

MSA, a. s. <b>DOLNÍ BENEŠOV</b>	<b>ASSEMBLY AND OPERATING INSTRUCTIONS</b>	Sheet No.: <b>1/23</b>
		Issue No.: <b>6</b>

## Assembly and Operating Instructions

### 组装和 操作说明

## BALL VALVES

### 球阀

此文件是 MSA 独有的知识产权，未经 MSA 技术部门经理同意禁止将此文件复印或提交给其他组织。

**出售阀门图纸七万套，水泵图纸1万套**

This document is an exclusive intellectual property of MSA, a.s. Dolni Benesov. Making copies of this document for other organizations, or submitting it to other organizations without consent of production technical director is forbidden.

Manufacturer: MSA, a. s.

Hlucinska 41

Dolni Benesov

747 22

Czech Republic

	Division	Name	Date	Signature
Made by:		<b>Ing. Jindrich Gratza Pavel Schiedek Designers</b>	<b>5. 3. 2004</b>	
Tested by:		<b>Ing. Jan Kalabza Chief Designer</b>	<b>5. 3. 2004</b>	

M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 2/23
		Issue No.: 6

**Contents:**

**内容**

1. 介绍 Introduction.....	3
2. 储存 Storage .....	3
3. 安装 Installation .....	4
4. 操作 Operation .....	6
5. 调试 Adjustment.....	10
6. 故障诊断 Trouble Shooting .....	11
7. 修理 Repairs.....	13

出售阀门图纸七万套，水泵图纸1万套  
QQ1263719818

**Annexes:附件**

č. 1 球阀的操作 Manipulation with Ball valve (BV).....	15
č. 2 球阀型式 BV Types .....	17
č. 3 球阀焊接的温度限制—管线 Temperature Restriction for BV Welding – Pipeline .....	18
č. 4 球阀压力引出位置 Position with Pressure Extraction.....	19
č. 5 球阀安装到管线上 BV Installation into Pipeline .....	20
č. 6 球阀密封元件的更换 Replacement of BV Sealing Elements.....	21
č. 7 球阀执行机构的更换 Replacement of BV Actuator.....	22
č. 8 球体位置调节装置 BV Adjusting Unit.....	23

M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 3/23
		Issue No.: 6

## 1. 介绍 INTRODUCTION

- 1.1 球阀是设计用以全关或全开两位式控制流经管线的介质流动的工业装置。不能对球阀进行在开与关之间的位置操作。

Ball valves (hereinafter BV) are two-way industrial valves designed for total opening or total closing the flow of operating fluid flowing through the pipeline. The BV cannot be operated in interposition.

- 1.2 球阀的使用范围由采购合同中的技术规格书规定和由设备铭牌中列明的压力—温度系列等级确定。

BV scope of use is determined by the technical specification stated in the contract and by the pressure-temperature system identified in the nameplate.

- 1.3 球阀用户必须使实施球阀安装的工人掌握此规程，以避免不适当的安装和不正确的使用导致阀门损坏。

The consumer is obliged to make the workers performing BV installation acquainted with this regulation. Thus improper installation and improper putting BV into operation or BV damage is avoided.

- 1.4 本规范适用于 TB 型球阀（三段式锻钢球阀）和 TW 型球阀，TW 型与 TB 型结构相同。TB 型球阀的阀体和阀盖之间是用螺栓连接的，而 TW 型是用焊接方式连接的，  
出售阀门图纸七万套，水泵图纸1万套  
001263719818

This regulation applies to ball valves of TB design (three-piece BV design of forged steel with two divisional planes) and TW design, which is identical with TB design. TB design has its divisional planes bolted together and TW design has its divisional planes welded - see Annex No. 2.

- 1.5 在质保期内对球阀的每一次操作，用户均应在操作日记或相类似的文件中记录。

Each activity performed on a BV and its actuator within the warranty period must be recorded by the user in a Operation Diary or other similar document.

- 1.6 不按本安装使用说明对球阀进行操作，视为用户违反采购合同，制造厂将取消质保。

Noncompliance to these Assembly and Operating Instructions will be considered as a violation of the contract by purchaser resulting in cancellation of warranty by supplier.

## 2. 储存 STORAGE

- 2.1 在附件 1 中规定了推荐的球阀管理方法。制造厂建议将带有执行机构的球阀或不带执行机构的球阀置于垂直位置存放。

Recommended manipulation with BV is specified in Annex No. 1. The manufacturer recommends storage of BV with or without actuator in vertical position.

- 2.2 球阀可被存放于封闭或露天场所，但不应使它们直接暴露于大气中，以防止球阀损坏，并避免任何机械材料在球阀安装到管线上之前进入到球阀通径内。

<p>MSA, a. s. DOLNÍ BENEŠOV</p>	<p>ASSEMBLY AND OPERATING INSTRUCTIONS</p>	<p>Sheet No.: 4/23 Issue No.: 6</p>
-------------------------------------	--	---

The ball valves must be stored in closed or open spaces but they shall always be protected against direct exposure to weather conditions, damage and intrusion of any mechanical materials into BV bore before its installation into pipeline.

- 2.3 万一在存放过程中发生损坏，必须对包装、防护层及面漆调整使其恢复到原来的状况。可以向球阀制造厂咨询有关涂漆方面的要求。

In case that there occurs damage during manipulation, it is necessary to adjust packaging, protective shields or paint into the original condition immediately. Consult paint repair with BV manufacturer.

- 2.4 当阀门与执行机构一起存放时，必须遵守相关执行机构的技术文件中规定的存储条件要求。

When storing the valves including actuators it is necessary to observe storage conditions specified in technical documentation of the respective actuator.

### 3. 安装 INSTALLATION

- 3.1 如果采购合同中要求在球阀组装和投入使用时要有 MSA 公司代表在场，用户必须提前 14 天通知。

If the contract requires presence of a representative of MSA a.s. during BV installation and its putting into operation, it must be announced 14 days in advance.

- 3.2 球阀的安装、使用、保养和维修工作，都必须由经过专业培训合格的人员进行，这些人员应能遵守所有安全规定并确保其工作质量。未经培训的人员对球阀进行操作，视为对采购合同的严重违背。

In the course of installation, operation, attendance and maintenance of ball valves it is always necessary to work with adequately trained personnel who observe all safety regulations and ensure quality performance. Use of non-trained personnel for operation with BV or actuator can be considered as a substantial breach of the contract.

- 3.3 球阀的运输、处置、储存和将球阀安装到管线的过程中，排污管线、放空管线、密封脂注入管线、喷漆或执行机构可能会发生损坏，或者某些螺栓发生松动。如果上述损坏发生，应该立即通知球阀制造商，球阀制造商将决定修复方式。

During transport, handling, storage or installation of BV into pipeline damage of drain, vent, sealing piping, paint or actuator or bolt relaxation can occur. BV manufacturer must be immediately informed of any damage occurred and he will decide about the proper way of repair.

- 3.4 如果是法兰连接的球阀应在尽可能临近安装前，而对焊接球阀应在尽可能临近焊接之前拆除盲堵设施。

Removal of blinding devices of bore in case of the flange design is to be done as late as possible prior to installation and in case of the weld design prior to welding of connecting pieces (pipeline) to the BV.

<p>M S A, a. s. DOLNÍ BENEŠOV</p>	<p>ASSEMBLY AND OPERATING INSTRUCTIONS</p>	<p>Sheet No.: 5/23 Issue No.: 6</p>
---------------------------------------	--	---

- 3.5 当将连接件与球阀焊接或球阀与管线焊接时必须选定一定的措施使得距球阀端部距离为“X”处的球阀的最高温度为 120°C — 见附件 3。推荐的距离与压力等级关系一直到 PN100（包括 PN100）。

When welding connecting pieces to the BV and welding the BV into the pipeline it is necessary to select such a procedure so that in the distance “X” from the end of the proper BV there is maximum temperature 120°C – see Annex No. 3. The recommended distances relate to pressure classes up to PN 100 including PN 100.

- 3.6 尤其是对于带有特殊保护性喷漆系统的埋地球阀，或者即使采用其它种类的保护漆，也都必须采用适当的焊接方法以保护球阀表面的防护涂层不被焊接产生的热量损坏。

Especially in case of underground BV, which is coated by a special protective paint type, but also in case of other paints, it is necessary to select such welding procedure so that generated heat does not damage this protective coat.

