

Neles[™] high performance butterfly valves Series BO

Installation, maintenance and operating instructions



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READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1. GENERAL

1.1 Safety precautions

CAUTION:

Do not exceed the valve performance limitations!

Exceeding the limitations marked on the valve may cause damage and lead to uncontrolled pressure release. Damage or personal injury may result.

CAUTION:

Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!

Dismantling or removing a pressurized valve will result in uncontrolled pressure release. Always isolate the relevant part of the pipeline, release the pressure from the valve and remove the medium before dismantling the valve. Be aware of the type of medium involved. Protect people and the environment from any harmful or poisonous substances. Make sure that no medium can enter the pipeline during valve maintenance.

Failure to do this may result in damage or personal injury.

CAUTION:

Beware of the discs' cutting movement!

Keep hands, other parts of the body, tools and other objects out of the open flow port. Leave no foreign objects inside the pipeline.

When the valve is actuated, the disc functions as a cutting device. The position of the disc can also be changed when moving the valve.

Close and detach the actuator pressure supply pipeline for valve maintenance.

Failure to do this may result in damage or personal injury.

CAUTION:

Beware of noise emissions!

The valve may produce noise in the pipeline. The noise level depends on the application. It can be measured or calculated using Neles Nelprof valve-sizing software.

Observe the relevant work environment regulations on noise emissions.

CAUTION:

Beware of a very cold or hot valve!

The valve body may be very cold or very hot during use. Protect yourself against cold injuries or burns.

CAUTION:

When handling the valve or the valve package, bear in mind its weight!

Never lift the valve or valve package by the actuator, positioner, limit switch or their piping.

Valve sizes DN 400 and over are equipped with lifting eye bolts.

Place the lifting ropes securely around the valve body.

Advise caution when lifting because the disc may turn.

Damage or personal injury may result from falling parts.

NOTE:

Do not turn the disc more than 90° as this could damage the seat. The valve is constructed so that the disc operates only between 0° - 90° .

1.2 Product & function description

High Performance Butterfly Valve Type BO; a single eccentric disc to shut off pipes and regulate the flow; soft-seated.

Type of body:

Type wafer

Nominal size:

- DN 200 DN 900
- NPS 8 NPS 36

Pressure rating:

- PN 10
- CL 150

Operation pressure: max. 2bar

- Temperature range for standard valves:
- Operating temperature -10 °C +130 °C
- Store temperature -20 °C +80 °C

Function description:

The High Performance Butterfly Valve Type BO has been designed especially for deployment in pressure-changing systems for oxygen production, where it is required to operate under extreme demanding conditions due to the high cycle-related peak tightness requirements. The shut-off disc is made of aluminium to minimize the disc inertia and give the valve extremely short opening and closing times. An elastic sealing ring has been chosen as the sealing element.

The actuator force will be transmitted to the drive shaft as well as to the disc, by means of fatigue-resistant feather key connections.

The valve is closed when the disk is in a rectangular position to the flow direction. The passage between OPEN and CLOSED amounts (90°) and the disk is driven by an actuator (manual, electric, pneumatic or hydraulic). There is a marking on the drive shaft as well as on the body. The valve is closed when the two markings are aligned.

The notch on the actuator shaft indicates the current position of the shut-off disc in the valve. The valve closes clockwise.

1.3 Intended use

The delivered valve has been designed especially in accordance with the requirements noted in the order-related specification.

This especially applies to the operation parameter pressure, temperature medium and cycle rates.

If the process parameter is exceeded, it can lead to damage of the valve.

The damaged parts have to be changed immediately.

The pipeline and used medium must be free of dirt, otherwise the tightness of the valve may be affected.

It is part of the intended use of the valve that the operating, mounting and maintenance personnel have read and understood this IMO manual.

Only qualified personal may perform the installation work.

Valmet will take no liability for structural modifications carried out without the corporation's explicit consent.

Use original spare parts only.

Spare parts should be installed by Valmet service personnel. The specific spare parts can be found in Chapter 7.

1.4 Scope of delivery

Normally the High Performance Butterfly Valve Type BO is delivered complete with the actuator.

1.5 Visual inspection

Before leaving Valmet, the valve has been checked for tightness and functionality by Valmet Quality Control and set for operation in accordance with the order-related specifications.

