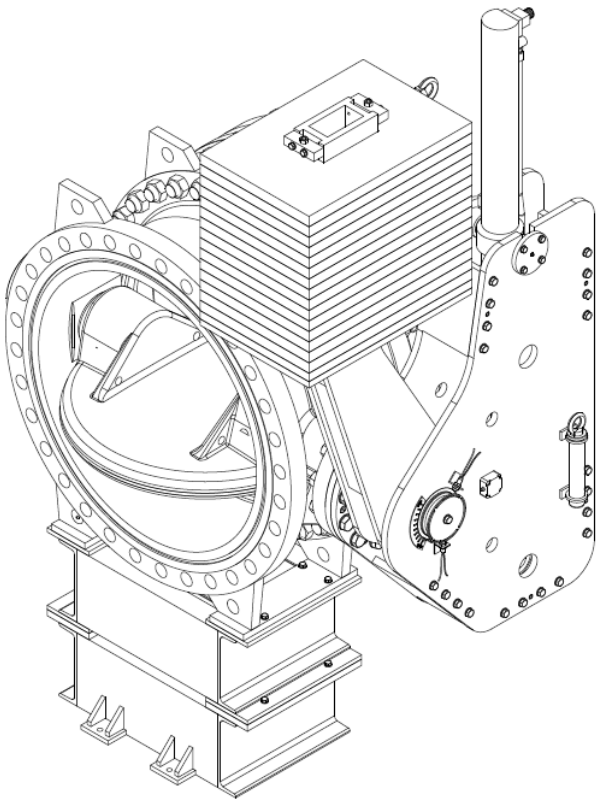
DVD VALVES

OPERATION MANUAL

KVC BUTTERFLY VALVE HYDRAULIC ACTUATOR



GENERAL SAFETY INSTRUCTIONS

This Operation Manual is created for you to use DVD Butterfly Valves with Hydraulic Actuator effectively and to reduce potential risks regarding faulty use of the mentioned valves. With this Manual, potential accidents and damages can be prevented and life time of the valve can be increased.

The product you will be using is designed and manufactured according to highest quality standards and has passed DVD quality procedures 100%. However, Valves hold potential risks and can cause danger in case of faulty use or faulty assembly. Therefore, **everyone, who somehow gets in contact with the valve, is responsible for reading and fully understanding this Operation Manual.**

Unauthorized revision, change or application on the product or any of its parts shall be prevented at all times. In case of incompliance to this Operation Manual, DVD Valves cannot be hold directly or indirectly responsible or liable.

During the use of the Valves, general regulations and standards shall be followed. Some of these regulations are defined in EN Standards. Installation of the Valves shall be done by qualified and experienced technical personnel. For detailed information regarding the Valves, DVD Documentation (Catalogs, if appropriate Special Specifications and Technical Drawings, related DVD Order Confirmation etc.) shall be used and followed.

Before disassembling the Valve from the pipeline or any of its parts from the valve, make sure that the pipeline is de-pressurized and necessary safety cautions are taken. **If the line (water or air) is pressurized, any part of the Valve can move unintentionally, without any control.**

After commissioning, consequently the Valves are working under pressure; the Valves shall be monitored at all times and should be inspected regularly. Furthermore; laws, regulations and standards about Occupational Health and Safety should be taken into consideration.

During dismantling of the Valve from the pipeline, medium can flow out from the pipe or the valve in a fast and uncontrolled way. Before dismantling, the pipeline must be emptied to prevent such an incident. Along with the medium; foreign objects (stone, sand, debris etc.) can be flowing out that can cause damage to personnel. Necessary precautions shall be taken to prevent such damage.

Operating limits such as Nominal Size, Pressure, and Temperature of the Valve can be found in DVD Documentation. Furthermore; Operating Size, Operating Pressure, Valve Body Material and Production Date can be found on the marking of the Valve Body. Any operating condition that is incompliant with these operating limits shall be approved by the Manufacturer in written. Pipeline Operating Pressure can be fluctuating (due to surge, water hammer, air regulation problems etc.). Therefore, such fluctuations should be considered, and the Valve should never be faced with a higher pressure than the defined Nominal Pressure.