- 3.7 对法兰连接的球阀在阀座与阀体之间的保护带必须同时与流道挡板一起去掉；对焊接连接的球阀应在现场与过渡短节（管线）焊接后去掉保护带。如果不要求过渡短节，可在将阀门焊接到管线上之前移除保护带，制造厂建议在开始焊接前用一块薄板在流道的下半部盖住护带，避免将护带点燃。

Covering tapes of gaps between the BV seat and body are to be removed simultaneously with the flow coverings in case of the flanged design BV and in case of the BV weld design only after welding of transition pieces (pipeline) on site. In case transition pieces are not required remove protective tape just before welding the valve into the pipeline. The manufacturer recommends to cover the protective tape in the flow bottom half with a metal sheet prior to starting welding to avoid burning of the tape.

- 3.8 除非订购合同中有特殊要求，球阀是双向阀门，故可以根据用户连接执行机构或相关准则的需要安装到管线上。然而，如果采用管线内的介质驱动执行机构，执行机构动力源管线必须安装在球阀的上游—见附件 4。此时，需按照标明的安装方向进行安装。

Except special cases specified in the contract, the BV is bi-directional valve, so it can be mounted into the pipeline according to user needs with regard to free access to actuator or different criteria. However, if the actuator driven by the transported medium is used, the actuator power supply tube must be installed upstream the medium flow - see Annex No. 4. In this case, marked mounting orientation shall be followed.

- 3.9 球阀在管线上安装时只能在全开位置，也就是在供货时球阀所处的阀位。只有在移除阀座保护带后才能对球阀进行操作。不允许在球阀安装前调整阀球的位置。球阀通常水平安装在管线上而阀杆是在垂直位置。例外情况要做商务处理，且必须在合同中已确认采用其它安装位置。

The BV is installed into the pipeline only in open position, i.e. in the supplied position. Manipulation with the valve is possible only after removal of seats protective tape. Adjusting of the ball position is forbidden. BV is usually placed in the horizontal position in the pipeline, with the stem in the vertical position.

The exceptions are business cases where another position was confirmed already in the contract.

M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 6/23
		Issue No.: 6

- 3.10 球阀的焊接和安装到管线上要按照技术流程和用户制定的相关安全规则实施—见附件 5。

Welding of the BV and its installation to the pipeline can be performed according to the technological process and the respective safety regulations of the consumer – see Annex No. 5.

- 3.11 DN200 以上（含 DN200）的球阀必须放置在坚固的基础之上（如混凝土墩），使得球阀不承受来自管线的附加应力，在将球阀安装在管线的轴线上，不产生轴向、垂直和横向偏差的情况下可以使这一应力最小。最大允许偏差为 2°。

The BV from DN 200(8”) including DN 200 must be placed on a solid base (cement block), so that the BV is not stressed by additional stress from the pipeline. This stress can be also minimised by placing the BV in the pipeline axis without an axial, vertical and lateral deviation. The maximum permitted deviation is 2°.

- 3.12 在将球阀焊接到管线上以后，制造厂建议清理球阀内部区域和相邻的管线部分以提取焊接过程中产生的焊渣等残留物。如果不能进行清理工作，在进行管线吹扫（blow-through）和清洗之前不允许操作球阀。如果用水清洗管线，必须在水中加入腐蚀抑制剂并在清洗后将球阀排空。使用者必须防止球阀中的残留水份将球阀冻坏。

After welding the BV into the pipeline, the manufacturer recommends to clean the BV internal area and the adjacent sections of the pipeline by extracting residuals generated in the course of welding. If this operation cannot be performed, it is forbidden to handle with the BV until performing blow-through or rinse of the pipeline. In case of water rinse, the water must contain corrosion inhibitor and after finishing the operation the BV must be drained. The user is obliged to prevent the BV from freezing of water residuals.

- 3.13 如果排污和放空管线带有截断阀，并且这些截断阀将埋于地面以下，用户采用的安装方法必须保证土壤载荷不会对于这些截断阀产生损坏。如果采用这样的方法进行安装，排污管线和放空管线发生了任何变形，这些截断阀发生的泄漏不在阀门制造厂的责任范围之内。

In case the ball valve is fitted with block valves in the drain and/or vent lines and these block valves will be installed underground, the user has to assure such method of soil loading avoiding damage on these valves. In case of any deformation of the drain and/or vent lines it is not acceptable to claim the untightness of those lines.

- 3.14 如果加长杆和阀门是分开运输的，用户必须保证现场组装后阀杆与阀门的相互位置与在制造厂车间测试期间的相互位置相同。

In case the valve and stem extension are delivered dismounted, the end-user has to assure the same mutual position after the assembly as it was in the producers' workshop during the tests.

#### 4. 操作 OPERATION

- 4.1 在对管线系统及其附属设备进行清洗以后，可根据用户的条件决定将其投入使用。

<p>MSA, a. s. DOLNÍ BENEŠOV</p>	<p>ASSEMBLY AND OPERATING INSTRUCTIONS</p>	<p>Sheet No.: 7/23</p>
		<p>Issue No.: 6</p>

After cleaning the pipeline system including fittings, it can be put into operation according to consumer condition.

- 4.2 在将球阀投用前，应检查球阀所有螺栓是否拧紧，并检查所有排污和放空管线的状态，这些附属管线必须是在关闭状态。

Prior to putting into operation, it is necessary to check the BV for tightening of all screw joints and to check position of fittings on drainage and vent lines, which must be closed.

- 4.3 在进行管线压力试验时，球阀必须在全开位置。中间位置是不允许的。压力试验的最大许用压力不得超过 1.5PN，PN 值在球阀的铭牌上注明。在制造厂，球阀是在此压力下进行试验。球阀内部必须彻底放空，所使用的水必须是清洁的并加入腐蚀抑制剂以保护球阀内部免被腐蚀。

During pipeline pressure tests the ball valve must be always in open position. Interposition is not permissible. Maximum permitted pressure for pressure test is 1,5\*PN; PN is stated on the name plate. The BV was tested for this pressure in the manufacturer's plant. The BV internal area must be vented.

Water being used must be clean and treated with inhibitors in order to protect the BV internal areas against corrosion.

- 4.4 当管线和球阀一起进行试验，球阀的执行机构已连接到管线上时（例如：气动执行机构或气液联动执行机构），在试验开始前，应将全部引压管等关闭。

During tests of the pipeline with the BV whose actuators are connected to the pipeline (e.g. pneumatic or gas-over-oil actuator), it is necessary to close these take-off tubings before starting the tests.

- 4.5 在进行球阀严密性试验时使用的压力值应符合技术规格书或采购合同上的规定。During tightness tests of the BV, there apply pressure values specified in the technical specification or in the purchase contract.

- 4.6 在进行压力和严密性试验后必须将球阀内部的可能导致冻冰的水排空以免造成球阀损坏的结果。

After performing pressure and tightness tests it is necessary to drain the BV so that possible freezing of water and consequent BV damage is avoided.

- 4.7 如果在压力试验后到投入使用之间的时间间隔较长，制造厂建议在第一次操作球阀之前用油清洗阀座。清洗可以通过密封脂注入装置进行。如果用户要求，这一工作可以由 MSA 提供。

If there is a longer interval between the pressure tests and putting into operation, the manufacturer recommends rinsing the seats with oil prior to the first manipulation with the BV. Rinse is done through sealant injection fittings. This action can be provided by MSA on request.

- 4.8 对设计用于气体的球阀，在阀体中间与阀门的上游和下游之间有旁路管连接，推荐用下述方法打开球阀：在将球阀后部的气体压力与阀体内腔（球阀壳体、球与阀座之间）的压力平衡以后，关闭旁路的第一部分（上游部分）并让第二部分与气体流向相同并永久处于全开的状态。

<p>M S A, a. s. DOLNÍ BENEŠOV</p>	<p>ASSEMBLY AND OPERATING INSTRUCTIONS</p>	<p>Sheet No.: 8/23 Issue No.: 6</p>
---------------------------------------	--	---

It is recommended to open the ball valves designed for gas service, which have bypass connecting the BV area upstream and downstream with the BV center, as follows. After balancing gas pressure in the branch downstream and the cavity (between BV casing, ball and seats), close the first branch of the bypass (upstream) and let the second branch be permanently open in the direction of gas flow.

- 4.9 在阀体内腔已经放空的情况下，对于带有旁通装置的球阀，必须对阀体内腔重新加压。

In case the body cavity is depressurized, then for BV with by-pass device the body cavity must be pressurized again.

