the plug and stem subassembly.

Note: For ease of disassembly-reassembly, two tapped lifting holes 1/4"-20 UNC have been provided in the cage of the 3", 4" or 6" valve sizes. Two holes of the cage must be in front of the outlet connection of the body.

Ensure also that seat ring, stack and cage are correctly installed ; i.e., that they are self aligned.

- I. Install the flat spring (25) at the top of cage (see mounting instructions on the flat spring, or refer to Figures 4 to 6 for orientation).
- J. Install the body gasket (14) in the body (20).
- K. Apply a liberal amount of heavy silicone lubricant to Tec-seal (16) and back-up ring (18). Slide back-up ring then Tec-seal (18 & 16) in their housing, between cage (17) and plug (12).

CAUTION

Refer to Figures 4 to 6 and install the Tec-seal so that the open side of the seal is facing up.

- L. Install O-Ring (23) and back-up ring (24) into the groove of the bonnet (11).

- M. Carefully place the bonnet (11) over the plug stem (1) and slowly lower it on the body. Place flange (10) [in case of a 2", 3", 4" or 6" forged block body valve sizes] as well as bonnet spacer (26) [in case of a 2" valve size], on the bonnet (11).

CAUTION

Extreme caution must be taken to insure that the O-Ring (23) slides over the cylindrical part of the cage (17). Do not use excess force to push the bonnet.

- N. Install washers (7) on the bonnet flange.
- O. Screw body stud nuts (9) until metal-to-metal contact between bonnet and body is achieved and refer to Figure 9 for proper bolt torque and tightening sequence.

CAUTION

It is very important that the body stud nuts be tightened evenly and in criss-cross fashion as indicated in Figure 9. During the body stud nut tightening sequence, the distance between the plug stem and the bonnet in the stuffing box should remain constant. Using the packing follower (5) to measure and insure clearance, should assist in insuring that the valve bonnet is being tightened evenly. Also, using of feeler gauges slid between the body and the integral flange of bonnet (around integral flange), during tightening, allows to achieve required results. Failure to follow this procedure specifically will result in damage to internal components.

- P. Replace packing (6), packing follower (5), packing flange (3) and screw packing flange stud nuts (2).

Note: Finger tighten packing flange stud nuts at this time. When valve is placed in service, tighten evenly until leaking around the stem stops.

- Q. Replace actuator to body. (Refer to Section 10.3—ACTUATOR ASSEMBLY AND ADJUSTMENT).

Actuator

The 79003 Series valves are normally equipped with the Types 37/38 Masoneilan Spring Diaphragm Actuators, Sizes No 15, 18 or 18L.

CAUTION

On actuator equipped with auxiliary handwheel, ensure this one is set on neutral position prior plug stem adjustment.

Actuator removal (see Figure 10)

On Air-to-Extend Actuator (Type 37)

Shut off air supply and disconnect air lines at the actuator. Remove nut (53), screw (52) and clamps (51). Unscrew drive nut (33), then remove actuator from the valve bonnet.

On Air-to-Retract Actuator (Type 38)

Retract actuator stem and plug about few millimeters by applying air pressure. Remove nut (53), screw (52) and clamps (51). Unscrew drive nut (33), then remove actuator from the valve. Shut off air pressure and disconnect air lines at the actuator.

Spring(s) Adjustment

Do not modify the setting of the actuator spring except when it is really necessary, to replace the diaphragm for example. In this case proceed as follows:

Hard-seat Ring Valves With Air-to-Extend or Air-to-Retract Actuator (Type 37 or 38)

An air supply, with a gauge and regulator should be piped to the 1/4" NPT air connection located on upper diaphragm case (on Type 37) or on the yoke (on Type 38).

With spring adjustor (36), adjust spring compression so that the actuator stem (26) just begins to move when air pressure reaches minimum pres-sure of the range stamped on the serial plate (initial of spring range). This movement is most easily detected by feeling the stem as air pressure is applied.

CAUTION

Adjust spring compression only when there is no air pressure on diaphragm.

PTFE Soft-seat Ring Valves With Air-to-Extend Actuator (Type 37)

Proceed as indicated in the above paragraph relating to hard seat ring valves.