Valves should be protected from frosting at all times. Especially in locations that have high risk, protective measures should be taken such as; protecting the valve chambers by isolation material, or fully draining of pipelines before freezing conditions occur. If no precaution is taken, due to expansion of water, Valve body or other parts of the Valve can be permanently damaged. DVD Valves cannot be held liable from such damages.

TRANSPORTATION AND STORAGE

During transportation and storage, Valves shall be packed with material that can withstand to its size and weight, and should be fully fixed on a pallet. If the Valves are not fully fixed on the pallet, the Valve can move during transportation and can cause severe damage. The Valve should be protected from environmental conditions and physical impacts from outside. Any part of the Valve body should not exceed the pallet dimension and shall be wrapped by protective cover (stretch film, insulation material etc.).

Valve coating and Valve accessories shall be protected at all times during transportation and assembly.

Center of Gravity of the Valve can be away from the Valve Center. Therefore, during lifting the Valve, it can swing around. Such incidents can cause damage on the lifting device, the Valve itself, and to personnel around the Valve. **Lifting operation should be done with extreme care and Center of Gravity of the Valve should be determined before lifting operation. Before lifting or moving the Valve, the counterweight mechanism should be firmly fixed to prevent sudden movement.**

Lifting Belts and Lugs which are according to safety norms shall be used. They have to be suitable for the Valve weight. Valve should be lifted only from the Lifting Bores. **Lifting from the Shaft, Lever, Actuator Mechanism or other internal parts should be prevented done at all times.** These parts are not designed to carry the weight of the Valve and lifting from these parts can cause breaking, tumbling or dropping. If a lifting device will be used on small sized valves (DN250>), Flange Connecting Holes can be used as a lifting point.

During Storage and Transportation, Valves should never be faced with direct sunlight. Under direct sunlight; seals or valve coating can get damaged. Valves should be protected and stored in a dry and aerated environment and should be protected from environmental effects. Storage should be done @ -20^{o}C/+50^{o}C temperature range. If the temperature is below 0^{o}C, before assembling the Valve; the Valve should be heated up to 5^{o}C.

Valves should never be in direct contact with the ground, and should be protected by a pallet. Valve internal surface and moving parts should be protected from foreign particles, sand, dirt, debris etc. Debris collected on moving parts can cause these parts to get stuck and prevent valve operation. Flange Protection Covers should only be dismantled right before assembly to the pipeline.

Valve seat and seal are extremely sensitive and should be cautiously protected at all times. This cautious protection should be done at all times, including but not limited to storage, transportation, installation and operation stages. In case of a small scratch or debris collection on the body seat surfaces Valve can face leakage problems. DVD Valves cannot be held liable from such seat and seal ring damages.

USE AND APPLICATION

DVD KVC Butterfly Valves are equipped with counter weight and hydraulic cylinder. The valve is opened by hydraulic cylinder and closed by the counter weight. Hydraulic cylinder is equipped with throttling valve to control the closing duration of valve. Throttling valve can be locked in order to prevent unauthorized operation. Hydraulic power should be connected to the cylinder.

DVD Butterfly Valves are designed as Isolation Valves (On-Off) and cavitation damage can occur in case of regulation (semi valve disc opening). If vibration or noise occurs during the operation of the Valve, please check whether the Valve is either in fully open or fully closed position. If the disc position is ok but the problem still continues, please check the system operation conditions (flow rate, pressure etc.) in order not to face any cavitation damage.

DVD KVC Butterfly Valves in standard configuration are designed to be used in potable or raw water systems. Operation in medium containing gas, oil etc. is only possible with written manufacturer approval and with special material selections suitable to the medium.

In systems that contain foreign particles (dirt, sand, debris etc.), the Valve can be clogged or sealing problems can occur. KVC Butterfly Valves should not be used in such applications. If the particle level is very low, Strainers should be used in the upstream of the Valves. For special applications other than clean water systems, please get in contact with the manufacturer and request a written approval.