- 4.10 对于 12”及以上球阀，推荐在球阀前后压力平衡的条件下开启球阀。如果在球阀前后压力不平衡的情况下操作球阀，制造厂不对可能产生的损坏负责，整个管路系统的工作介质流的空气动力效应或流体动力效应可能会损坏球阀。

It is recommended to open ball valves of sizes 12” and larger with balanced pressures before and behind the valve. In case of operation with ball valves of sizes 12” and larger with unbalanced pressures the manufacturer is not responsible for possible damages, which can be caused by aerodynamic or hydrodynamic effects of working medium flow on the whole piping system.

- 4.11 如果任何球阀应用于填充管线系统，球阀的开启过程必须连续并满足规定的开启时间。球阀在中间位置对管线进行填充是严格禁止的。同样的操作方法（即：快速连续开启或关闭）适用于排污和放空阀。

In case that any ball valve is used for filling of a pipeline, the ball valve must be continuously open in accordance to specified time of opening. Any filling of a pipeline with the valve in intermediate position is strictly prohibited. The same operation method, i.e. quick continuous opening or closing, must be used also for drain or vent valves.

- 4.12 由于 4.10 及 4.11 所述的原因，制造商推荐 12”及以上球阀安装旁通连接。旁通阀门的采用可以大大延长主阀的寿命。

Due to reasons stated in the par. 4.10 and 4.11 above the manufacturer recommends to equip ball valves of sizes 12” and larger with by-passes. Use of by-pass valves considerably extends life time of the main ball valve itself.

- 4.13 用于液体（油，水等）且阀座要求具有双活塞（DPE）功能的球阀，球阀必须装有泄压装置。和旁路一样泄压管将球阀两端与中心部分相互连接。应用户要求可以提供只有一根泄压管线的球阀。如果球阀配有两根泄压管线，在泄压操作时，一根管线开启时，另外一根管线必须关闭。

Ball valves intended for liquids where “double piston effect” seats were required, must be equipped with a relief device. The relief device connects as well as by-pass both valve ends with valve center. Based on customer requirement it is possible to supply a ball valve with only one relief line. In case a ball valve is equipped with two relief lines, one of the two lines must be always open and the second closed.

- 4.14 在球阀使用的过程中需要对球阀的状况进行定期检查和进行标准化的维护（例如拧紧任何因振动影响而松动的螺栓等）。

M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 9/23
		Issue No.: 6

In the course of the BV operation it is necessary to perform regular inspection of its condition and to perform standard maintenance (e.g. tightening any screw joints loosened by influence of vibrations etc.).

- 4.15 制造厂建议每年将球阀的排污口排放一次或在球阀计划停用（检修）时排放一次，避免排放管被杂质堵塞。作为停用（检修）的一部分工作，制造厂还推荐对球阀多次开关（over-cycling）以避免在球的部分形成沉积物。

The manufacturer recommends to perform BV drainage once a year or during planned putting the unit out of operation to prevent the drainage line from clogging with impurities. The manufacturer also recommends to perform the BV over-cycling as a part of putting out of operation. The purpose of over-cycling is to avoid formation of deposits on the ball area.

- 4.16 由于在流动介质内所含的杂质的影响在运行期间可能发生阀座密封的部分密封失效或由于动态应力的影响耳轴的“O”形密封圈也会失去密封性。泄漏问题可以通过密封脂注入装置注入 FUCHS 生产的 RENOLIT 密封脂（早期的商品名叫 RENEX）或与之相当的密封脂暂时解决或减轻。

在注入密封脂时，需要将球转动 3—4 次，以使密封脂均匀的分布在整個阀座的环线上。

介质的流动会将密封脂驱向损坏部位并形成密封。当对耳轴注入密封脂后，也应将其转动 1—2 次。鉴于密封脂的粘度较高，不适合在温度低于+5°C 的情况下注入密封脂。

在必要的情况下，可以通过加热的方法降低后密封脂的粘度。

密封脂注入操作完成后，必须将密封脂注入管件置于原来的位置（拧上丝堵）。密封脂注入装置必须能够产生 1.5 倍的工作压力。紧急情况密封脂注入装置的最大承受压力为球阀公称压力的三倍。

By influence of impurities contained in the flowing medium there can occur partial loss of BV seat tightness during the operation or loss of tightness of the trunnion „O„ rings by influence of dynamic stress. Leakage can be temporarily stopped or reduced by sealing paste Renolit (the earlier trade name was Renax) made by FUCHS or equivalent type of other producer put through sealant injection fittings.

When injecting the sealant to the seats it is necessary to cycle the ball 3-4 times during indentation so that the paste is evenly spread over the whole circumference of the seats.

The medium flow will force the paste in the damaged place and seal it. When sealing the trunnion it is also suitable to perform cycling 1 - 2 times. With regard to big viscosity of sealing agent it is not suitable to perform after-sealing with temperatures under +5°C.

In necessary cases heating up of the after-sealing agent can decrease viscosity.

When accomplishing sealing it is necessary to put the emergency grease fittings into original position (screw them into the sealing plug). The sealing device must be able to generate pressure at least 1,5 times higher than operating pressure. Maximum allowable pressure of emergency sealing is triple of valve nominal pressure.

<p>M S A, a. s. DOLNÍ BENEŠOV</p>	<p>ASSEMBLY AND OPERATING INSTRUCTIONS</p>	<p>Sheet No.: 10/23 Issue No.: 6</p>
---------------------------------------	--	--

- 4.17 球阀都带有无论球在开或关的位置都可以在运行状态下更换耳轴上部密封环的结构。管线可以维持原来状态不变，对地上球阀，执行机构和第三法兰要拆掉，而对埋地球阀，还必须拆除延长阀杆短接。阀体内腔当时的压力状况可以通过放空管线监测到。详细内容见附件 6。

Ball valves are of design enabling replacement of the trunnion upper sealing ring under operation with open or closed ball position.

Actuator and the third flange are removed in case of the above ground design, and additional removal of the extending adapter is necessary in case of underground design, while piping must be maintained in the original position.

Current pressure condition in the BV body cavity is to be monitored through the vent line.

For more details – see Annex No. 6.

- 4.18 如果管线停用球阀不带压力，见附图 6，则可以更换更多数量的耳轴周围的密封件。在这种情况下有必要保证部分拆卸的球阀附近的区域不受污染。

If the piping is put out of operation and the BV has no pressure, it is possible to replace a higher number of sealing elements in the trunnion area – see Annex No.6. In this case it is necessary to secure the workplace in such manner so that there does not occur pollution of accessible areas of partially removed BV.

- 4.19 根据第 4.14 到 4.18 条要求进行的操作必须通过 MSA 或由 MSA 授权的服务结构来做。

Operations according to articles 4.14 to 4.18 must be performed through the manufacturer or an organization which is authorized for such services by MSA, a.s.

- 4.20 当要投用和对执行机构做适当处理时，用户必须遵守所用执行机构制造厂给出的说明书。执行机构操作说明和规定也是产品文件的一部分。如果要将阀门与执行机构一并投入使用。

When putting into operation and with proper handling with the actuator, the consumer must observe instructions of the manufacturer of the actuator that is used. Actuator operating instructions and regulations are a part of the product documentation.

- 4.21 电气接线（包括电缆）包括球阀控制信号由用户提供。制造厂要求控制的连接或可能的阀位的调节（他们通常由制造厂进行调节）和信号调节应由经过训练的专业的人员完成。上述工作可由 MSA 或 MSA 授权的服务机构完成。

Electrical wiring (i.e. cabling) including signalling for the BV control is provided by the consumer. The BV manufacturer requires to make connection of the control, or possible adjustment of positions (they are usually adjusted by the manufacturer) and signalling by professionally trained workers. The described operations can be ordered in MSA or Servis.

- 4.22 如果 MSA 的代表参加球阀的安装和投用，他的根据采购合同及技术规格书所做出的满足所有所需条件和无明显隐含缺陷的报告将作为质保期开始的相关依据。

M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 11/23
		Issue No.: 6

If MSA representative is present at installation and putting into operation, his report of fulfilling all required conditions and non-revealing any defects is relevant for starting warranty period according to the purchase contract and technical specification.

## 5. 调节 ADJUSTMENT

- 5.1 球阀球体所处位置（即：阀位状态），根据安装在执行机构上部的固定的指示器的位置就能从阀的外部得到直观的显示。

State of position of the BV closing element (ball) can be evaluated visually from the outside according to a fixed indicator position which is located in the actuator upper part.

