FLOWSERVE	MANUAL DE INSTALAÇÃO, OPERAÇÃO E MANUT.	Nº	2C0322300644-MA		
	CLIENTE:	BRASKEM	FOLHA:	01 a 54	
	PROJETO:	PJ-0602565	PLANTA:	BA01-02	
	TAG:	XV-441054	ÁREA:	4400	
ENGENHARIA	TÍTULO:	**VÁLVULA ON-OFF**	CENTRO LOGÍSTICO	BA01 - UNIB-BA	

FLOWSERVE LTDA	**RAZÃO SOCIAL FORNECEDOR:** FLOWSERVE DO BRASIL LTDA	**PEDIDO DE COMPRA N°** 4503649776
	ENG. RESP. / CREA N°: NILO FERNANDES GIRON / CREA-SP: 0527090	**DOC. FORNECEDOR N°** 2C0322300644

ÍNDICE DE REVISÕES

REV.	DESCRIÇÃO E/OU FOLHAS ATINGIDAS
0	EMISSÃO ORIGINAL - PARA INFORMAÇÃO.

KEMPETRO ENGENHARIA

A	SEM COMENTÁRIOS. Enviar cópias certificadas. Prosseguir a Fabricação
B	COM COMENTÁRIOS. Reemitir documento para comentários. Prosseguir fabricação com exceção das partes comentadas
C	COM COMENTÁRIOS. Enviar cópias certificadas. Prosseguir a fabricação
D	REJEITADO. Reenviar para comentá-rios. NÃO PROSSEGUIR a fabricação.
E	ACEITE DO CERTIFICADO
F	PARA INFORMAÇÃO

Ass PSVIANA Data 21/09/23

OS COMENTÁRIOS FEITOS NESTE DOCUMENTO NÃO EXIMEM O FABRICANTE DA RESPONSABILIDADE SOBRE O PROJETO, A FABRICAÇÃO E O DESEMPENHO DO EQUIPAMENTO OU SISTEMA.

PLANTA: BA01-02; ÁREA: 4400;
PROJETO: PJ-0602565;
~~NÚMERO DO PJ: 10002-6255-I26-4-00004;~~ → NÚMERO KEMPETRO: 10002-6255F-I30-4-00024
NÚMERO DA RM: BK-BA01-04400-RM-81-00116_00000;
PEDIDO DE COMPRA: 4503649776;
ITEM: ~~00010;~~ → 3247794
TAG: XV-441054.

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATA	15/09/2023								
PROJETO	PJ-0602565								
EXECUÇÃO	VG								
VERIFICAÇÃO	LB								
APROVAÇÃO	NG								

FLOWSERVE
Valbart

USER INSTRUCTIONS

Flowserve Valbart On-Off Products

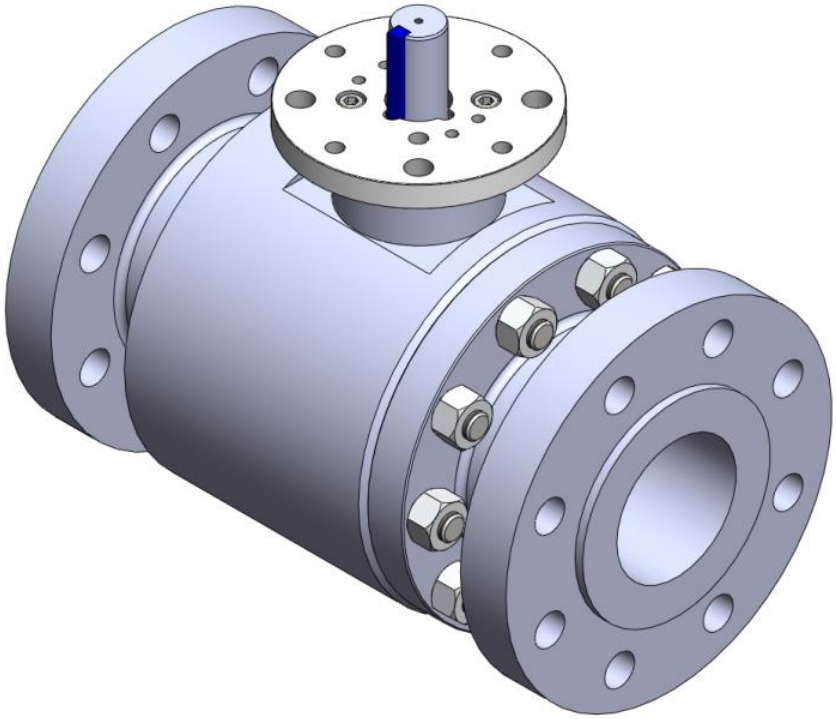
Installation
Operation
Maintenance

2 Piece Split Body Trunnion Mounted Ball Valves
Bolted Body Side Entry (model VB2) for special service

M02-LSS ENG rev. 8

Original Instructions

⚠ ***These instructions must be read prior to installing, operating, and maintaining this equipment.***



Experience In Motion

Copyright

Revision history

Revision Date	0 18-11-2010	1 11-10-2011	2 15-02-2012	3 22-05-2015	4 16-09-2016	5 16-03-2017	6 31-03-2017	7 22-06-2018	8 12-10-2018	
Signed	A.P.	A.P.	A.P.	A.P.	A.P.	A.P.	A.P.	A.P.	A.P.	
Approved	L.P.	L.P.	A.Z.	A.Z.	A.Z.	A.A.	A.A.	D.B.	D.B.	

CONTENTS

1 General Information

1.1 Scope of manual

⚠ These instructions must be kept close to the product's operating location or directly with the product.

⚠ These instructions must be read prior to installing, operating, using, or maintaining the equipment in any region worldwide. The equipment must not be put into service until all of the safe operating conditions noted in the instructions have been met. Failure to comply with the information provided in the User Instructions is considered to be misuse. Personal injury, product damage, delay in operation, or product failure caused by misuse are not covered by the Flowserve warranty.

The following instructions are applicable to the maintenance and installation of Flowserve Valbart 2 Piece Split Body Trunnion Mounted Ball Valves Bolted Body Side Entry (model VB2) for general service.

Metric DIN Units - PN 20 to PN 420, DN 100 full bore and DN 150 x 100

English ASME Units - Class 150 to 2500, NPS 4 full bore and NPS 6 x 4

Assembled with manual gear, pneumatic/hydraulic or electric actuator.