High Water Velocity can cause damage to the Valve. To prevent such damage, please check the Water Velocity. Maximum operating velocity for DVD Valves is as follows:

Nominal Pressure	Max Water Velocity
10 bar	3 m/s
16 bar	4 m/s
25 bar	5 m/s
40 bar	6 m/s

DVD Hydraulic Actuators are specially designed for the project data provided. Please provide the below details for a proper Hydraulic Actuator selection. If the below data was not provided to the manufacturer during the order, or if the provided data was revised without the manufacturer's consent, DVD Valves cannot be held responsible from the proper operation of the Valve:

- Design Pressure
- Operating Pressure
- Min – Max Operating Discharge Flow Rate
- Flow Velocity
- Closing Time
- Opening Time
- Min – Max Oil Pressure

Standard DVD KVC Butterfly Valves are not equipped with a Hydraulic Pack, Foundation Plate or Terminal Box. If such accessories are required, it should be informed to the manufacturer before the order and manufacturer's written consent should be taken.

INSTALLATION TO THE PIPELINE

Pipeline flanges, which the valve will be installed to should be in the same axis and flange surfaces should be parallel to each other. Sealing problems can be seen if this is not obtained, and/or the Valve can face high load forces that can cause failures in long time. Load forces transmitted to the Valve from the pipeline should not go beyond what is defined in EN 1074-2 standard. Not to do so can cause Valve failure.

For Valve installation, enough distance should be provided between two connecting pipeline flanges. Shorter distance than needed can damage the Valve flange or the Valve coating. If there is longer distance than needed, do not try to pull the pipeline flanges and Valve flanges towards each other. During installation, make sure that flange surfaces are clean and smooth.

Valve flange to pipeline flange connection should be done by bolts and nuts; and washers must be used to protect the Valve coating. Opposing bolts should be screwed equally, preventing high load forces, strain and failure. Steel reinforced gaskets or special O-rings should be used between the flanges. Make sure that the gaskets are correctly positioned on the sealing surface of the flanges. Flange bolting should be selected according to EN 1591 Standard requirements. Excessive screwing of the bolts can cause permanent damage on the Valve.

Valve should be protected from outside effects (construction work, coating, concrete work etc.) at all times. Welding work should be concluded before Valve installation, and welding burrs should be cleaned beforehand.

Pipeline should be flushed and cleaned from all foreign particles, before Valve installation. Even though the pipeline can seem to be clean around the Valve installation area, during filling the line, particles from long distances can be carried to the installation area and can cause permanent damage on the Valve. DVD Valves cannot be held liable from damages occurred due to foreign particles such as debris, dirt, stones, wooden sticks etc.

Valves have body seat which is precisely machined to provide sealing. **The Valve seat and sealing are extremely sensitive and should be cautiously protected at all times.**

If a residual (sand, stone, sticks, leaves etc.) gets in-between the body seat and sealing, the Valve cannot provide sealing. Furthermore, in case of a small scratch on the seat surfaces and damage to the sealing ring, the Valve cannot provide sealing. Residuals in the line, hitting the rings; can damage or wear the ring. Therefore make sure that there are no residuals on the line. For such incidents, DVD Valves cannot be held liable.

Especially at steel pipeline applications, make sure to have full cathodic protection. In the absence of cathodic protection or non-active protection, Galvanic Corrosion can occur very fast. DVD Valves cannot be held liable from such damages.

Inspect the Valve before installation and make sure that there are no foreign particles inside the Valve. Check the sealing surfaces of the Valve and confirm that they are clean. Open and close the Valve at least one time and check the functionality of the Valve before installation. For Valves that are stored for a long period of time, please check the sealing ring and sealing for any deformation and please contact the manufacturer if you see any problems.

If the Valve needs to be re-coated on site, for maintenance purposes, be sure to protect the sealing surfaces (gaskets, O-rings, stainless steel surfaces etc.) If these surfaces are coated, sealing problems can occur.

VALVE POSITIONING

During installation, take into consideration possible inspection and maintenance circumstances and provide enough space for such intervention. Quick Couplings such as Dismantling Pieces should be used together with the Valve for ease of dismantling the Valve. Dismantling Pieces are recommended to be installed in the upstream of the Valve. Furthermore, a Lifting Device should be available on the site that is in line with the weight of the Valve. Otherwise, dismantling and re-installing of the Valve for maintenance purposes will not be possible.

Butterfly Valve Disc rotation can go beyond the Valve Body; and Disc may need more space than the Body. Therefore, if there is a restriction for not installing a straight pipeline in the upstream and downstream of the Valve; make sure that equipment around the Valve is not preventing the Valve Disc Rotation.