- 5.2 在需要拆除或更换执行机构时，根据耳轴上的键槽的位置粗略的判定其方位。阀开位置时键槽的方位在管线的轴线位置上，关闭位置时键槽在与管线垂直方位。要准确调整执行机构的开、关状况，必须把开和关的位置在第三法兰区域内做一个机械标记—见附件 7。

In case of actuator removal or its exchange, there is gross orientation according to key grooves position in the stem. Open position is signalled by the grooves of the keys in the pipeline axis and closed position is signalled by their location crosswise the BV.

To accurately adjust the actuator for closed – open condition, it is necessary to make mechanically a mark in the 3. flange area in the open as well as closed position - see Annex No. 7.

- 5.3 当向用户提供的球阀不带执行机构时或根据用户要求提供的球阀带有调整装置时，球阀的开、关位置可以进行调节，见附件 8。对于地上球阀，调整机构安装在第三法兰上，对于埋地球阀则安装在加长阀杆上。

If a BV is supplied to the customer without the actuator or according to customer requirement the BV is equipped with an adjusting device by means of which open – closed position can be adjusted – see Annex No. 8. In the aboveground design this device is located on the 3. flange and in the underground design it is located in the stem extension.

- 5.4 建议通过 MSA 进行第 5.2、5.3 条所述的操作。这些组织的工作人员将提供安装、执行机构极限位置的调整、故障保护、功能试验及关闭密封性试验等。

It is recommended to perform the operations according to articles 5.2, 5.3 through MSA. Authorized workers will provide installation, adjustment of actuator end positions, breakdown protection, proper functional tests and closure tightness tests.

## 6. 故障诊断 TROUBLE SHOOTING

- 6.1 球阀阀座密封不严 Untightness of Ball valve Seat

- 6.1.1 当球阀是 DPE 型（双活塞功能 = 双密封）时，需要检测球阀出口是否有泄漏。如果只是从球阀中间位置（腔体）检测到泄漏，即只有一侧密封失效时，没必要对球阀进行维修。

<b>M S A, a. s.</b> <b>DOLNÍ BENEŠOV</b>	<b>ASSEMBLY AND OPERATING</b> <b>INSTRUCTIONS</b>	Sheet No.: <b>12/23</b> Issue No.: <b>6</b>
---	--	--

In case that the BV is in DPE (Double piston effect = double tightness) design it is necessary to check possible leakage on the outlet side of BV. Leakage detected from the middle part (cavity) of BV cannot be considered as defect.

- 6.1.2 当球阀不是 DPE 型且只有一个阀座密封失效时，建议通过密封脂注入装置使用低粘度的成品油对阀座进行清洗。如果仍然持续泄漏，有必要按第 4.16 条进行维修。

If the BV is not in DPE design and one seat failed to seal it is recommended to flush the seats with low viscosity oil product through sealant fittings. In case the leakage continues it is necessary to repair the tightness according to article 4.16.

- 6.1.3 当两个阀座密封都失效时，需要检查执行机构的调节是否停在开—关位置。当然，这只能由经过专业训练的人员来完成。如果尽管做了执行机构极限位置的再调整以后，密封不严仍然存在，建议通过密封脂注入装置使用低粘度的成品油对阀座进行清洗。如果仍然持续泄漏，有必要按第 4.16 条进行维修。

If both seats fail to seal, it is necessary to check adjustments of actuator stops in open – closed position. This can be done only by well trained personnel. If leakage prevails even after re-adjusting actuator stops, it is recommended to flush the seats with low viscosity oil product through sealant fittings. In case the leakage continues it is necessary to inject sealant paste according to 4.16.

出售阀门图纸七万套，水泵图纸1万套

001263719818

- 6.2 球阀耳轴泄漏 BV Trunnion Leakage

对于地上球阀的密封不严可从第三法兰面上或从执行机构及调节机构的开口处显现。按第 4.16 条的操作可暂时解决泄漏的问题，如果密封不严的问题依然存在有可能要按 4.17 条更换上部密封“O”环。

对带有加长杆的球阀，密封不严可从从执行机构和延长短接或从其上部开口处显现。此后可采取与地上球阀同样的程序步骤。

BV in design can be revealed through the division plane of the 3rd flange and the actuator or through the adjusting device opening. Leakage can be temporarily removed according to article 4.16. If leakage prevails it is possible to replace the upper sealing „O,, ring according to 4.17.

In case of design with stem extension leakage can be revealed through the division planes of the actuator and stem extension or through the opening in its upper part. Then the same procedure as in aboveground design is performed.

- 6.3 排污、放空、旁通和密封脂注入管线螺纹连接处泄漏。

Leakage of Screw Joints of Drain, Vent, By-pass and Emergency Sealing Piping.

快速拧紧压盖螺母，如果不行有必要在确定管线内不带压的情况下更换对应的密封环。

Tighten fast the cap nuts. In negative case it is necessary to replace the respective sealing ring, with ensuring zero pressure in the line.

M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 13/23
		Issue No.: 6

#### 6.4 附属管线的小球阀密封不严 Leakage of used small BV on tubing

6.4.1 密封不严时反复采用吹通的方法以清除在密封部位留存的杂质，如果依然泄漏，就必须更换新的小球阀。

In case of leakage, perform „blow through,, repeatedly in order to remove any impurities on the sealing elements. If untightness prevails, the fitting must be replaced for a new one.

6.4.2 如果排污管线和/或放空管线装有两个或两个以上的截断阀，此系统的泄漏可以认为是所有的截断阀均在泄漏。

If the drain and/or vent lines are fitted with two or more block valves such system is considered as leaking only after all block valves in such lines are leaking.

#### 6.5 密封脂注入装置的泄漏 Leakage of sealant fittings

用不对橡胶和聚四氟乙烯产生影响的溶剂降低后密封脂的粘度，再连续用油漂洗阀门。如果依然泄漏，就必须更换新的阀门。

By a respective solvent, which does not affect either rubber or teflon, decrease after-sealing paste viscosity and successively rinse the valve with oil. If leakage prevails the respective valve must be replaced for a new one.

#### 6.6 泄压阀泄漏 Relief Valve Untightness.

排除泄漏只能将泄压阀从泄压管线上拆除。将阀门解体找到泄漏源并更换失效部件或整个泄压阀。

Untightness can be removed only by its dismounting from the relief line. Disassembly of the valve will show the leakage reason and it is removed by replacing the defective component or the whole valve.

#### 6.7 执行机构功能故障 Actuator Defective Function.

执行机构的可能故障原因和故障诊断在执行机构操作说明中描述。

Possible cause and trouble shooting are described in the actuator operating instructions.

### 7. 修理 REPAIRS

7.1 在质量保证期以内球阀的修理只能由其制造厂完成。

In the course of the warranty period the BV can be repaired only by its manufacturer.

<p>M S A, a. s. DOLNÍ BENEŠOV</p>	<p>ASSEMBLY AND OPERATING INSTRUCTIONS</p>	<p>Sheet No.: 14/23 Issue No.: 6</p>
---------------------------------------	--	--

7.2 在质量保证期期滿以后，球阀的修理应由有资格的机构或经球阀制造厂或执行机构制造厂授权的人员进行。

After warranty period expiration repairs can be performed by a qualified organisation or a worker authorised by the valve or actuator manufacturer.

7.3 如果进行大的维修，我们建议有制造厂的服务技术人员在场。

In case of a bigger repair, we recommend presence of a manufacturer service technician.

7.4 如果决定将整个焊接在管线上的球阀拆除，必须在将球阀割除时带有向管线方向延伸 30—60mm 的管线材料余量。

If it has been decided to remove the whole BV, which is welded to the pipeline, it is necessary to withdraw it with material allowance 30 to 60 mm lengthwise from the assembly weld in direction into the pipeline.

7.5 同样的条件也适用于球阀大修后。

The same conditions as for new fittings apply to the valves after overhauling..