These instructions cannot claim to cover all details of all possible product variations, nor can they provide information for every possible example of installation, operation or maintenance. This means that the instructions normally include only the directions to be followed by qualified personal using the product for its defined purpose. If there are any uncertainties in this respect, particularly in the event of missing product-related information, clarification must be obtained via the appropriate Flowserve sales office.

These instructions are intended to familiarize the reader with the product and its permitted use. Operating the product in compliance with these instruction is important to help ensure reliability in service and avoid risks. These instructions may not take into account all local regulations; ensure such regulations are observed by all, including those installing the product. Always coordinate repair activities with operations personnel, and follow all plant safety requirements and applicable safety and health legislation.

1.2 Disclaimer

Information in this User Instruction is believed to be complete and reliable. In spite of all Flowserve's efforts to provide comprehensive information and instructions, sound engineering and safety practices should always be used. Please consult with a qualified engineer.

Flowserve manufactures products to applicable International Quality Management System Standards as certified and audited by external Quality Assurance organizations. Genuine parts and accessories have been designed, tested, and incorporated into the products to help ensure continued product quality and performance in use. As Flowserve cannot test parts and accessories sourced from other vendors the incorrect incorporation of such parts and accessories may adversely affect the performance and safety features of the product. The failure to properly select, install, or use authorized Flowserve parts and accessories is considered to be misuse. Damage or failure caused by misuse is not covered by Flowserve's warranty. In addition, any modification of Flowserve products or removal of original components may impair the safety of these products in use.

Valbart declines any responsibility should the valve not be used for the service indicated on the client's data sheets.

The user is not allowed, in any case, to modify the valve; this action causes immediate expiring of guarantee period and API marking (when applicable).

Valbart refuses any liability for any damage to personnel, property or plants caused by incorrect usage of valves, incorrect or maintenance not strictly carried out in line with these procedures, unskilled personnel or non-observance of safety rules.

In case Valbart is not aware of the final use of the valve (e.g. valve ordered and stocked by a third party) it is the responsibility of the third party or of the user to verify the suitability of the valve material combination for the medium and/or service the valve is to be used.

Unless specifically requested the valves are furnished without thermal and noise insulation.

Even if the valves are provided with an antistatic device it is strongly recommended to ground the line.

1.3 Certification instruction

It is a legal requirement that valves put into service within certain regions of the world shall conform to the Marking Directives applicable to Flowserve products (i.e. Pressure Equipment Directive (PED), Equipment for Potentially Explosive Atmospheres (ATEX), etc.).

Note: Certificates defined in the Contract requirements are provided with these instructions where applicable. Examples of the certificates can be found in the Annex of this document. If required, copies of other certificates sent separately to the Purchaser should be obtained from the Purchaser for retention with this User Instruction.

1.4 Units

The metric unit system is utilized in this document.

2 Safety Information

2.1 Intended use

⚠ The valve must not be operated beyond the parameters specified for the application. If there is any doubt as to the suitability of the valve for the application intended, contact Flowserve for advice, quoting the serial number.

- Installing, operating, or maintaining the valve in any way that is not covered in this User Instruction could cause death, serious personal injury, or damage to the equipment. This includes any modification to the valve or use of the parts not provided by Flowserve.
- Only operate the valve when it has successful passed all inspection acceptance criteria
- Do not operate the valve in a partially assembled condition.
- If the conditions of service on the customer's purchase order change (i.e. pumping fluid, temperature, or duty conditions) it is requested that the user seeks written agreement from Flowserve before start up.
- Observe equipment labels, such as arrows designating the direction of rotation, warning signs, etc., and keep them in a legible condition. Replace any damaged and/or illegible labels immediately.

2.2 Safety symbols and description

This User Instruction contains specific safety markings where non-observance of an instruction would cause a hazard. The specific safety markings are:

Table 1: Definition of safety symbols and markings

Symbol	Description
⚠ DANGER	**DANGER** This symbol indicates a hazardous situation which, if not avoided, will result in death or serious injury
⚠ WARNING	**WARNING** This symbol indicates a hazardous situation which, if not avoided, could result in death or serious injury
⚠ CAUTION	**CAUTION** This symbol indicates a hazardous situation which, if not avoided, could result in minor or moderate injury
SAFETY INSTRUCTIONS	**Safety Instruction** This symbol indicates specific safety-related instruction or procedures
NOTICE	**NOTICE** This symbol is used to address practices not related to physical injury
⚠	This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Table 2: Additional symbols

Symbol	Description
	**ELECTRICAL HAZARD** This symbol indicates electrical safety instructions where non-compliance would affect personal safety and could result in loss of life
	**TOXIC HAZARD** This symbol indicates "hazardous substances and toxic fluid" safety instructions where non-compliance would affect personal safety and would damage the equipment or property
	**ATEX EXPLOSION PROTECTION** This symbol indicates explosive atmosphere marking according to ATEX. It is used in safety instructions where non-compliance in the hazardous area would cause the risk of an explosion

2.3 General hazard sources

2.3.1 Mechanical Hazards

a) Lifting limits and guidelines

Note: The load values mentioned in this section are Flowserve recommendations only. All lifting must be done in compliance with site safety protocol, local regulations, and related industry standards.

Many precision parts have sharp corners which require appropriate personal protective equipment during handling. Prior to any attempt to lift an item, employees must first determine the approximate weight and stability of the load.

- Large, unstable, or awkward loads should always be handled with the assistance of additional personnel or appropriate mechanical means.
- Loads in excess of 23kg (50 lb.) should only be lifted by appropriate mechanical means and in accordance with current local legislation or with the assistance of additional personnel.
- Lifting items less than 23kg (50 lb.) may be prohibited without assistance if the lift is repetitive and/or awkward (i.e., away from the body, above the shoulders or below the knees) thus placing excessive stress on the personnel.
- Repetitive lifting of any kind should be evaluated as part of a documented end-user safety program.

2.4 Qualified personnel and targeted group

All personnel involved in the operation, installation and maintenance of the unit must be qualified to carry out the work involved. If the personnel in question does not already possess the necessary knowledge and skill, appropriate training and instruction must be provided. If required the operator may commission the manufacturer / supplier to provide applicable training.

Always co-ordinate repair activities with operation and health and safety personnel, and follow all plant safety requirements and applicable safety and health laws and regulations.