If the Butterfly Valve is to be installed in the downstream of a Regulating Valve (Hydraulic Control Valve, Plunger Valve etc.) or a Pump, make sure to leave at least DN x 10 gap. Cavitation risk is higher for Regulating Valves and Pumps compared to stationary equipment.

In case nothing is mentioned with the Order, DVD factory set Configuration is to place the lever and counterweight hydraulic actuator on the right of the water flow direction, weight dropping against flow direction. Any other configuration should be mentioned in the order, and written approval should be received from the manufacturer.

In KVC models, lever & counterweight moves with the disc. Thus, there should not be any objects which might limit the movement of the lever & counterweight around the Valve. Besides, lever & counterweight can move suddenly due to the disc movement, without any notice. Thus, security should be provided for people around the valve.

Standard configuration of KVC Butterfly Valves should be installed horizontally. If vertical or tilted installations are required, this information should be provided to the manufacturer during the order process and should be approved by the manufacturer in written. **Do not position the standard KVC Valve in vertical or tilted positions.**

MAINTANANCE

Before starting the maintenance, make sure that the Valve is isolated; upstream and downstream pipelines of the Valve are drained and de-pressurized.

Before starting the maintenance, in order to prevent unintentional movement of lever and counter weight, locking pin should be in position either in closed or open position. In case pipeline is not de-pressurized fully; potential dangers such as sudden disc movement, part movement or pressurized water outflow etc. can occur.

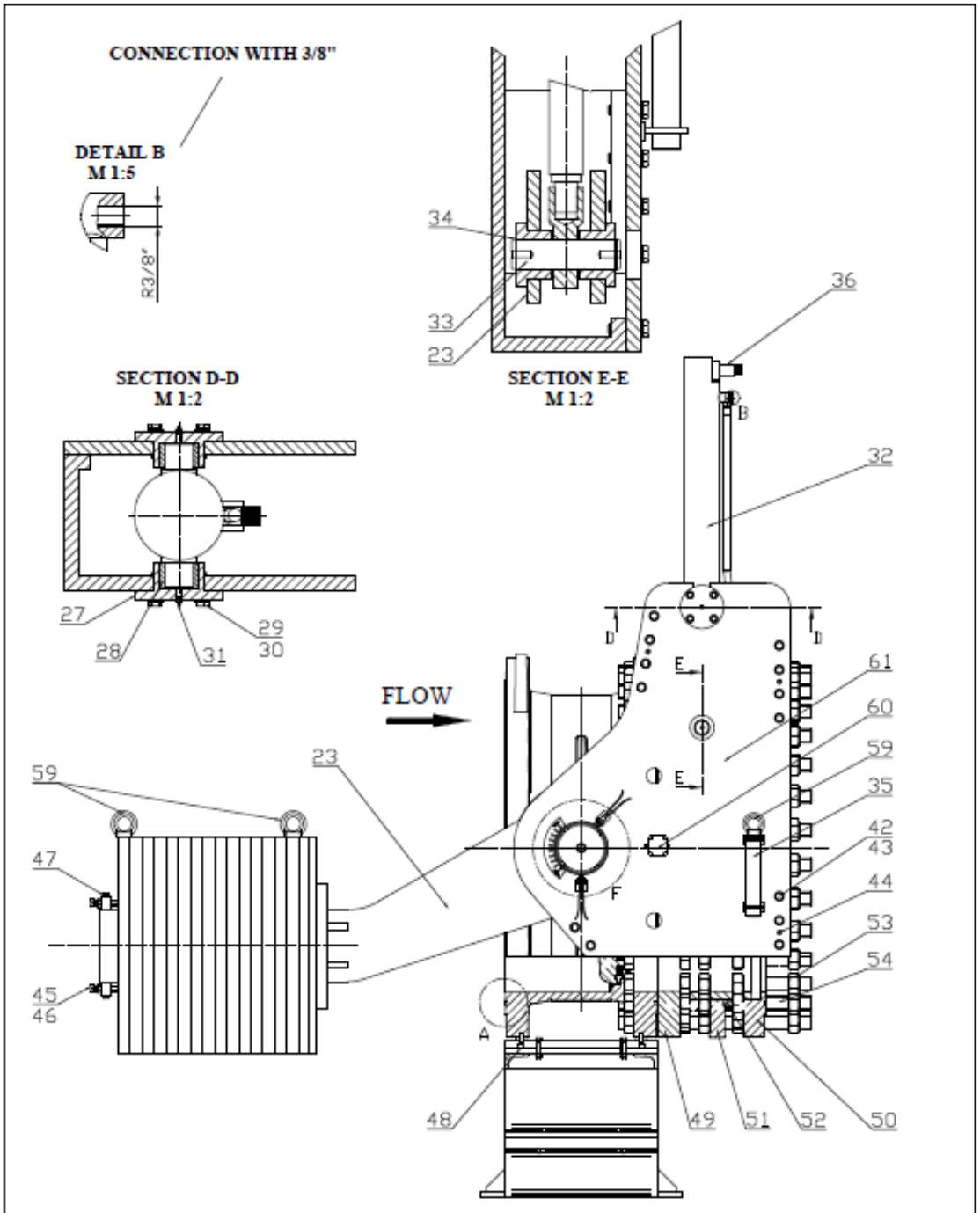
After maintenance is done, please re-install the Valve to the pipeline according to the related section in this Operation Manual.