 Before installation, please check the valve for possible transport damage. If parts of the delivery are damaged, please contact our qualified personnel immediately.

2. Before installation, please check the valve for functionality. Proceed as follows:

 Lifting ropes are necessary depending on the size and weight of the valve

Fasten the lifting ropes around the valve body (see Fig. 1) for a horizontal transport position.

If you fix the ropes on the actuator, the shaft may be damaged.

CAUTION: Danger of twisting!





Fig. 1

Fasten the lifting ropes only on the actuator for a vertical transport position. (see Fig. 2)



Fig. 2

- Visual inspection all screws are tightened correctly
- Visual inspection for damage on the following parts:
 - disc
 - shaft
 - actuator and tubing
 - gland packing
 - sealing elements
 - sealing surface of the valve

Bring the valve into a vertical position.

The valve can move uncontrolled during the check. For this reason, ensure that the valve cannot move or even tilt over under any circumstances.

Normally valid:

View from above on the drive shaft of the disk:

Counterclockwise rotation = OPEN, Clockwise rotation = CLOSE (see

If the valve does not work correctly during the check, please contact our professionals.

1.6 Marking and identification

\bigcirc			0
0	Valmet Ge	ermany G	mbH 💛
Valmet Job	o 50402	36529	
Туре	500OC55	R010	
Body	0.7043	Year	2020
DN	500	PN	10
Valve-no:	KV 1105		
TS=	80°C	PS=	2 bar(g)
P.O.NO.	1141 0 07	16	
Made in Ge	rmany	Free of 0	Oil and Grease
0			0

Fig. 3

The valve specifications are placed on the type plate.

In the case of maintenance and repair, you need the Unique-No. to reliably identify the valve.

This number is also engraved in the valve body, so you can find it even if the type plate is not detectable.

Further information:

Job-No	=	Job number of Valmet
Unique-No	=	Serial number of the valve
Туре	=	Type code of the valve
Body	=	Body material
YEAR	=	Year of manufacture
NPS or DN	=	Size
CL or PN	=	Pressure class
ID-No.	=	Customer identification number
Tag-No	=	Valve number
TS.	=	Valve working temperature in °C (medium)
PS	=	Valve working pressure
P.O.NO.	=	Customer's order number / commission number
Cv	=	Flow rate in gal/min
EX II 2GcTx	=	ATEX-marking
CE	=	CE0036 (notified body for PED)

To display the trim in the built-in condition of the valve, the following markings are available (see Fig. 4):

- CLOSED-plate with marking on the body.
- marking on top of the drive shaft.

If both markings align, the valve is "CLOSED". The sealing element is located on the side of the body where you see the CLOSED-plate.

Open and close like a tap (seen from the actuator side).

1.7 ATEX, ASME & CE-marking

The valve meets the requirements of the European Directive 2014/68/EU related to pressure equipment or the ASME B 16.34-2009, and has been marked according to these directives.

The ATEX, ASME and/or CE markings are placed on the type plate (see Figure 3) in accordance with the specification of the valve.

1.8 Contact

Please contact your local Valmet on: www.neles.com/valves



Fig. 4 Direction of rotation of the actuator and disc position

2. TRANSPORT, RECEPTION AND STORAGE

Check the valve including the equipment for any damage that may have occurred during transport.

Store the valve carefully before installation, preferably indoors in a dry place.

Store temperature = -20° ... 80 °C

Humidity 85% max (non-condensing)

The valve must be stored with the appropriate factory-made flow port protectors.

The valve is usually delivered in the closed position.

A valve equipped with a spring-return actuator is delivered in a position determined by the spring.

During storage, the valve must be lightly closed.

Do not transport the valve on-site until the installation is to be executed.

Remove the flow port protectors before installation.

3. INSTALLATION

Only qualified personnel are permitted to perform installation work on the valve!

3.1 Installation planning

Before installation, consider the following aspects:

- Install the valve so that the actuator is easy to access.
- Do not connect the power supply of the actuator (electrical, pneumatic or hydraulic energy) until the installation of the valve is completed.
- The flange holes of both pipe ends must be exactly aligned and the sealing surface of the opposing flanges must be exactly parallel. The flange holes must not be twisted against each other: this way, the installation will not cause any stress in the valve.