2.5 Potential explosive areas

 Measures are required to:

- Avoid excess temperature
- Prevent build-up of explosive mixtures
- Prevent the generation of sparks
- Prevent leakages
- Maintain the pump to avoid hazard

All instructions for equipment installed in potentially explosive atmospheres must be followed to help ensure explosion protection. For ATEX, both electrical and non-electrical equipment must meet the requirements of the European Explosion Protection Directive 2014/34/EU. Always observe the regional legal Ex requirements, e.g. Ex electrical items outside the EU may be required certified to other than ATEX e.g. IECEx, UL.

 Use equipment only in the zone for which it is appropriate. Always check that all equipment is suitably rated and/or certified for the classification of the specific atmosphere in which they are to be installed.

2.6 Protective equipment

Plant operating personnel must be equipped with the proper safety equipment (e.g. glasses, helmets, gloves, reinforced boots, hear plugs) according to local regulation.

3 Product Description

3.1 General product description

VB2 is an on-off valve that controls (start and stop) the flow of a fluid in pipeline, a system or a process.

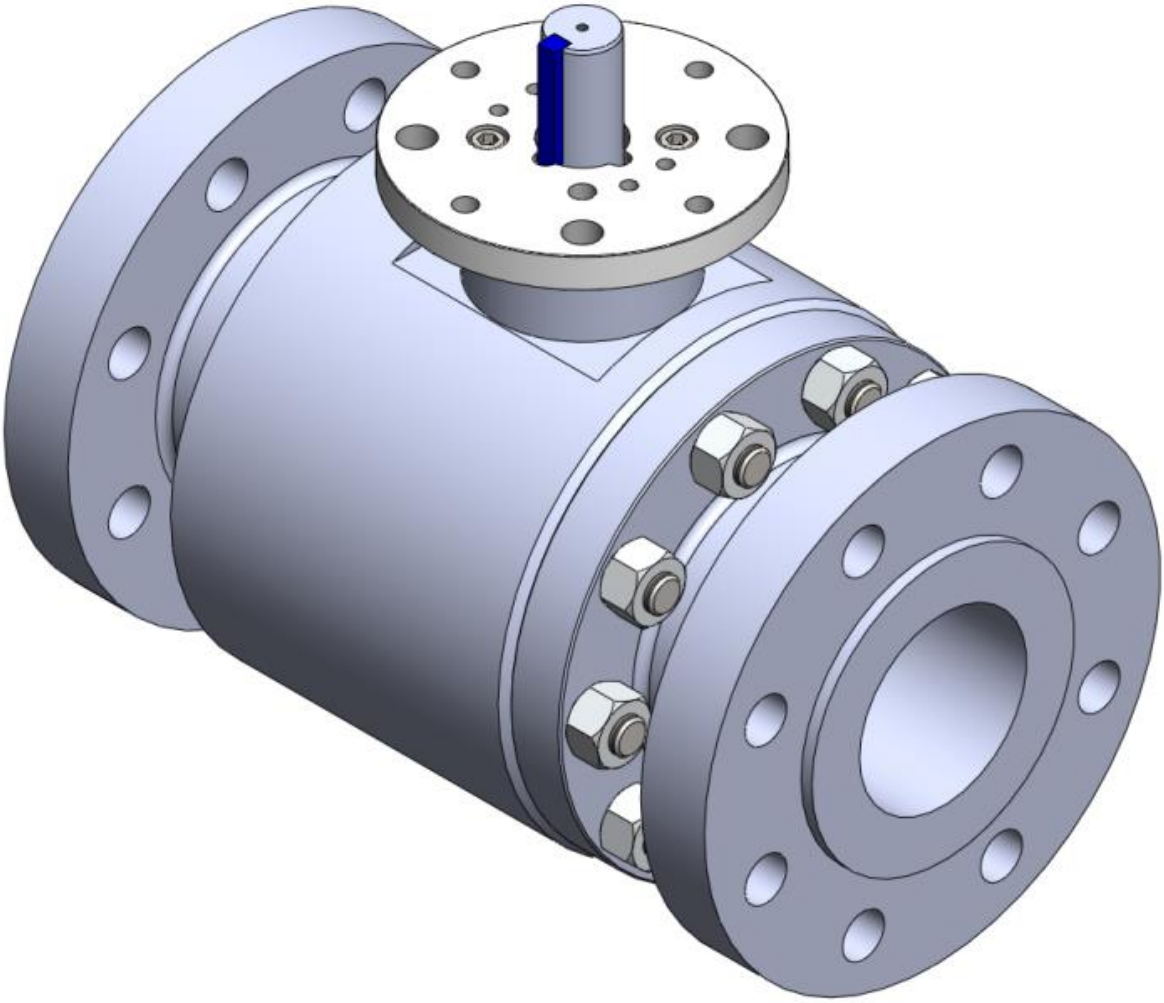


Figure 1: View of the VB2 (NPS 4 full bore and NPS 6 x 4)

Because the VB2 valves are designed to control flow for on/off service only, the valve working conditions admitted are always fully open or fully closed.

3.2 Function description

Main Valbart trunnion-mounted ball valve design features:

1 Independent ball and stem

The ball and stem are independent to minimize the effect of the side thrust generated by the pressure acting on the ball.

2 Trunnion-mounted ball

The ball is bound and the seat rings are floating, free to move along the valve axis. Side load generated by the pressure acting on the ball is absorbed by bearings. At low pressure, the seat

sealing action is achieved by the thrust of the springs acting on the seat rings. As the pressure increases, the fluid pressure pushes the seat rings against the ball.

3 Anti-blowout stem

Stem is retained by the stem cover (other designs available on request).

4 Anti-static design

The electrical continuity between all the metallic components is guaranteed and certified.

5 Floating seat rings

Two independent floating seat rings assure the bi-directional tightness of the valve. The seats are carefully designed to minimize the torque required to operate the valves without losing sealing power, which is assured from zero differential pressure to the valve's maximum rated pressure. Self-relieving seats are supplied as a standard feature. Double piston or combination seats (self-relieving/upstream, double piston/down-stream) can be supplied upon request.

6 Emergency sealant injection

Each valve is supplied complete with emergency sealant injection feature located between the upper lip seal and the graphite gasket.

3.3 Connections

3.3.1 Electrical power connections

In case of the valve is equipped with electric actuator, refer to the actuator Installation, Operation and Maintenance Manual for the details of these connections.