Maintenance work should be done by experienced and skilled personnel. If there is no such personnel, please get in contact with DVD Valves and request your maintenance need. All personnel who will do the maintenance work should read and fully understand this Operation Manual.

Maintenance personnel should follow Occupational Health and Safety requirements and should use the necessary protective accessories (Work shoes, glasses, helmet, gloves etc.).

All seal rings and O-rings should be lubricated after renewal (with de-mineralized lubricant). If the Valve is potable water approved, potable water approved lubricants should be used.

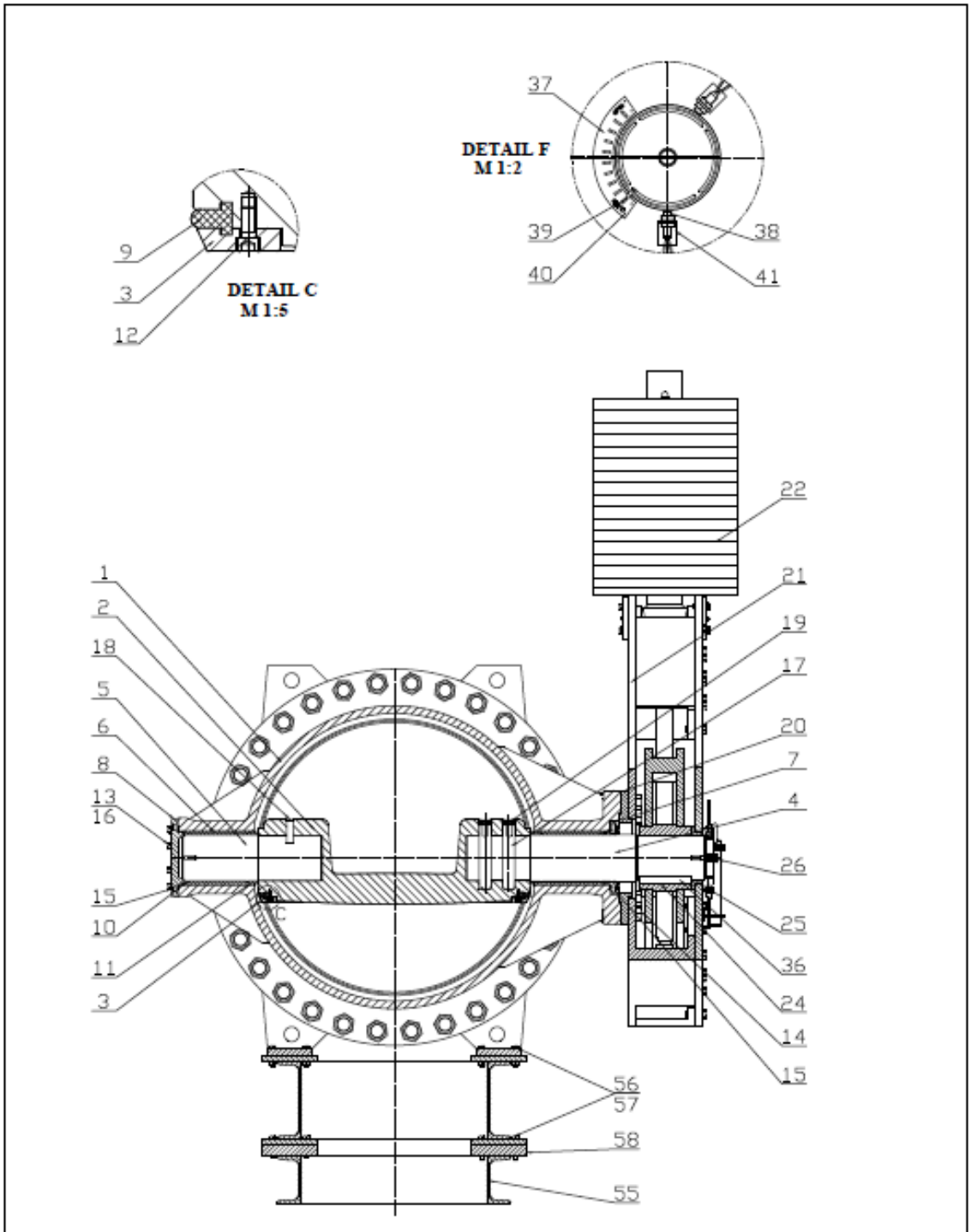
The counter weight and hydraulic cylinder are maintenance-free but the system should be protected from extreme weather conditions.