(see Figure 5)



Fig. 5 Check the flange position before installing

3.2 Preliminary

Flush or blow the pipeline carefully before installing the valve. Foreign particles such as sand, rust, dirt or welding residues will affect the tightness of the valve and damage the disc-sealing surface and seat. This is very important for installation of valves in new plant sections. During the process, the medium must also not carry any contaminant which may settle in the sealing area.

Caution advised when installing flaps with the safety position "Spring-to-open"!

If the disc endures the total length of the valve, you must close the disc prior to installation (pneumatic, hydraulic, etc.). Be sure that the energy supply is safely fastened and cannot suffer damage or break off during installation.

If there is a sudden shutdown of energy supply, the valve will be opened abruptly by the prestressed spring package. This may cause heavy personal injuries and material damage.

If you mount a larger valve into the pipeline, you need a hoist. You will find the weight of the valve package in the order-related documentation.

Place the lifting ropes securely around the valve body and not on the actuator. Otherwise, you may damage the valve.

(see Figure 1).

3.3 Installation

For installation of the high performance butterfly valve, proceed in the following manner:

- If no indication of the valve installation direction is given, install the valve so that the valve shaft side is on the upstream side.
- If the mounting direction is mentioned, install the valve so that the P points to upstream and F points the direction of medium flow. (see Figure 6)



Fig. 6

- Close the valve for installation. In the open position, the discsealing surface can endure the total length of the valve body, and may be damaged at installation.
- Please note that the minimum tube inside diameter is in accordance with ASME B36.10M, ASME B36.19M respectively DIN EN 10305-2 and DIN EN 10305-5.
- Insert on both sides of the valve, between the valve body and the opposite flanges, a flange gasket in accordance with your operating conditions. These gaskets are not included in the standard scope of delivery. We deliver the desired gaskets on request.
- Piping bolt dimensions and amounts can be found in the following tables:



stud bolt dimensions type BO - Class 150

NDC	thus a d ll	I	_	L1	
NP5	thread K	length	quantity	length	quantity
8	3/4"-9UNC	180	8		
10	7/8"-9UNC	195	12		
12	7/8"-9UNC	205	12		
14	1"-8UN 230	8	95	8	
16	1"-8UN	245	16		
18	1 1/8"-8UN	260	12	115	8
20	1 1/8"-8UN	290	16	120	8
24	1 1/4"-8UN	330	16	130	8
28	1 1/4"-8UN	390	24	160	8
30	1 1/4"-8UN	420	24	170	8
32	1 1/2"-8UN	450	24	180	8
36	1 1/2"-8UN	480	28		
40	1 1/2"-8UN		500		32
flange connection acc. to ANSI B 16.5 for NPS <= 24" flange connection acc. to ASME B 16.47 for NPS > 24"					

stud bolt dimensions type BO - PN 10

DN	thread I/	I	-	L1			
DN	UN thread K		quantity	length	quantity		
200	M20	170	12				
250	M24	190	12				
300	M24	200	12				
350	M24	210	12	80	8		
400	M27	230	16				
450	M27	250	16	90	8		
500	M30	270	16	105	8		
600	M33	320	16	115	8		
700	M33	340	20	125	8		
750							
800	M36	370	20	130	8		
900	M36	390	24	140	8		
1000	M39	425	24	160	8		
flange con	flange connection acc. to EN 1092-2 PN 10						

Screw the each other opposite stud bolts, flange screws and hex nuts crosswise and equal with a torque key in accordance with the parameter of the operator. (see Figure 7).

· Finally connect the energy supply.



Fig. 7 Sample for a crosswise installation with twelve flange holes.

3.4 ATEX-version

ATEX certified valves have to be professional connected by the end user to a main grounding point at the site in accordance with the applicable regulations of the respective countries. The grounding of the valve is the responsibility of the end user. Operation without grounding is not permitted!

The grounding connection is a marked screw with the Earthing symbol. This screw is a single, extra marked screw at, e.g., the body, flange or bracket. (see Fig. 8)

The grounding cable must have a braided wire with at least 16mm² conductive area to the grounding point in the piping construction.

ATEX certified valves must be serviced and maintained only by Valmet Service or authorized personnel.