7.6 用户可自行决定是否向制造厂提交所有的失效记录报告，以使球阀的结构和可靠性得到改善。

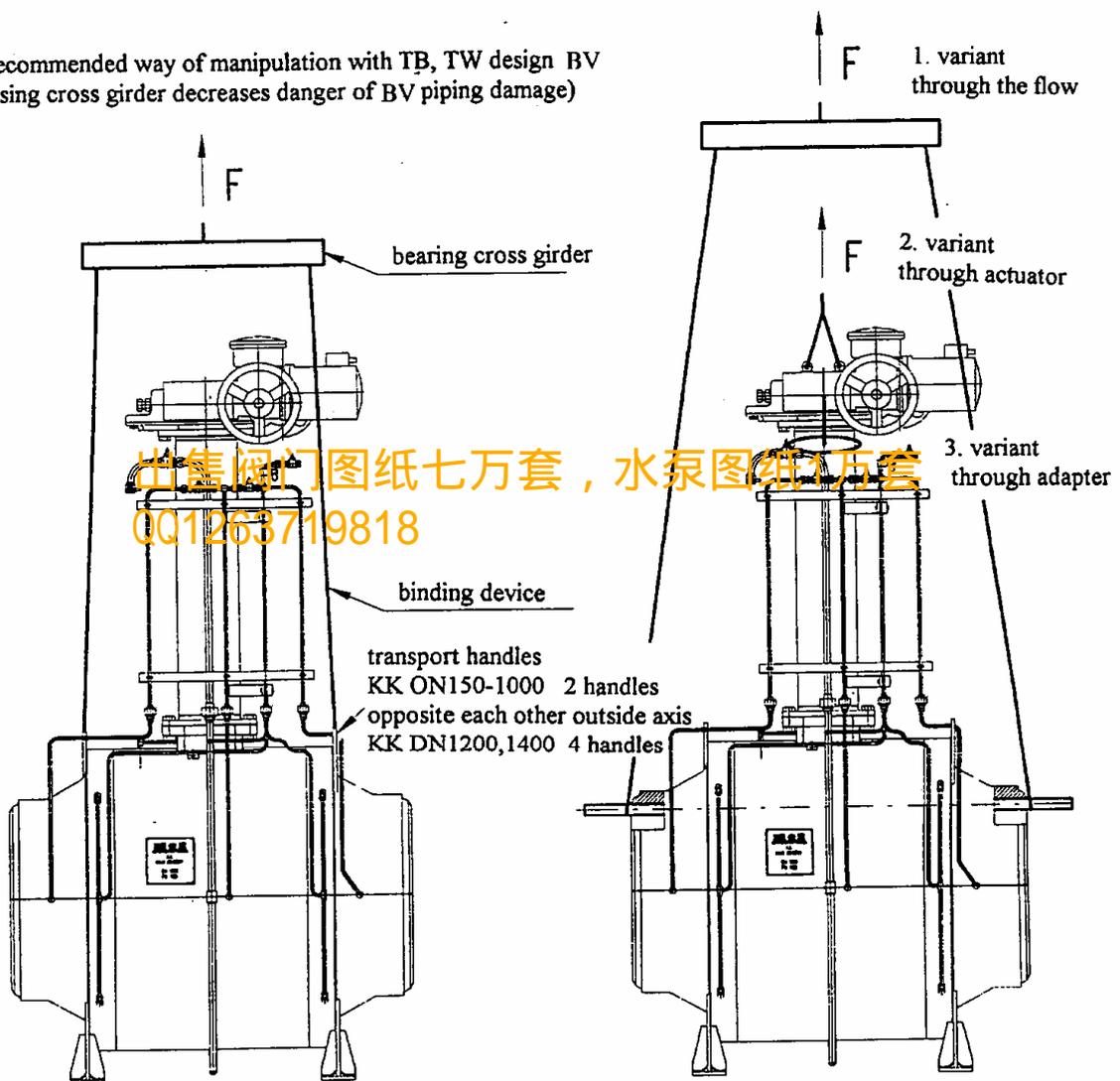
It is in the interest of the consumer to report all recorded defects to the manufacturer plant so that structure and reliability of valves can be improved.

出售阀门图纸七万套，水泵图纸1万套  
QQ1263719818

M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 15/23
		Issue No.: 6
Annex No.: 1	球阀的操作	
Page: 1/2	Manipulation with Ball valve (BV)	

Forbidden way of manipulation with BV

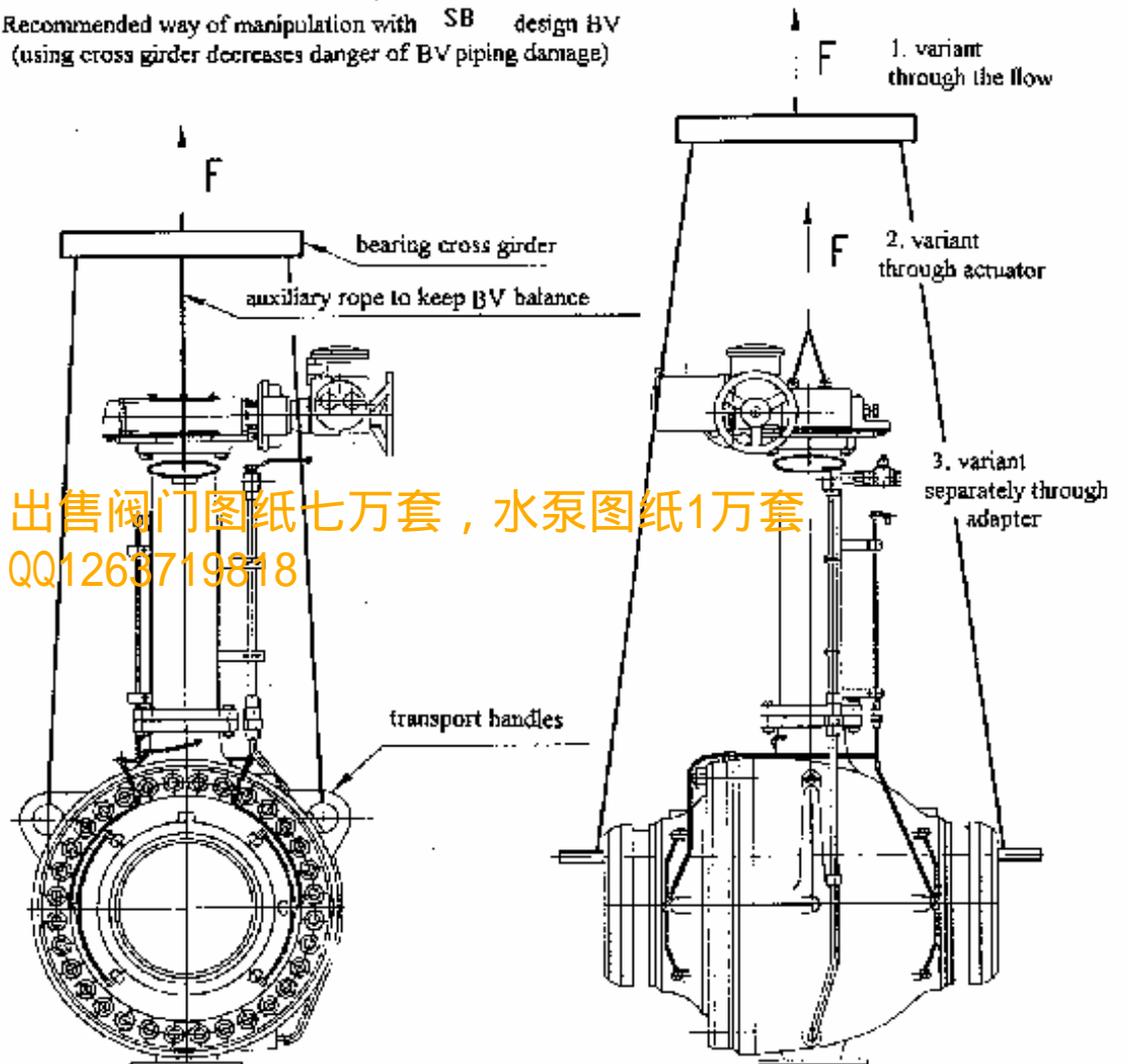
Recommended way of manipulation with TB, TW design BV  
(using cross girder decreases danger of BV piping damage)



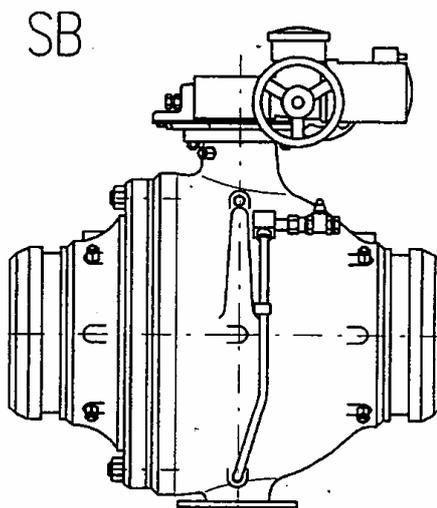
M S A, a. s. <b>DOLNÍ BENEŠOV</b>	<b>ASSEMBLY AND OPERATING INSTRUCTIONS</b>	Sheet No: <b>16/23</b>
Annex No.: <b>1</b> Page: <b>2/2</b>	球阀的操作 Manipulation with Ball valve (BV)	Issue No.: <b>6</b>