3.3.2 Mechanical connections

Valve ends can be Flanged RF or RTJ to ASME B16.5.

Butt-weld ends to ASME B16.25 (others types of weld ends are available upon request).

Hub ends for clamped connect-ions are available as per customer specification.

3.3.3 Auxiliary connections

In case of the valve is equipped with pneumatic/hydraulic actuator, refer to the actuator Installation, Operation and Maintenance Manual for the details of these connections.

3.4 Tools, equipment and fixtures for maintenance activities

3.4.1 Typical tools

- Hydraulic tensioner for body/bonnet studs with UN/UNC tool series [x4]
- Dynamometric wrench with metric Allen tool series [x1]

3.4.2 Typical equipment

- Hydraulic high pressure pump unit [x1]

3.4.3 Typical fixtures

- Blind flange [x1] for each flanged end

- End plug [x1] for each BW end

3.4.4 Miscellaneous

- Thread sealant (e.g. Loctite 577)
- Solid lubricant paste for bolted metal joints (e.g. Molykote 1000)

4 Packaging, Transportation and Storage

4.1 Consignment receipt

Immediately after receipt of the valve it must be checked against the delivery/shipping documents for its completeness and that there has been no damage in transportation.

The following symbols are used to label the packaging (as applicable):

Table 3: Definition of packaging symbols and markings

Designation	Symbol	Explanation
Fragile, Handle with care		The symbol should be applied to easily broken cargoes. Cargoes marked with this symbol should be handled carefully and should never be tipped over or slung.
Use no hooks		Any other kind of point load should also be avoided with cargoes marked with this symbol. The symbol does not automatically prohibit the use of the plate hooks used for handling bagged cargo.
Top		The package must always be transported, handled and stored in such a way that the arrows always point upwards. Rolling, swinging, severe tipping or tumbling or other such handling must be avoided. The cargo need not, however, be stored "on top".
Keep away from heat (solar radiation)		Compliance with the symbol is best achieved if the cargo is kept under the coolest possible conditions. In any event, it must be kept away from additional sources of heat. It may be appropriate to enquire whether prevailing or anticipated temperatures may be harmful. This label should also be used for goods, such as butter and chocolate, which anybody knows should not be exposed to heat, in order to prevent losses.
Protect from heat and radioactive sources		Stowage as for the preceding symbol. The cargo must additionally be protected from radioactivity.
Sling here		The symbol indicates merely where the cargo should be slung, but not the method of lifting. If the symbols are applied equidistant from the middle or center of gravity, the package will hang level if the slings are of identical length. If this is not the case, the slinging equipment must be shortened on one side.

Keep dry		Cargoes bearing this symbol must be protected from excessive humidity and must accordingly be stored under cover. If particularly large or bulky packages cannot be stored in warehouses or sheds, they must be carefully covered with tarpaulins.
Center of gravity		This symbol is intended to provide a clear indication of the position of the center of gravity. To be meaningful, this symbol should only be used where the center of gravity is not central. The meaning is unambiguous if the symbol is applied onto two upright surfaces at right angles to each other.
No hand truck here		The absence of this symbol on packages amounts to permission to use a hand truck on them.
Stacking limitation		The maximum stacking load must be stated as "... kg max.". Since such marking is sensible only on packages with little loading capacity, cargo bearing this symbol should be stowed in the uppermost layer.
Clamp here		Stating that the package may be clamped at the indicated point is logically equivalent to a prohibition of clamping anywhere else.
Temperature limitations		According to regulations, the symbol should either be provided with the suffix "...°C" for a specific temperature or, in the case of a temperature range, with an upper ("...°C max.") and lower ("...°C min.") temperature limit. The corresponding temperatures or temperature limits should also be noted on the consignment note.
Do not use forklift truck here		This symbol should only be applied to the sides where the forklift truck cannot be used. Absence of the symbol on other sides of the package amounts to permission to use forklift trucks on these sides.
Electrostatic sensitive device		Contact with packages bearing this symbol should be avoided at low levels of relative humidity, especially if insulating footwear is being worn or the ground/floor is nonconductive. Low levels of relative humidity must in particular be expected on hot, dry summer days and very cold winter days.

Do not destroy barrier		A barrier layer which is (virtually) impermeable to water vapor and contains desiccants for corrosion protection is located beneath the outer packaging. This protection will be ineffective if the barrier layer is damaged. Since the symbol has not yet been approved by the ISO, puncturing of the outer shell must in particular be avoided for any packages bearing the words "Packed with desiccants".
Tear off here		This symbol is intended only for the receiver.

4.2 Unpacking

Unpacking of the valves (and relevant operators when applicable) must be made in such a way that no damage can occur to the exposed parts of the valves and their auxiliary equipment.

In order to maintain the valves (and relevant operators when applicable) protected, unpacking should be done just before installation, except for the case in which the valves must be unpacked for inspection or for periodical stroke activities when applicable. Once the inspection or the periodical stroke activities have been completed, the original packing must be restored.

4.3 Handling

4.3.1 Packed Valves

Crates: Lifting and handling of the packed valves in crates will be carried out by a fork lift truck, by means of the appropriate fork hitches.

Cases: The lifting of packed valves in cases should be carried out in the lifting points and at the centre of gravity position which have been marked. The transportation of all packed material must be carried out safely and following the local safety regulations.

4.3.2 Unpacked Valves

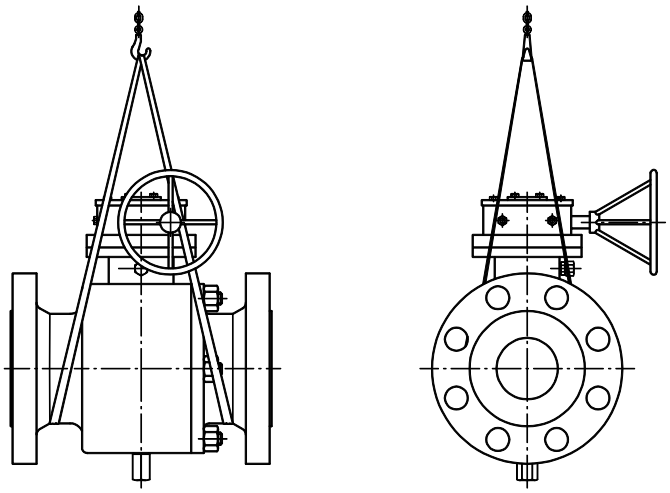
1. The lifting and the handling of these valves has to be carried out by using appropriate means and by respecting the carrying limits. The handling must be carried out on pallets, protecting the machined surfaces to avoid any damage.