Fig. 8 Earthing

3.5 Demounting

Make sure that:

- the pipeline is pressureless, flushed and empty.
- the valve mentioned is undocked from the process.
- The valve is in a defined position (normally closed).

CAUTION: Danger of explosion!

Follow the end user safety instructions!

For demounting the valve, proceed in the following order:

- Close the valve.
- If you detach the actuator to demount the valve, tag the actuator to the valve body with a waterproof marker.
- This way you can easily find the correct position of the actuator on reassembly, and the actuator cannot cause a malfunction.

Further instructions for detaching the actuator in Chapter 4!

Switch off the energy supply of the actuator.

- · Detach the actuator.
- Support the valve carefully with a hoist. Place lifting ropes in a correct position on the body (not on the shaft) of the valve.(see Figure 8)
- Demount the valve by unscrewing the opposite pipe flange bolts crosswise.
- Lift and transport the valve carefully to protect it from damage.



Fig. 9 Correct position of lifting ropes

3.6 Cleaning and maintenance interval

Type BO high performance butterfly valves are extensively maintenance-free.

For cleaning, use only a soft and lint-free cloth. Do not under any circumstances use pointed or sharp tools (knife, file, screwdriver, etc...) or sandpaper. Similarly, do not use any cleaning agents that may cause undesirable chemical reactions with the residues of the medium or attack the sealing elements.

Check the tightness of the valve at regular intervals.

You should replace the sealing element (320) after two years at the latest.

At the same time, check the condition of the following parts and change them if necessary:

O-rings (472, 474),

U-ring (475),

bearing bushings (410, 424)

After dismantling the valve, you must replace the locking plate (447).

For ordering the necessary spare parts set, please contact your Valmet Service Partner.



Fig. 10 Sealings and bushes

4. DETACHING AND MOUNTING THE ACTUATOR

4.1 General

The actuator mounting is in accordance with DIN/ISO 5211. All actuators based on this standard can be easily mounted on the valve. Typical installations are for pneumatic- and hydraulic actuators with valve controllers for control, ESD or on/off use or with electric actuator or manual gear.

CAUTION:

When handling the valve or the valve package, bear in mind its weight!

The actuator cannot be removed from the valve when the pipeline is under pressure as a result of dynamic torque!

NOTE:

Before dismantling, carefully observe the position of the valve with respect to the actuator and positioner/limit switch to ensure that the package can be properly reassembled.

The actuator must be mounted to be easily accessible, particularly for a possible emergency manual override.

4.2 Mounting preperation

The actuator used is normally on customer request. For safe mounting on site, you need a hoist and lifting ropes.

CAUTION:

When handling the actuator, bear in mind its weight!

4.3 Mounting

To mount the actuator, proceed in the following order:

- Turn the valve to the closed position before mounting the actuator.
- Position the indexing shaft of the actuator on the valve shaft carefully. Bear in mind that the actuator must be mounted exactly and flush to the bracket, so that no stress is caused to the valve shaft.
- Make sure that the jag on the indexing shaft conforms to the position of the disk (see Figure 12).
- Fix the actuator with the appropriate screws and lock them crosswise. Finally, check the closed position of the valve by means of multiple depth measurements. The detected data must not deviate more than 0.3 mm (see Figure 11).
- · Finally, connect the energy supply.



Fig. 11 Checking the closed position by means of depth measurement



Fig. 12 The markings on the actuator conform to the position of the disk

4.4 Detaching preperation

If the actuator is mounted in a pipeline, the following conditions must be ensured before starting to detach the actuator:

- Make sure that detaching the actuator will not cause any fault.
- Check carefully if a hot medium has been sent through the pipeline and if the actuator has cooled down sufficiently, so no danger exists due to extreme temperature.
- Make sure that the medium finally sent through the valve does not cause any danger for the service technician.

If you do not execute the dismantling yourself, you must alert the qualified personal.

4.5 Detaching

To detach the actuator, proceed in the following order:

- Make sure that the pipeline is pressureless and the mentioned valve is undocked from the process.
- Make sure the valve is in a defined position (normally closed).
- Switch off the energy supply of the actuator.
- Support the actuator with lifting ropes.
- Unbolt the screws between the bracket and the actuator. Pull the actuator carefully, vertical from the valve shaft.
- Lift and transport the actuator carefully to protect it from damage. Make sure that the energy supply of the actuator is safely

switched off before starting to detach the actuator.