PTFE Soft-seat Ring Valves With Air-to-Retract Actuator (Type 38)

Connect an air supply with a gauge and a regulator to the 1/4" NPT air connection on the yoke. Adjust simultaneously air pressure and spring adjustor (36) so that the actuator stem (26) is retracted of .20 in.(5 mm) for the valve sizes 1" and 1 1/2" (25 and 40 mm) or .34 in. (8,5 mm) for the valve sizes 2", 3", 4" and 6" (50, 80, 100 and 150 mm), when air pressure reaches minimum pressure of the range stamped on the serial plate (initial of spring range).

Actuator assembly and adjustment (see Figure 10)

Hard-seat Ring Valves

On Air-to-Extend Actuator (Type 37)

- Push plug stem (1) down until the plug seats.
- Install actuator on bonnet in required position and secure with drive nut (33). Connect a temporary supply air line on actuator. Apply to diaphragm sufficient air pressure to extend actuator stem (26) to full stroke.
- Install the stem clamps (51) and travel indicator pointer (58). The amount of thread engagement of both stems should be approximately equal. Tighten clamp nut (53).
- Adjust travel indicator scale (56) in front of travel indicator pointer (58) when the plug is seated under the supply pressure (max. signal of positioner).

On Air-to-Retract Actuator (Type 38)

- Push plug stem (1) down until the plug seats.
- Connect a temporary supply air line on actuator. Admit sufficient air pressure to fully retract actuator stem. Install actuator on bonnet in required position and secure with drive nut (33).
- Relieve air pressure from actuator, then increase air pressure to retract actuator stem about 1,5 mm (.06 in.).
- Install stem clamps (51) and travel indicator pointer (58). The amount of thread engagement of both stems should be approximately equal. Tighten clamp nut (53).
- Adjust travel indicator scale (56) in front of travel indicator pointer (58) when the plug is seated under the supply pressure (max. signal of positioner).

PTFE Soft-seat Ring Valves

The actuators allow a .14 in. (3,5 mm) overtravel for the valve sizes 1" and 1 1/2" (25 and 40 mm) and .28 in. (7 mm) for the valve sizes 2", 3", 4" and 6" (50, 80, 100 and 150 mm) guaranteeing a tightness in case of partial wear or complete disappearance of the PTFE insert of seat-ring, (Refer to Figure 11).

On Air-to-Extend Actuator (Type 37)

The procedure is the same than the one used for the hard seat valves with type 37 actuator, except that the step b. must take account of the following :

On a valve equipped with a PTFE soft-seat, the "full stroke" corresponds to :

- The nominal valve stroke if a new soft-seat ring has been installed.
- The nominal valve stroke, increased of over-travel due to partial wear or complete disap-pearance of the PTFE insert, if the worn soft-seat ring has not been replaced. In this case, refer to the value measured prior valve disassembling — see Section 7.

CAUTION

Never exceed the supply pressure stamped on the serial plate.

On Air-to-Retract Actuator (Type 38)

The procedure is the same than the one used for the hard seat valves with type 38 actuator, except that the step c. which must be replaced by :

- c. Relieve air pressure from actuator, then increase air pressure to retract actuator stem (26) about .20" (*) (5 mm) for 1" and 1-1/2" (25 and 40 mm) valve sizes and .34" (*) (8,5 mm) for 2", 3", 4" and 6" (50, 80, 100 and 150 mm) valve sizes.

CAUTION

These values are only valid if the valve have a new soft-seat ring.

If the worn soft-seat ring has not been replaced, these values should be reduced of the value corresponding to the partial wear or complete disappearance of the PTFE insert.

To calculate wear value, subtract the nominal valve stroke from the full stroke value measured prior valve disassembling — refer to Section 7.