2. With valves of large dimensions, the sling and the hooking of the load must be carried out by using the appropriate tools (brackets, hook, fasteners, ropes) and load balancing tools in order to prevent them from falling or moving during the lifting and handling.

The valves are equipped with lifting lugs: they represent the only lifting points that can be used.

Valves shall be lifted as per pictures shown below.

Valve equipped with manual gearbox/(electric actuator)



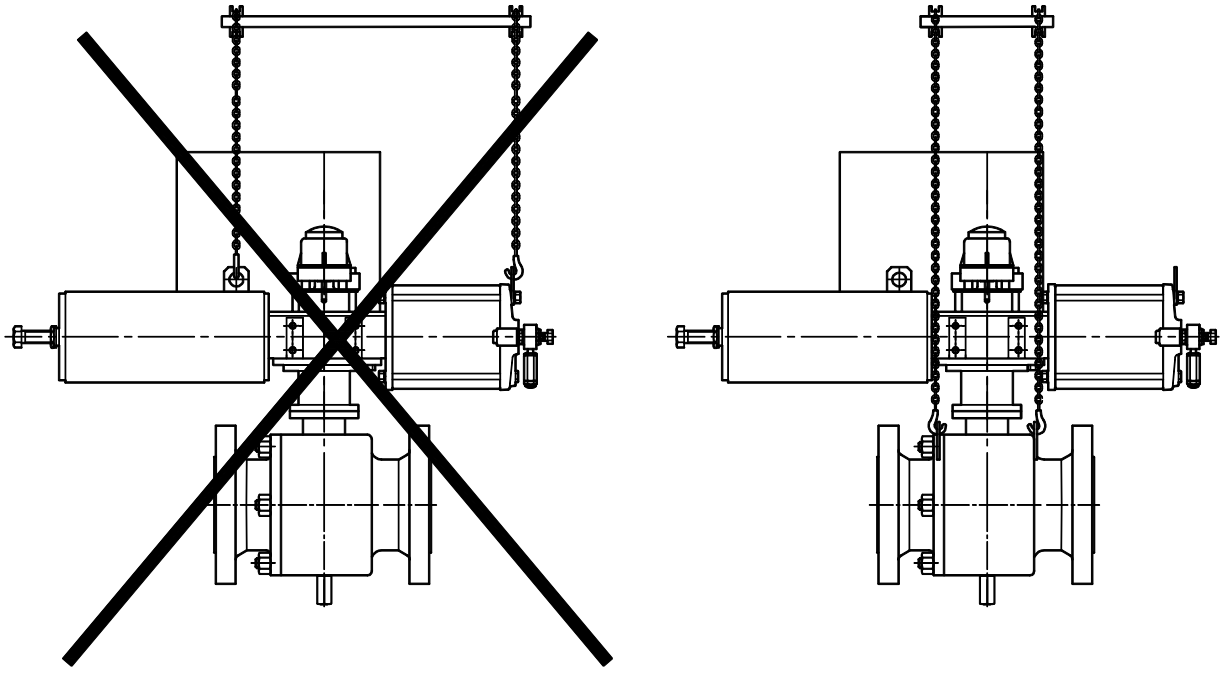
NOTICE	**Make sure that the lifting belts never go in contact with handwheel/(motor) or other exposing parts.**

Figure 2: Handling of the VB2 valve equipped with gearbox/(electric actuator)

Valve equipped with actuator

Valve/actuator assemblies must be handled only by using the valve lifting lugs, which are suitably sized for this purpose; actuator lifting lugs must not be used in any case.

Special care must be taken to avoid contact between lifting devices and actuator. If necessary, use of special equipment is recommended.



NOTICE	**In order to prevent any damage to the actuator and its devices, before starting the lift make sure that the lifting devices (belts / chains) cannot go in contact with the control panel, the tubing or any other device.**

Figure 3: Handling of the VB2 valve equipped with pneumatic/(hydraulic) actuator

4.4 Storage

4.4.1 Standard packing

The valves shall be kept indoors, with actual valve temperature higher than the dew point, unless otherwise specified in Flowserve contract requirements.

Before unpacking for installation, the valves (and relevant operators when applicable) shall be kept inside their original package.

During the storage period, regular checks shall be made for package condition according to the following instructions.

The integrity of packaging shall be checked on a monthly basis. If the wooden box is damaged, the integrity of the envelopes (e.g. VCI film, plastic film) protecting the valves shall be checked. If a damage is found on the envelope, the condition of exposed surfaces of valves (and operators when applicable) shall be verified.

Upon satisfactory completion of inspection, the original package conditions shall be restored.

Refer to par. 8.1 for additional maintenance activities that must be carried out during storage period.

In order to avoid ingress of foreign matter into the valve bore, the valve ends protectors shall not be removed unless necessary for inspection, then securely replaced on completion of inspection).

4.4.2 Special packing

The additional requirements stated in this paragraph shall be followed in case of special packing including:

- valves enclosed in waterproof vacuum-sealed barrier bags with desiccant bags;
- humidity indicator placed on barrier bag;
- wooden box with inspection window to check the humidity indicator.

In addition to the mandatory requirements stated in the previous para. 4.4.1, at least every three months the humidity level on the humidity indicator shall be checked via the box inspection window.

The desiccant bags shall be replaced every year or whenever necessary after checking the waterproof barrier bag humidity indicator.

After replacing the desiccant bags and the humidity indicator, the waterproof barrier bag shall be re-sealed, the vacuum inside the bag made again and the original package restored.

5 Installation

5.1 Inspection and preparation

Remove the valve from crate or case by means of lifting lugs being careful not to damage the valve ends and do not dent the paint.

Remove the protection discs and the corrosion protection coating from the ends.

Make sure that the relevant surfaces are not damaged and there are no loose parts.

To avoid bending stresses the valve and the line piping have to be correctly supported.

Unless specifically requested the valve is not designed for supporting external loads (e.g. seismic loads).

In order to check the integrity of valve components and avoid damages due to wear, a scheduled maintenance must be done (refer to Chapter 7).