5. TOOLS

• No special tools are needed for servicing the valve.

6. ORDERING SPARE PARTS

When ordering spare parts, always include the following information:

- Unique number of the valve (on the type plate see Fig. 3 and additionally stamped on the valve body)
- Name of plant, date of start-up
- Type code (on the type plate see Fig. 3) with information about size and pressure
- If possible, a picture of the type plate
- Number of the parts list, part number, name of the part and quantity required

7. EXPLODED VIEW AND PARTS LIST



PARTS LIST

Part No.	Qty.	Description	Material	Spare part
101	1	Body	Carbon Steel	
201	1	Disc	Aluminium hard coated	3
301	1	Sealing Ring	Stainless Steel	3
304	1	O-ring seal	FKM	1
306	8	Cylinder head screw	Stainless Steel	
320	1	Seat	FKM	2
401	1	Drive shaft	Stainless Steel	3
402	1	Shaft	Stainless Steel	3
404	2	Thrust bearing	Metal + Teflon coating	1
410	1	Bearing bushing	Stainless Steel	3
411	1	Bearing bushing	Stainless Steel	3
412	8	Cylinder head screw	Stainless Steel	
424	2	Bearing	Metal + Teflon coating	1
425	2	Bearing	Metal + Teflon coating	1
430	1	Cover	Stainless Steel	
432	4	Hexagon screw	Stainless Steel	
435	4	Wascher, Retaining plate	Stainless Steel	
440	2	Кеу	Stainless Steel	3
441	1	Кеу	Stainless Steel	3
444	2	Clamping disc	Stainless Steel	3
447	2	Lock Washer, Retaining plate	Stainless Steel	3
448	4	Hexagon screw	Stainless Steel	3
453	1	Packing Gland, Flange	Stainless Steel	
-462	2	Кеу	Stainless Steel	3
472	4	O-ring packing	FKM	1
474	2	O-ring packing	FKM	1
475	2	Sealing	PTFE	1
476	8	Bearing protection, Back up ring	PTFE	1
502	4	Hexagon head screw	Stainless Steel	
507	2	Pin	Stainless Steel	
508	2	Retaining plate	Stainless Steel	
509	4	Hexagon nut	Stainless Steel	

1&2) Maintenance after 750 000 cycles or every 1 year 3) Maintenance after 1500 000 cycles or every 2 year

8. DIMENSIONS AND WEIGHTS



Type BO + A

			Main dimensions							Wei	ight	
Size DN/inch	Actuator	BL	н	к	L	N	В	с	J	М	Actuator kg	Valve kg
200/8"	A60-K	71	250	245	435	300	170	85	320	885	16	28
250/10"	A60-K	76	265	260	450	300	170	85	320	915	16	34
300/12"	A60-K	83	290	285	475	300	170	85	320	965	16	49
350/14"	A120-K	92	325	330	570	390	195	120	345	1095	28	58
400/16"	A120-K	102	355	350	590	390	195	120	345	1145	28	72
450/18"	A120-K	114	385	380	620	390	195	120	345	1205	28	108
500/20"	A120-K	127	405	400	640	390	195	120	345	1245	29	134
600/24"	A250-K	154	490	485	795	430	260	155	410	1485	51	187
700/28"	A500-K	165	545	535	880	595	290	175	490	1625	100	262
750/30"	A500-K	190	570	560	905	595	290	175	490	1675	100	310
800/32"	A500-K	190	585	580	925	595	290	175	490	1710	100	360
900/36"	A500-K	203	655	650	1075	750	400	215	600	1930	100	460

9. TROUBLESHOOTING

Valve leakage at the shut-off disc

- No matter what the situation, do not close the valve by force: irreparable damage may occur if you do so.
- · Check that the energy supply is connected.
- Check that the closed position of the actuator is in accordance with the closed position of the disc.
- Check that the torque of the valve is in accordance with the following table. (see the table on the page 17).
- Check the sealing surface of the disc and the sealing element for damages. If necessary, dismantle the disc.
- Check if there is foreign material between the disc and the sealing element. If necessary, remove foreign material or deposits.
- If necessary, replace the damaged parts

For dismounting see Appendix: maintenance.