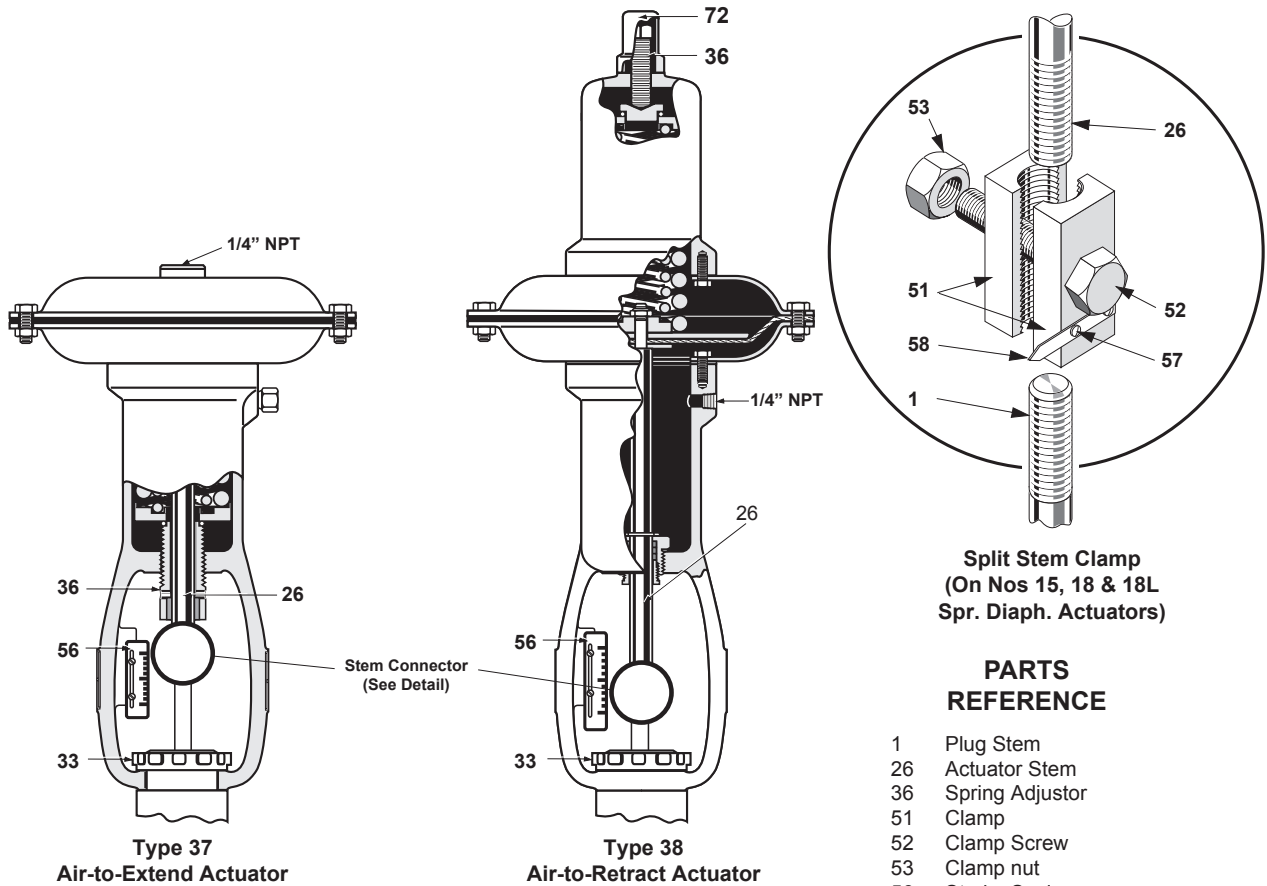


Figure 10 - Types 37/38 Spring Diaphragm Actuators

**Split Stem Clamp
(On Nos 15, 18 & 18L
Spr. Diaph. Actuators)**

**PARTS
REFERENCE**

- 1 Plug Stem
- 26 Actuator Stem
- 36 Spring Adjustor
- 51 Clamp
- 52 Clamp Screw
- 53 Clamp nut
- 56 Stroke Scale
- 57 Pointer Screw
- 58 Travel Indicator Pointer
- 72 Spring Barrel Cap

Allowable overtravel to compensate partial wear or complete disappearance of the PTFE insert of seat-ring
Equal to full stroke reduced of the nominal valve stroke.

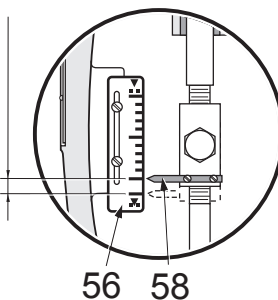


Figure 11 - Allowable Overtravel for Valve with PTFE Soft-seat Ring

Notes

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