5.2 Mounting

Before installation, fix the gear or the actuator to the valve top (if shipped separately take care to not put grease between valve mounting flange and gear or actuator mounting flange), tighten the operator bolting (14c, 13c) in accordance with the operator IOM bolt tightening torque table, set the open and close position or verify the operator set-up in case the actuator has been fixed on the top of the valve by us.

NOTICE	**It is strongly recommended to perform piping flushing before installation of the valve; if this is not possible, the valve must be set with the ball in full open position before starting the flushing .**

5.3 Installation

Remove any foreign object from the valve bore.

Make sure that the valve is correctly placed and aligned with the line.

For bolted end valve be careful to use adequate gaskets and bolting.

Tighten the bolts gradually, in cross position with the proper loads recommended by the gasket supplier or end user recommended practice.

5.3.1 Additional instructions for valve with welded end

A valve with weld ends without pup pipes should never be installed with the ball in closed position.

During the installation of the valve the ball must be placed in fully open position. Failure to keep the ball in fully open position during installation can cause damage to the valve.

If the ball must remain in the closed position during assembly of the valve, cover with grease the exposed surfaces of the ball. This will protect the ball from damage caused by weld splatter.

For a welded end valve use an adequate welding procedure which shall limit the temperature to maximum 100 °C at 100 mm of distance from the seat ring rear face.

The use of transition pup is mandatory when this condition is not possible.

In case of welding to higher strength pipe the thickness of the component shall at least equal to the ratio of minimum specified yield strength of the pipe to minimum specified yield strength of the component.

The maximum thickness of the component shall not exceed 1.5 times the pipe thickness.

The use of transition pup is mandatory when the above condition cannot be achievable.

5.3.2 Standard stem/flow line valve orientation

- For manual valves any stem orientation with the stem key over the horizontal plane is allowed: at most the stem can be found in horizontal position (see figure).
- For motor operated valves the vertical stem position is the only allowed. Any other option must be defined in the purchase order.

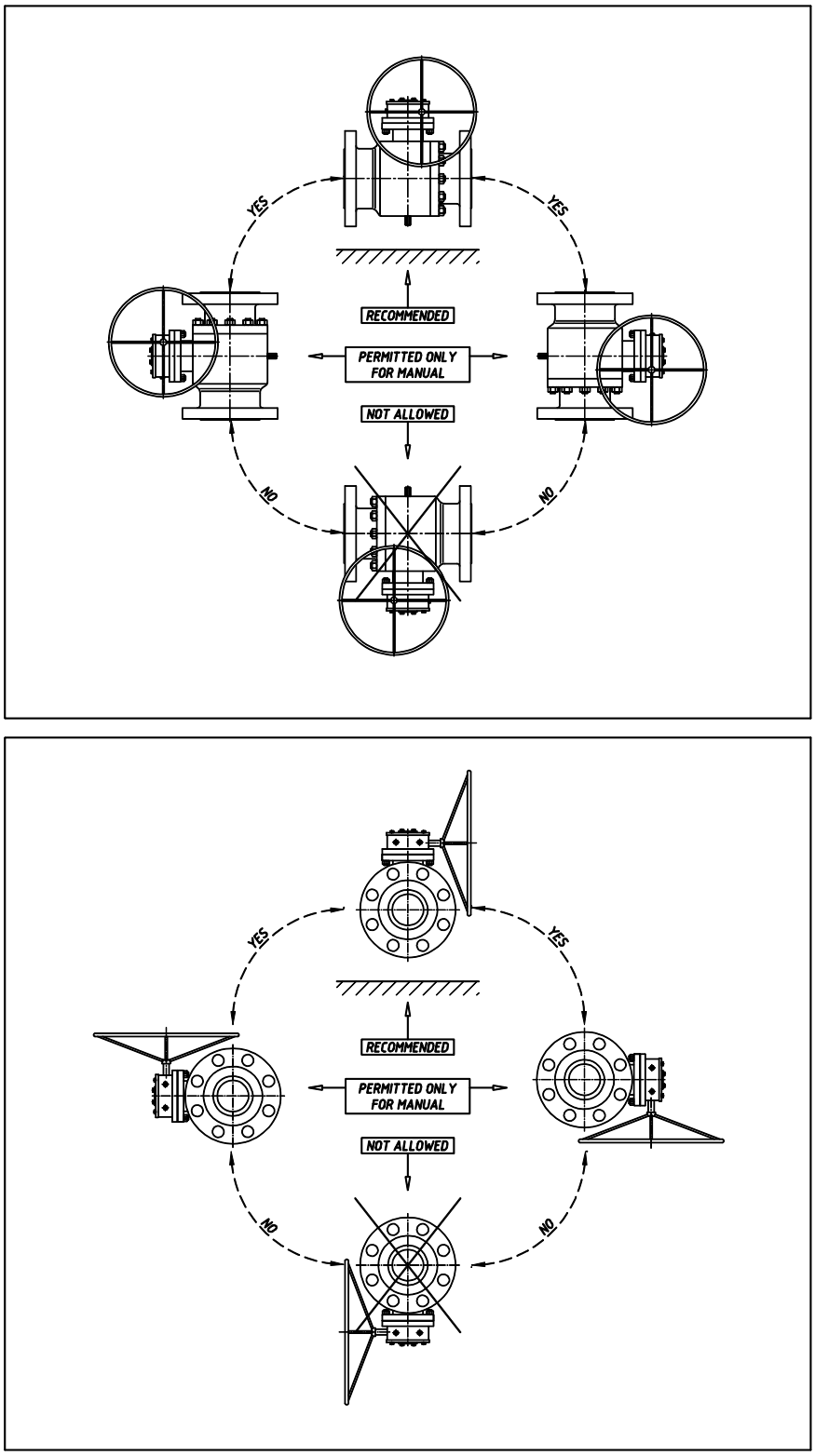


Figure 4: Stem/flow line valve orientation permitted

6 Commissioning

6.1 Periodic checks

Between installation and operation it is recommended to perform periodic checks and maintenance operations described in par. 8.1.

6.2 Hydrostatic on-site testing recommendations

When the valve requires hydrostatic testing (before or after the installation in a piping system) these instructions must be followed.

6.2.1 Test fluid

Hydrostatic tests must be carried out with fresh and clean water containing a water soluble corrosion inhibitor and chloride/fluoride content not exceeding 30 ppm.