Keep in mind the notes in Chapter "Cleaning and maintenance" in Appendix: maintenance.

Escape of fluid or gas...

at gland packing

Check if the gland is still precompressed by the disc springs. The disc springs may be damaged. In this case, you must change them. If the precompression is too minimal, you must retighten the nuts, but not up to the stop: if you do so, the disc springs will be damaged. If the precompression of the disc springs is in order, the gland packing is damaged and you must change it.

Please see notes for dismounting in Appendix: maintenance.

at the cover plate

Check that all cover screws are tightened well. If necessary, change the sealing.

Please see notes for dismounting in Appendix: maintenance.

10. SAFETY INSTRUCTIONS

Please pay attention to the following safety instructions when doing maintenance and when operating the high-performance disc valve:

- Because of safety reasons you are not allowed to carry out modifications to the method of operation of the disc valve or its actuator.
- 2. Only specialist personnel are allowed to carry out installation work on the high-performance disc valve.
- There is the danger during the functional test that the highperformance disc valve will move uncontrollably or suddenly due to the energy supply. Therefore, make sure that the valve can under no circumstances move or even tip during the functional test.
- 4. Take care during the installation of valves with the safety position "spring open". If the disc extends over the installation length of the valve, the valve must be closed before installation (pneumatically, hydraulically, etc.).
- 5. Make sure in particular that the energy supply is safely attached and cannot be damaged or torn in any way during installation.

If the energy supply is suddenly interrupted, the valve opens abruptly. This can lead to severe injuries and damage to materials.

- 6. During possible maintenance work, there is considerable risk of injury by the accidental use of the remote control. If you plan remote control for the work using the high-performance disc valve, make sure that the energy supply of the actuator is switched off.
- 7. Ensure that the cleaning substance cannot cause any unwanted chemical reactions in connection with possible residues in the high-performance disc valve.
- If you work in the area of the sealing surface of the disc, secure the disc with wooden wedges to prevent the risk of crushing. Take care that by doing this the sealing surface of the disc is not damaged.
- 9. If the seals are destroyed by a medium which is too hot, the medium used could leak at the shaft.

10.1 Welding notes

WARNING:

Welding and/or grinding stainless steel and other alloys containing chromium metal may cause the release of hexavalent chromium. Hexavalent chromium(VI) or Cr(VI), is known to cause cancer. Be sure to use all appropriate personal protective equipment (PPE) when welding metals containing chromium.

NOTE:

A qualified welder must do the installation welding. The welder and welding procedure should be qualified in accordance with the ASME Boiler and Pressure Vessel Code Section IX or other applicable regulation.

CAUTION:

To prevent damage to the seat and seals, do not allow the temperature of the seat and body seal area to exceed 94 $^{\circ}$ C (200 $^{\circ}$ F). It is recommended that thermal chalks be used to check the temperature in these areas during welding.

CAUTION:

Ensure that any weld splatter does not fall onto the valve closing members eg. ball or seats. This may damage critical seating surfaces and cause leaks.

11. MAINTENANCE

11.1 Cleaning and maintenance interval

Type BO high-performance disc valves are to a great extent maintenance-free.

Check the valve regularly for tightness. Valmet recommends a replacement of the O-ring (320) on demand or in critical applications after no more than two years.





If the medium has contamination which could impair the tightness of the valve, the sealing surface of the disc must be cleaned regularly. Contamination can damage the sealing surface of the disc or the sealing element.

 Cleaning substances which could attack the sealing surface or the sealing element must not be used to remove residues. Use water, soap suds or other solvents and a soft, lint-free cloth.

Never use cutting, scraping or grinding tools like files or emery paper. Do not use substances containing solvents: these can cause unwanted chemical reactions with the residues of the medium or can attack the seal.

When allocating cleaning or maintenance work to qualified outside companies or qualified outside personnel, draw attention to the risk of the medium used and, if necessary, the existing residues. The IMO must be sent.

11.2 Preliminary

In order to avoid longer shutdowns during the maintenance work, suitable spare parts should be kept ready or procured in time. Take delivery times and transportation into account.