Forbidden way of manipulation with BV

Recommended way of manipulation with SB design BV  
(using cross girder decreases danger of BV piping damage)

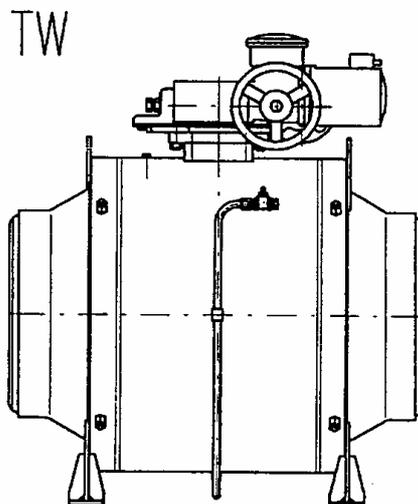
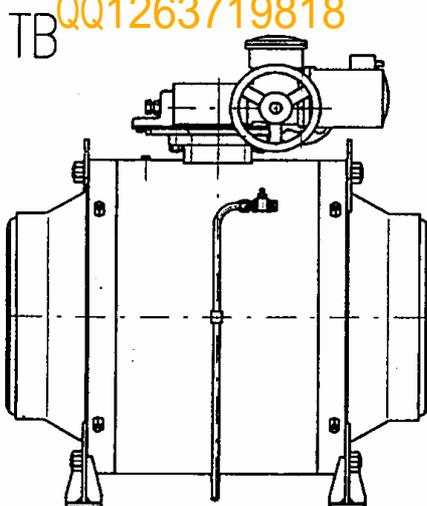


M S A, a. s. <b>DOLNÍ BENEŠOV</b>	<b>ASSEMBLY AND OPERATING  INSTRUCTIONS</b>	Sheet No.: <b>17/23</b> Issue No.: <b>6</b>
Annex No.: <b>2</b> Page: <b>1/1</b>	球阀型式 BV Types	

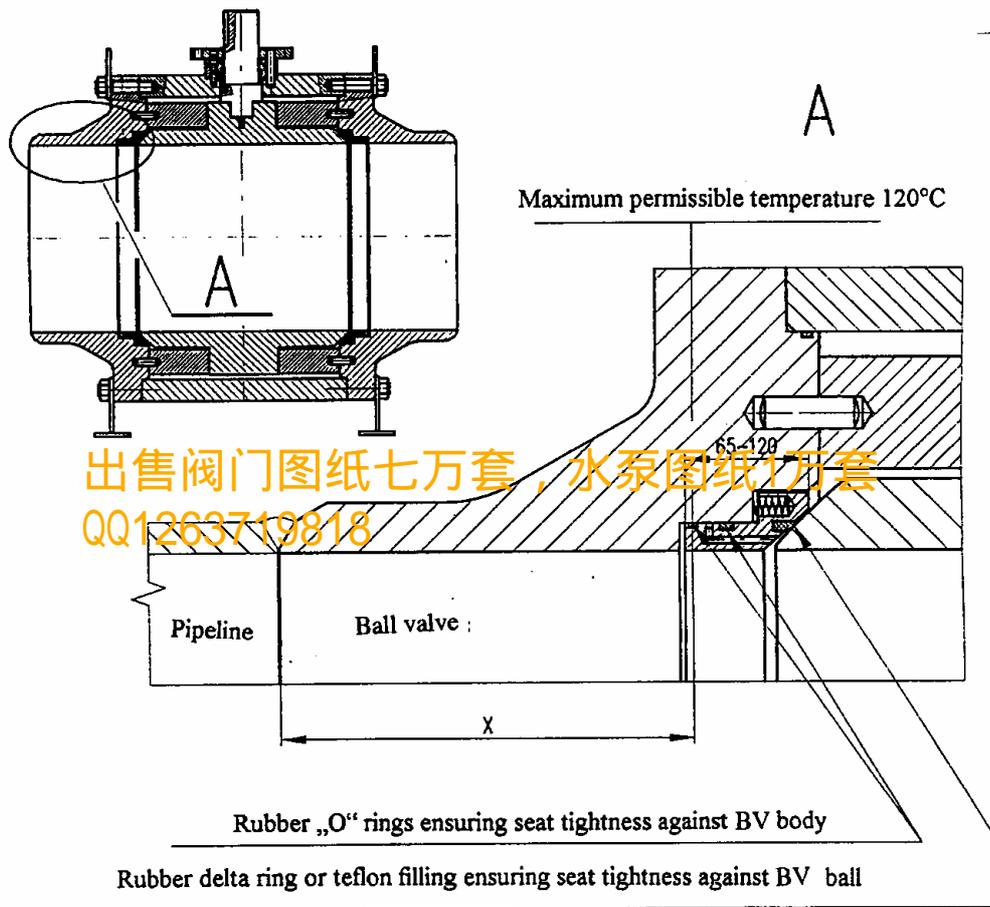


出售阀门图纸七万套，水泵图纸1万套

QQ1263719818

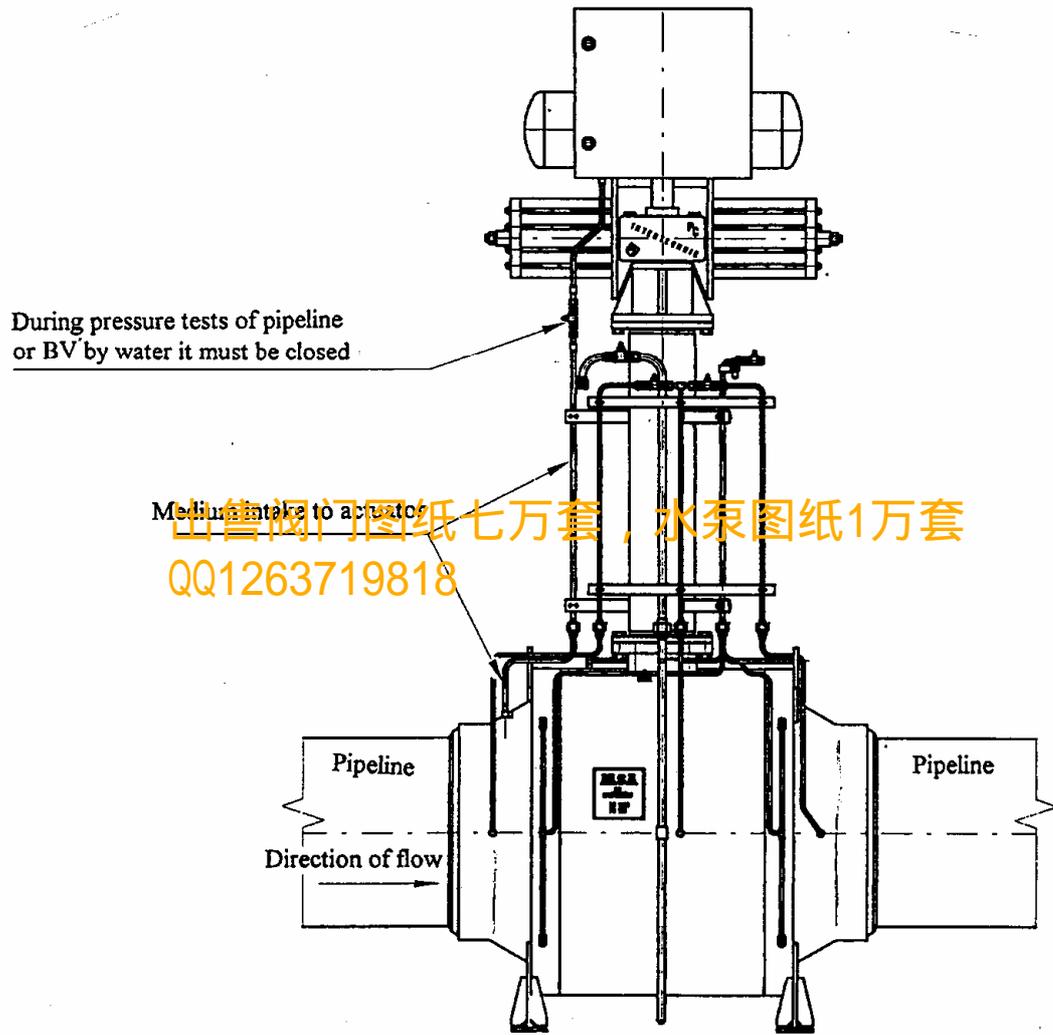


M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 18/23
		Issue No.: 6
Annex No.: 3	球阀焊接的温度限制—管线	
Page 1/1	Temperature Restriction for BV Welding – Pipeline	