Air used for pneumatic test must be dry, clean and oil free (if applicable).

NOTICE	**It is client responsibility to make sure that testing medium is conform to these recommendations and does not contain any components/particles that may compromise the correct valve functioning.**

It is client responsibility to make sure that testing medium is conform to these recommendations and does not contain any components/particles that may compromise the correct valve functioning.

6.2.2 Valve ready to be installed in a piping system

If the valve is ready to be installed in a piping system and requires hydrostatic testing, please follow the Valbart Hydro Testing Procedure related to the specific job which the valve belong to in conjunction with the instructions specified below.

Piping system pipes welded on the valve ends

In case the valve has been prepared with piping system pipes welded on the valve ends, the piping system test pressures must be used.

Drying

1. The valve body cavity must be fully drained after completion of all tests and duly dried as follows:
2. Drain the residue test liquid remaining the valve opening the drain port (remove the drain plug or the drain/vent bleeder).
3. Flush the valve with compressed air from the vent port (vent/bleeder housing) in order to optimize the drain.
4. Close the drain port (mount the drain plug or the drain/vent bleeder). Pay attention to remount the PTFE seal(s) in case of the drain fitting is provided with.
5. Close the vent port (mount the vent bleeder). Pay attention to remount the PTFE seal(s) in case of the vent/bleeder is provided with.
6. When accessible, proceed to aspirate the valve bore and the gaps between ball/seats and seats/closures.
7. Dry and the internal bore of the valve.

6.2.3 Valve installed in a piping system

1. When the valve is installed in a piping system that requires hydrostatic testing, follow these steps to minimize any damage that may occur to the sealing surfaces and seals in the valve seats.
2. The valve must be with the ball in partially open position (approximately 10° to the fully open position) and the drain port open when the flushing with the test fluid begins. This will allow any piping system debris to be expelled through the drain port of the valve and/or outside of the piping system.
3. Once all the debris has been expelled out of through the drain port and the piping system has been purged of debris, the valve must be placed in a half open position. This allows the test fluid to enter into the valve body cavity.
4. Start the filling of test fluid.
5. The valve is ready to be pressure tested once it has been filled completely with the test fluid through the piping system.
6. Apply the test pressure inside the valve body through the end and vent the air off through the uppermost vent on the body (if any). Make sure to vent air off as much as possible.
7. Examine the entire surface of the valve and the body/closure joint and ascertain that no drops, or sweating, or humidity is visible during the duration of the test.
8. At the end of the hydrostatic test, the valve must be placed in the fully open position before removing the test fluid from the piping system. The test fluid in the body cavity can be drained through the drain opening located in the lower part of the valve body.
9. Once the valve and the piping system have been pigged and before the customer's product is introduced in the piping system, the valve must be placed in the partially open position (approximately 10° to the fully open position). Any residual test fluid trapped in the cavity of the valve body can then be drained through the drain port, which is located in the lower part of the valve body. If the valve has been fitted with a stem extension, the drain plug is located below the operator flange on the top of the stem extension.
10. The opening of the drain plug of the body will force the test fluid trapped in the body cavity to exit. Keep the drain plug open until all the liquids have been expelled through the body.
11. Close the drain plug of the body and put the valve in the fully open position or operating position request.

7 Operation

7.1 Start-up

After the line has been flushed and pressure tested the valve is ready to operate.

In case of problem close the valves upstream and downstream, then depressurize the line in which the valve is connected.

7.1.1 Valve Verification Before Start Up

1. Verify the tightness of the drain plug and of the vent valve.
2. Check the valve operability by stroking it to "full open" and "full close".

7.2 Normal operation

The valves described in this manual have been designed to control flow for on/off service only, so the valve working conditions are always fully open or fully closed.

Do not use the valve for flow control either in partly open or for throttling service to avoid damage on the sealing surface.

To ensure longer life of the valve it is recommended to perform periodic checks and maintenance operations.

8 Maintenance

8.1 Scheduled maintenance

In order to check the integrity of valve components and avoid damages due to wear we suggest regular 'in service maintenance operations in accordance with the following table or whenever requested by local regulations.

Table 4: Recommended maintenance checklist

Phase	No.	Service	Verification frequency [*]	Object of verification
STORAGE	1	Full stroke test (soft seated) [*]	Every three months	Operability
		Full stroke test (metal seated)	Yearly	
INSTALLATION				
COMMISSIONING	1	Full stroke test (soft seated) [*]	Every three months	Operability
		Full stroke test (metal seated)	Yearly	
OPERATION	1	Full stroke test (soft seated) [*]	Yearly	Operability
		Full stroke test (metal seated)		
	2	Visual inspection	Yearly	No external leakage
				No external corrosion

[*] timing for maintenance frequency is cumulative and must be referred at the warranty effective date

[**] operate the valves from open to closed position for three/four times

8.1.1 Actuated Valves for Safety Instrumented Systems

When the actuated valves supplied by VALBART are intended for use in Safety Instrumented Systems, the relevant Safety Integrity Level (SIL) requirements (if applicable) must be clearly specified in Customer's Purchase Order or Contract documentation.

In addition to the maintenance activities described above, the provisions given in VALBART's Safety Manual shall be followed.

8.2 Disassembly

In case disassembly is needed for valve refurbishing activities the instructions below must be followed:

1. If the valve is installed **MAKE SURE TO RELEASE THE PRESSURE FROM THE LINE**.
2. Rotate the ball (3) to fully closed position.
3. **OPEN THE DRAIN/VENT BLEEDER (17e) TO RELEASE ANY RESIDUAL PRESSURE FROM THE BODY CAVITY**, remove the drain/vent bleeder (17e).