Before you dismount the disc valve, the following requirements must be complied with:

- Ensure that the pipeline is both free of pressure and free of process gases and fluids.
- Check that the disc valve has cooled down or warmed up enough so that there is no further risk of extreme temperatures.
- Determine which medium passed through the disc valve last. There could be residues in the valve. Make sure that there is no risk of poison or acid when you come into contact with the residues. Protect yourself if necessary with the appropriate protective clothing, eye-protection glasses and respiratory protection. The operator's safety instructions must be followed.
- If you do not undertake the dismounting yourself, inform the specialist personnel and, if necessary, make protective clothing available for them.

When installing and dismounting the disc valve, the valve must be closed in order to eliminate damage during installation and dismounting.

11.3 Demounting

When dismounting the disc valve, please proceed as follows:

- Close the disc valve.
- If the actuator must be removed from the disc valve, mark the position of the actuator to the body with a permanent marker before dismounting. In this manner, you can find the right position of the actuator when re-mounting, and it cannot trigger a malfunction.

Switch off the power supply of the actuator.

Dismount the actuator. For further instructions, see section 4.5 of this IMO.

- Support the disc valve with lifting ropes. Put the lifting ropes on the body (and not on the shaft) of the disc valve.(see Figure 16)
- Remove the disc valve by loosening the screws or nuts (which are opposite) crosswise.
- Transport the disc valve in such a way that it cannot move or suffer damage during transportation.



Fig. 14 Supporting with lifting ropes

11.4 Reassembly

To re-install the disc valve, please proceed as follows:

- Close the disc valve.
- At the end of the actuator shaft and on the shaft extension of the disc valve, there is a marking. The marking at the actuator shaft must be in line with the marking on the body when re-installing the valve.(see Figure 17)

When the markings are aligned, the valve is closed.



Marking on the valve body

Marking on the actuator shaft

- Fig. 15 Installation markings
- · Put the actuator in the closed position.
- Make sure that you place the actuator in the correct position on the actuator shaft. Use the marking for this that you made on the valve body as well as on the actuator when you dismounted the valve, and ensure as exact an alignment of all parts (body – actuator) as possible. (see Chapter 4)
- Install the disc valve between the pipelines (see Chapter 3)

11.5 Replacement of the sealing element

Please proceed as follows:



Demount the valve in its CLOSED position. For further instructions, see section 4.5 of this IMO.

- 1. Fix the valve on a solid base or workbench so that it cannot slip or tip.
- 2. Turn the disk in the 180° open position.



Fig. 16 180° open position

3. Loosen the hexagon head screws (306). (see figures 19 & 20).



Fig. 17 Loosen the screws



Fig. 18

4. Demount the retaining ring (301). (see Figure 21).



Fig. 19 Demount the retaining ring

 Now you can remove the o-ring (320). (Figure 22)



Fig. 20 Remove Pos.320

- 6. Before replacing the o-ring, you must clean all parts with care and diligence.
- Before reassembly, check all parts for traces of wear. Use Oxigenoex S4 for the hexagon head screws on the thread of the screws. (See figure 21)



Fig. 21 Grease the hex head screws and the thread.

8. Check the high performance disc valve for its tightness and smooth operation before rere-installation. Instructions for installation are in Chapter 3.

11.6 Replacing wear parts

In order to replace the wear parts, proceed as follows:

- 1. Remove the actuator by loosening the hexagon head screws (502).
- 2. Swivel the disc 180°to demount the sealing element (320), as own in section 11.5.
- Now you have free access to the clamping discs (444), retaining plates (447) and hexagon head screws (448), which you can now loosen.
- 4. Demount the cover (430) on the backside of the valve. Now you can remove the thrust bearing (404), shaft (402) and bearing bushing (410).
- 5. On the front side (actuator side), remove the flange (453). Now you can remove the thrust bearing (404), shaft (401) and bearing bushing (411).
- 6. Now you have free access to all bearings and sealing elements of the shafts.