Mon. No	Qty	Part No	Part Name	Material	Standard	Note
-	-					

Product Name: TURBINE INLET VALVE WITH DISMANTLING JOINT			DVD DOĞUS VANA SANAYİ
Date	22.03.2019	İmza	Drawing No:
Design	Bülent CANBAY		
Approved	Alaattin YILDIRIM		
Size A3	Scale 1:5	Wight	

GENERAL TOLERANCE ISO 2768-M	0-6	6-30	30-120	120-400	400-1000	1000-2000	2000-4000
	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2



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Mon. No	Qty	Part No	Part Name	Material	Standard	Note
61			HYDRAULIC SUPPORT COVER	S355J2		
60			TERMINAL BOX			
59			EYEBOLT	A2		
58			STAND	S355J2		
57			WASHER	A2		
56			BOLT	A2		
55			FOUNDATION PLATE	S355J2		
54			STUD BOLT	8.8 Zn		
53			NUT	8.8 Zn		
52			SEALING RING	EPDM		
51			RETAINER FLANGE	GGG-40		
50			FLANGE PIPE SHORT	GGG-40		
49			FLANGE PIPE LONG	GGG-40		
48			BOLT	A2		
47			BOLT	A2		
46			WASHER	A2		
45			BOLT	A2		
44			SLOTED SPRING PIN	A2		
43			WASHER	A2		
42			BOLT	A2		
41			LIMIT SWITCH PLATE	S355J2		
40			RIVET	A2		
39			INDICATOR	AISI 304		
38			LIMIT SWITCH		IGS244	
37			POSITION INDICATOR PLATE	AISI 304		
36			FLOW CONTROL VALVE	GFG2PKCS18-10		
35			LOCKING PIN	X5CrNiCuNb16-4		
34			CIRCLIP	A2		
33			LEVER PIN	X20Cr13		
32			HYDRAULIC CYLINDER	Ø125/Ø70/1000		
31			GREASE NIPPLE	A2		
30			WASHER	A2		
29			BOLT	A2		
28			BUSH	DELRIN		
27			BEARING COVER	C 1040		
26			BOLT	A2		
25			BUSH	BRONZE		
24			LEVER HUB	C 1040		
23			LEVER	S355J2		
22			WEIGHT	S355J2		
21			HYDRAULIC SUPPORT	S355J2		
20			COVER	S355J2		
19			PLUG	X20Cr13		
18			PIN	X5CrNiCuNb16-4		
17			PIN	X5CrNiCuNb16-4		
16			WASHER	A2		
15			SETSCREW	A2		
14			BOLT	A2		
13			BOLT	A2		
12			BOLT	A2		
11			O-RING	EPDM		
10			O-RING	EPDM		
9			SEALING RING	EPDM		
8			COVER	GGG-40		
7			COVER	GGG-40		
6			BUSH	BRONZE		
5			SHAFT	X20Cr13		
4			DRIVE SHAFT	X20Cr13		
3			RETARINING RING	AISI 304		
2			DISC	GGG-40		
1	-		BODY	GGG-40		