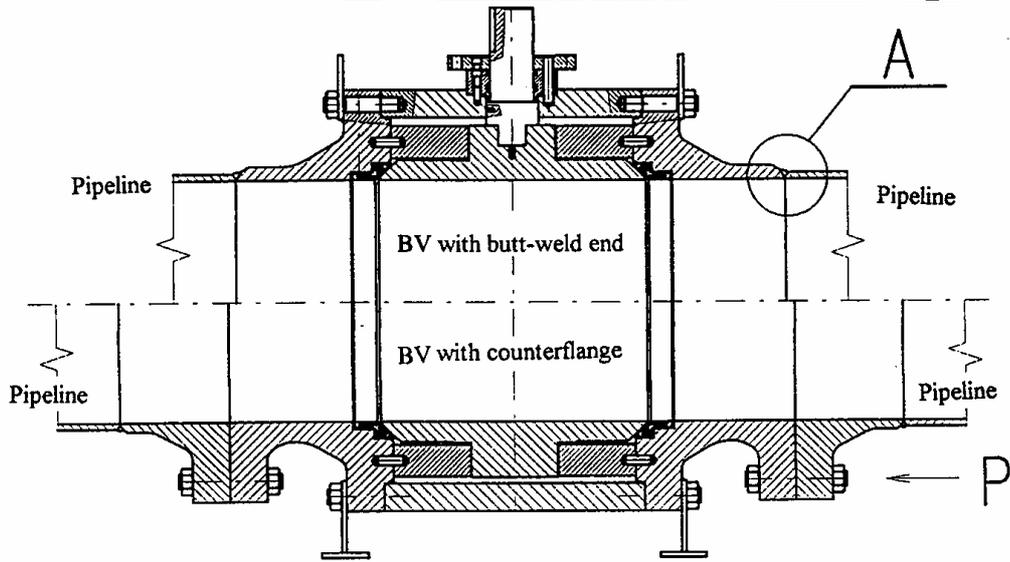
PN \ DN	150-250	300	350-400	450-500	600-700	750	800-1000	1050	1200-1400
	X [mm]								
16,25,40	80	100	145	150	185	225	265	290	295
63,100	145	195	205	240	310	355	390	320	380

M S A, a. s. <b>DOLNÍ BENEŠOV</b>	<b>ASSEMBLY AND OPERATING INSTRUCTIONS</b>	Sheet No.: <b>19/23</b>
Annex No.: <b>4</b> Page: <b>1/1</b>	球阀压力引出位置 Position with Pressure Extraction	Issue No.: <b>6</b>



出售阀门图纸七万套，水泵图纸1万套  
QQ1263719818

M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 20/23
		Issue No.: 6
Annex No.: 5	球阀安装到管线上	
Page: 1/1	BV Installation into Pipeline	



出售阀门图纸七万套，水泵图纸1万套

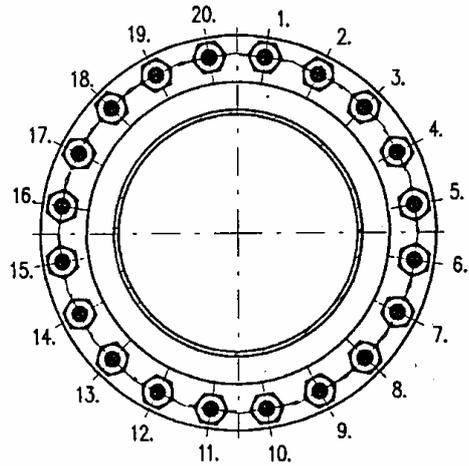
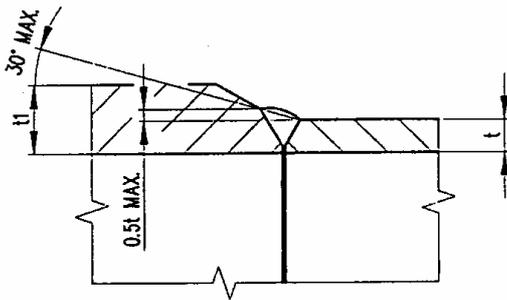
QQ1263719818

A

P

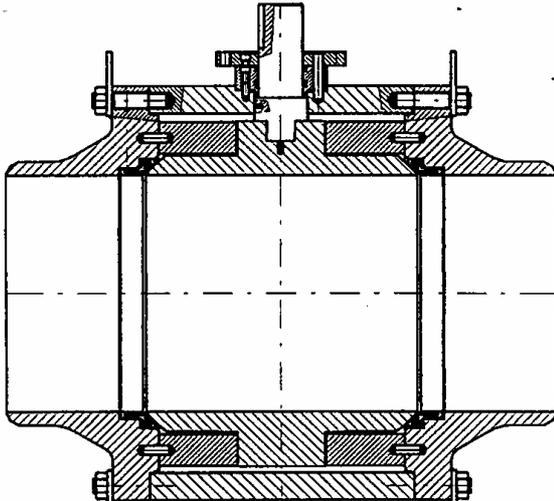
Recommended procedure of screw tightening e.g. for n=20

Allowed pipeline and BV weld reinforcement



1-11,6-16,3-13,8-18,5-15,10-20,7-17,12-2,9-19,14-4

M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 21/23
		Issue.: 6
Annex No.: 6 球阀密封元件的更换		
Page: 1/1 Replacement of BV Sealing Elements		



Pos.	Part name
1	3. flange peg
2	3. flange screw
3	3. flange
4	Rubber „O“ ring or graphite sealing
5	Flange screw
6	Flange
7	Rubber „O“ ring
8	Rubber „O“ ring or graphite sealing
9	Rubber „O“ ring
10	Thrust bearing of trunnion

Note:

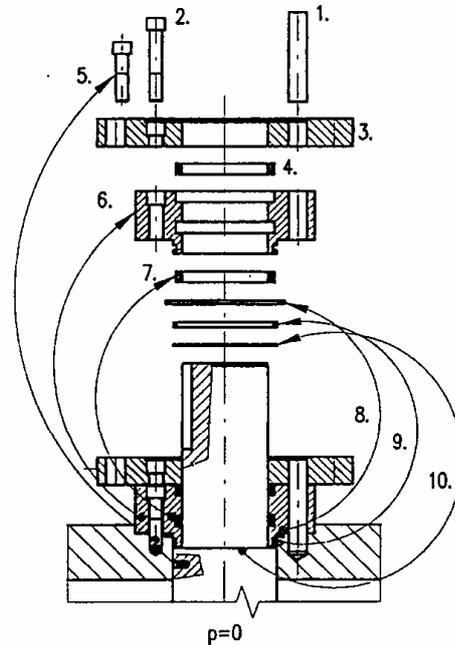
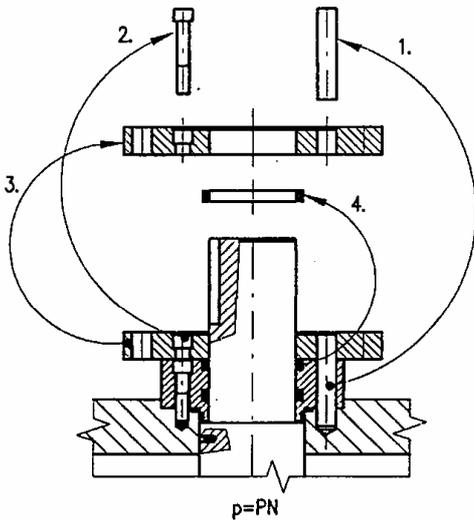
Graphite sealing is used in trunnion „FIRE SAFE“ design.