Fig. 22





Fig. 26



Fig. 27



Fig. 28

Fig. 23



Fig. 24



Fig. 25

Now following parts can be changed with the recommended spare part sets:

Quantity/ Valve	Description	Contents
1x	Set 1 (Soft parts)	Pos. 304, 320
1x	Set 2 (Sealing)	Pos. 404, 410, 411, 435, 447, 472, 474, 475, 476
1x	Set 3 (Heavy overhaul)	Pos. 201, 301, 401, 402, 430

Customer gets always: set 1

set 1 + set 2 + set 3

- 7. All parts must be cleaned accurately before reassembly.
- 8. Check the shafts for wear. If you find grooves or other damage, it is recommended that you replace the shafts (401, 402).

- 9. The reassembly takes place in reverse order. To avoid damage to the seals, install the bearing bushings (424, 425) and the shafts (401, 402) with extreme care.
- 10. Tighten the cover screws (412, 432) with a suitable torque wrench to the given torques, in compliance with section 11.6.
- 11. Check the high performance disc valve for its tightness and smooth operation before re-installation. The instructions for installation are in section 3.3

11.7 Valve screws – Clamping torque

The permissible clamping torque for screws of the category A2-70.2 and A4-70 with standard metric thread should be in accordance with DIN 13, 70 % utilisation of Rp 0.2, friction coefficient 0.16.

Ø	Tensile strength area	Load ¹⁾ Force on the shaft		Preload force	Clamping torque
	AS in mm ²	R _{p 0,2} in N	R _m in N	N	Nm
M4	8,8	3951	6146	2489	2,13
M5	14,2	6390	9940	4026	4,19
M6	20,1	9045	14070	5698	7,3
M8	36,6	16470	25620	10376	17,5
M10	58,0	26100	40600	16443	35,2
M12	84,3	37935	59010	23899	60,3
M14	115,0	51750	80500	32603	95,8
M16	157,0	70650	109900	44510	146,2
M18	192,0	86400	134400	54432	203,1
M20	245,0	110250	171500	69458	285,7
M22	303,0	75750	151500	47723	212,4
M24	353,0	88250	176500	55598	273,9
M27	459,0	114750	229500	72293	405,3
M30	561,0	140250	280500	85358	549,0

1) Values correspond to 100% of the 0.2%-tensile elastic limit

12. TYPE CODE – HOW TO ORDER

1.	2.	3.	4.	5.	6.	7.	8.	9.
-	BO	6	С	-	16	F1	N	-

1. sign	
-	

2. sign	PRODUCT SERIES / DESIGN
	Single eccentric high cycle, soft seated butterfly valve

3. sign	BODY CONSTRUCTION
6	Wafer
Y	Special, to be specified

7. sign	
F	Body: DIN 1693 – 0.7043 (GGG40.3) / EN1543 - EN-GJS-400-18-LT Disc: F-AL70, hard coated
F1	Body: DIN 1693 – 0.7043 (GGG40.3) / EN1543 - EN-GJS-400- 18-LT + coating (ENP) Disc: F-AL70, hard coated
G	Body: EN 10250 – 1.0570 (S355J2G3) Disc: F-AL70, hard coated
G1	Body: EN 10250 – 1.0570 (S355J2G3) + coating (ENP) Disc: F-AL70, hard coated
Y	SPECIAL, to be specified

4. sign	BODY PRESSURE RATING
С	ASME class 150
J	DIN PN 10
K	DIN PN 16

Note: max. dp = 1,8 barg

5. sign	BEARING AND DESIGN
-	Standard: Soft bearings
Y	Special design

6. sign	SIZE Note: Pressure rating = ASME -> inch sizes Pressure rating = DIN -> metric sizes
-	Inch: 08, 10, 12, 14, 16, 20, 24, 28, 32, 36, 40 Metric: 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000

8. sign	SEAT, PACKING & SHAFT MATERIAL
N	Shaft sealing: FKM (VITON) Sealing Element: FKM (VITON) Shaft: EN 1.4021 or equal, T = -10 200 °C
Y	SPECIAL, to be specified

9. sign	FACE-TO-FACE AND FACING With sign "Y" always check suitability from factory
-	Without sign valve facing according to the valve body pressure rating <u>DIN-rating:</u> EN1092-1 ASME-rating: - ASME B 16.5 sizes 4" – 24" - ASME B 16.47 Series A #150 - 600 sizes 26"
Y	Special, to be specified

Valmet Flow Control Oy

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