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			±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2

Please follow the below steps to renew the Sealing Ring (9):

1. Check and be sure that the line is drained and empty.
2. Bring the Valve Disc (2) to fully closed position.
3. Insert the locking pin (35) to closed position locking hole in order to secure the disc in closed position.
4. Remove the weight (22) from the lever (23).
5. Pressurized oil supply should be cut from hydraulic system and hydraulic cylinder (32) should be isolated from the hydraulic main.
6. Loosen the hydraulic connections of hydraulic cylinder (32). Be careful during this operation, pressurized oil may come out.
7. Remove the Valve from the line, in line with the above mentioned requirements.
8. Remove the bolts (12) on the Retaining Ring (3).
9. Remove the Retaining Ring (3).
10. Remove damaged Sealing Ring (9).
11. Clean the Disc (2) channel and retaining ring (3) facing surface.
12. Clean the Retaining Ring (3) and Body Seat Surface.
13. Install the new Sealing Ring (9) on the Disc (2). Make sure that T shaped seal ring is correctly fit to the channel.
14. Install the Retaining Ring (3) on the Sealing Ring (9). Make sure that ring is correctly fit with the Retaining Ring (3).
15. Tighten the Retaining Ring (3) bolts in opposing order.
16. After installing the Valve, check the Disc (2) for good sealing.

Front Cover (7) O-ring renewal should be done by competent personnel only. It is recommended to get in contact with the manufacturer for this process. In order to reach and replace the Front Cover O-ring all drive system (hydraulic cylinder, lever, counter weight) should be removed)

Please follow the below steps to renew the Front Cover (7) O-rings:

1. Check and be sure that the line is drained and empty.
2. Bring the Valve Disc (2) to fully closed position.
3. Remove the weight (22) from the lever (23).
4. Pressurized oil supply should be cut from hydraulic system and hydraulic cylinder (32) should be isolated from the hydraulic main.
5. Loosen the hydraulic connections of hydraulic cylinder (32). Be careful during this operation, pressurized oil may come out.
6. Close hydraulic connection ports of cylinder with plugs in order to prevent ingress of particles.
7. Secure and hold the hydraulic cylinder by the help of crane.
8. Remove the circlips (34) on the lever pin (33) connects the cylinder to the lever.
9. Take the pin (33) out.
10. Remove the bolts (29) on cylinder bearing covers (27). Check once again hydraulic cylinder is in a safe position and then remove the bearing covers (27).
11. Take the hydraulic cylinder by crane and keep it on a clean and safe surface.
12. Remove the position indicator.
13. Secure and hold the hydraulic support cover (61) by the help of crane.
14. Remove the bolts (42) fixing the cover to the hydraulic support body.
15. Take the hydraulic support cover (61) by crane and keep it on a clean and safe surface.
16. Secure and hold the lever (23) by the help of crane.
17. Use a suitable pulling tool to move the lever. Remove the lever by sliding out on the drive shaft (4).

18. Take the lever by crane and keep it on a clean and safe surface.
19. Remove the bolts (14) of the Front Cover (7) and take it out. Do not touch setscrews (15) during this operation. Setscrews should be kept in position.
20. Remove the O-rings on the Front Cover (7).
21. Clean the O-ring channels on the cover and mating surfaces on shaft housing.
22. Renew the O-rings on the Front Cover (7). Make sure that the new O-rings are fit correctly.
23. Tighten the Front Cover (7) bolts (14) in opposing order.
24. Follow the procedure backwards in order to assembly the system.
25. After installing the Valve, check the body shell for good sealing.

Back Cover (8) O-ring renewal should be done by competent personnel only. It is recommended to get in contact with the manufacturer for this process.

Please follow the below steps to renew the Back Cover (9) O-rings:

1. Check and be sure that the line is drained and empty.
2. Remove the bolts (13) of the Back Cover (8) and take it out. Do not touch setscrews (15) during this operation. Setscrews should be kept in position.
3. Clean the O-ring channel on the cover and mating surfaces on shaft housing.
4. Renew the O-ring on the Back Cover (8). Make sure that the new O-ring is fit correctly.
5. Tighten the Back Cover (9) bolts in opposing order.

CONTACT INFORMATION

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