出售阀门图纸七万套, 水泵图纸1万套

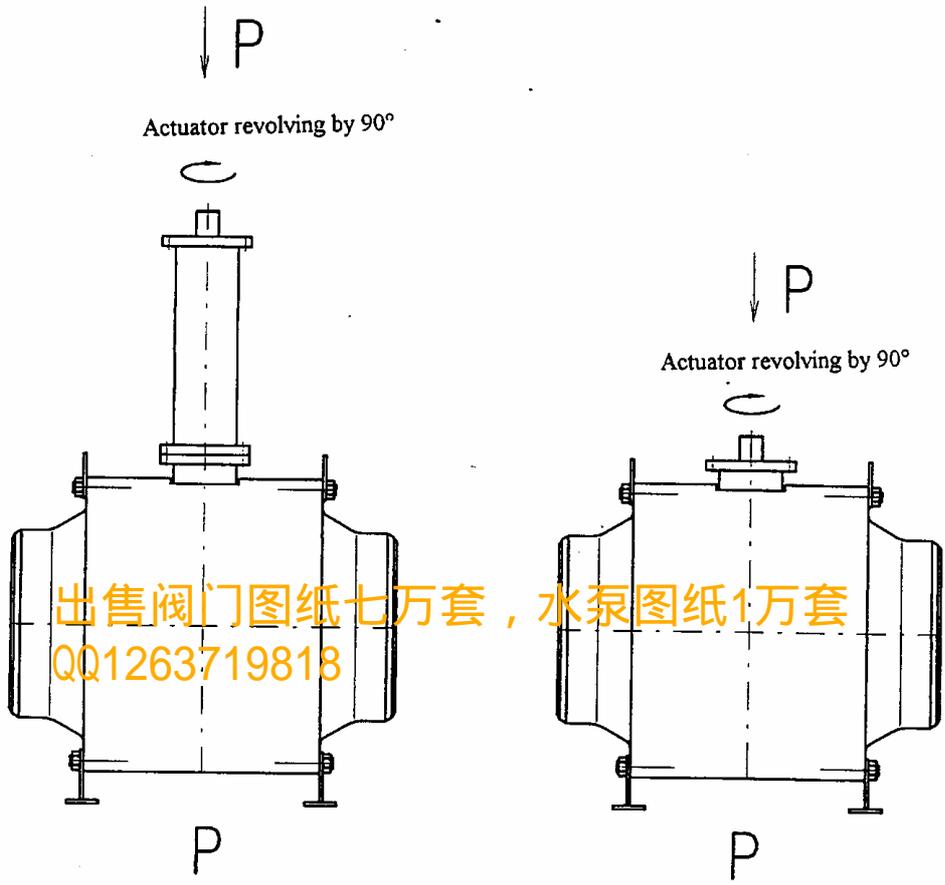
QQ1263719818

Replacement of trunnion sealing element during putting out of operation

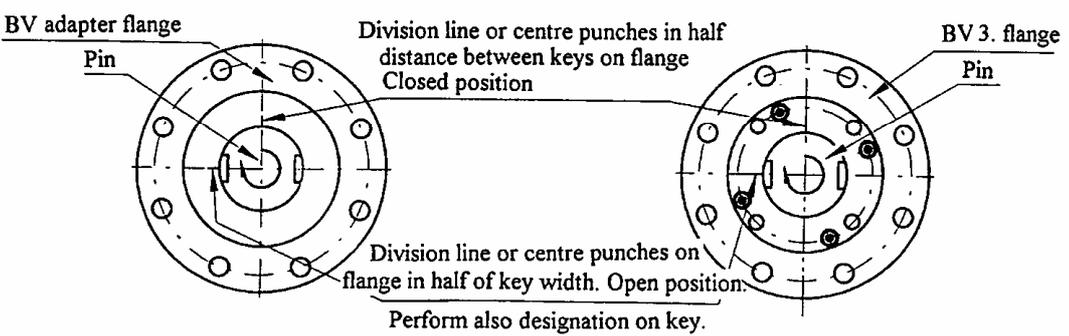
Replacement of upper sealing of trunnion under operation



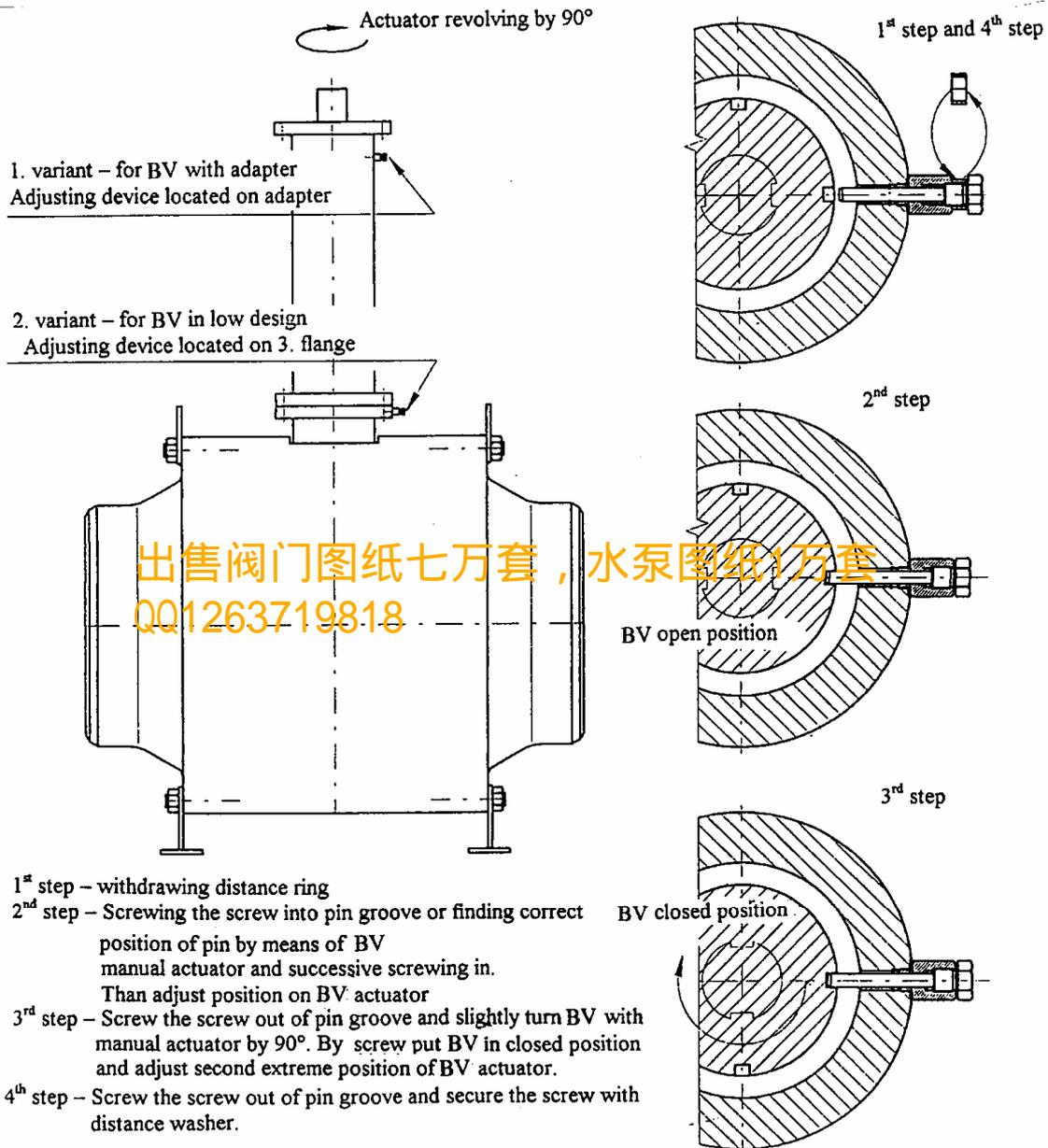
M S A, a. s. DOLNÍ BENEŠOV	ASSEMBLY AND OPERATING INSTRUCTIONS	Sheet No.: 22/23
		Issue No.: 6
Annex No.: 7	球阀执行机构的更换	
Page: 1/1	Replacement of BV Actuator	



出售阀门图纸七万套，水泵图纸1万套  
QQ1263719818



M S A, a. s.	ASSEMBLY AND OPERATING	Sheet No.: 23/23
DOLNÍ BENEŠOV	INSTRUCTIONS	Issue No.: 6
Annex No.: 8	球体位置调节装置	
Page: 1/1	BV Adjusting Unit	



### 球体位置调节装置描述:

球体位置调节装置可以在调节（设定）执行机构时对球阀的全开和全关位置精确定位。

### Description of device:

Device for ball position adjustment in open or close position during actuators adjusting (setting).