4. Remove the valve from the line.
5. For operated valve remove the nuts (14c), the operator and the stem key (9a).
6. Place the valve on the end of the body (1) being careful do not damage the ends surface.
7. Remove the cap screws (15b) the pins (22b) and the operator flange (8d). At this point it is possible to remove and replace the following components:
    - Dust seal holder ring (5b);
    - Stem gasket (10b);
    - Dust seals (11o);
    - Stem bushing (20a).
8. Remove the cap screws (15a) the stem cover (7), the stem (5) and the stem grease fitting (17a), if provided, for cleaning. At this point it is possible to remove and replace the following components:
    - Lantern ring (5a);
    - Stem lip seals (26b);
    - Stem cover gasket (10c);
    - Antistatic spring (16b);
    - Stem thrust washer (21a);
    - Stem cover lip seal (26c).
9. Remove the nuts (14a) and the closure (2). At this point it is possible to remove and replace the following components:
    - Body gasket (10a);
    - Body lip seal (26a);
    - Seat (4) closure side;
    - Back seat ring (4a) closure side;
    - Seat gasket (10d) closure side;
    - Seat lip seal (26d) closure side;
    - Seat springs (16a) closure side.
10. Extract the ball (3) with ball supports (6). At this point it is possible to remove and replace the following components:
    - Seat (4) body side;
    - Back seat ring (4a) body side;
    - Seat gasket (10d) body side;
    - Seat lip seal (26d) body side;
    - Seat springs (16a) body side;
    - Ball bushing (20b);
    - Ball thrust washer (21b).

UN/UNC BOLT TIGHTENING TORQUE TABLE (ref. T6A rev. 06) Note: torque values are calculated using friction factor 0.11, typical for bolting treated with MOLYKOTE 1000				ASTM A193 B7 ASTM A320 L7 ASTM A320 L43 ASTM A193 B16 ASTM A453 660D ASTM B637 N07718 ASTM B637 N09925	ASTM A193 B7M ASTM A320 L7M ASTM A479 S32750 ASTM A479 S32760	ASTM A193 B8 Cl.2 ASTM A320 B8 Cl.2 ASTM A193 B8M Cl.2 ASTM A320 B8M Cl.2	ASTM A479 S31803	ASTM A193 B8M Cl.1 ASTM A320 B8M Cl.1 ASTM B473 N08020
Stud Diameter			Metric Eq. (BS1560)	Torque T	Torque T	Torque T	Torque T	Torque T
D [in]	n [-]	SR [-]	[mm]	[Nm]	[Nm]	[Nm]	[Nm]	[Nm]
1/4	20	UNC	M6	12	9	11	8	3
5/16	18	UNC	M8	24	18	22	15	7
3/8	16	UNC	M10	41	31	37	26	12
1/2	13	UNC	M12	97	74	88	60	27
5/8	11	UNC	M16	188	143	171	117	53
3/4	10	UNC	M20	327	249	297	204	93
7/8	9	UNC	M24	519	396	396	324	148
1	8	UN	M27	772	590	590	482	220
1 1/8	8	UN	M30	1115	852	697	697	318
1 1/4	8	UN	M33	1326	1182	967	967	440
1 3/8	8	UN	M36 x 3	2077	1587	995	1298	591
1 1/2	8	UN	M39 x 3	2716	2074	1301	1697	773
1 5/8	8	UN	M42 x 3	3225	2653	1664	2170	989
1 3/4	8	UN	M45 x 3	3425	3329	2088	2724	1241
1 7/8	8	UN	M48 x 3	3460	3231	2579	3364	1533
2	8	UN	M52 x 4	6556	5008	3141	4098	1867
2 1/4	8	UN	M56 x 4	6706	6716	-	5868	2673
2 1/2	8	UN	M64 x 4	6469	6610	-	6353	3683
2 3/4	8	UN	M70 x 4	12352	12361	-	10801	4920
3	8	UN	M76 x 4	11697	12646	-	12055	6407
3 1/4	8	UN	M80 x 4	24227	20514	-	17925	8166
3 1/2	8	UN	M90 x 4	23324	23840	-	22434	10220
3 3/4	8	UN	M95 x 4	22991	24855	-	23693	12592
4	8	UN	M100 x 4	24452	24719	-	23999	15306

Table 6: Metric bolting torque requirements

CAPSCREW TIGHTENING TORQUE TABLE (ref. T6B rev. 04) Note: torque values are calculated using friction factor 0.13, typical for dry threads		**ASTM A193 B7 ASTM A320 L7 ASTM A320 L43 ASTM A193 B16 ASTM A453 660D ASTM B637 N07718 ASTM B637 N09925**	**ASTM A193 B7M ASTM A320 L7M ASTM A479 S32750 ASTM A479 S32760**	**ASTM A193 B8 Cl.2 ASTM A320 B8 Cl.2 ASTM A193 B8M Cl.2 ASTM A320 B8M Cl.2**	**ASTM A479 S31803**	**ASTM A193 B8M Cl.1 ASTM A320 B8M Cl.1 ASTM B473 N08020**
Diameter						
M [-]	**D** [mm]	**Torque T** [Nm]	**Torque T** [Nm]	**Torque T** [Nm]	**Torque T** [Nm]	**Torque T** [Nm]
M8	8	30	23	27	19	8
M10	10	58	45	53	36	17
M12	12	100	76	91	62	28
M14	14	139	106	127	87	40
M16	16	213	163	194	133	61
M18	18	297	227	271	186	85
M20	20	417	318	379	261	119
M24	24	720	550	550	450	205
M27	27	1044	797	652	652	297
M30	30	1425	1089	891	891	406
M33	33	1933	1476	926	1208	550
M36	36	2483	1897	1190	1552	707

Table 7: NPT tightening requirements

NPT tightening according to ASME B1.20.1

(ref. T6N rev. 03)

A	B	C	D	E
NPT SIZE (INCH)	Threads/inch Filetti per pollice	HAND TIGHT ENGAGEMENT L_1 (turns) Tolerance ±1 turn	WRENCH TIGHT ENGAGEMENT L_3 (turns) Tolerance ±1 turn	Total Minimum Turns
1/8"	27.0	4	3	5
1/4"	18.0	4	3	5
3/8"	18.0	4	3	5
1/2"	14.0	4	3	5
3/4"	14.0	5	3	6
1"	11.5	5	3	6
1 1/4"	11.5	5	3	6
1 1/2"	11.5	5	3	6
2"	11.5	5	3	6
2 1/2"	8.0	5	2	5
3"	8.0	6	2	6
3 1/2"	8.0	7	2	7
4"	8.0	7	2	7

1. Inspect components to ensure that male and female port threads and sealing surfaces are free of burrs, nicks and scratches, or any foreign material.

2. Apply sealant or lubricant to male pipe threads if not pre-applied, as required by Operative Istruction IO 10-09.

3. Manually screw the connector into the port, following the value detailed in column C of the table.

4. Wrench tighten the connector following appropriate values shown in in column D of the table.
Never back off (loosen) pipe threaded connectors to achieve alignment.

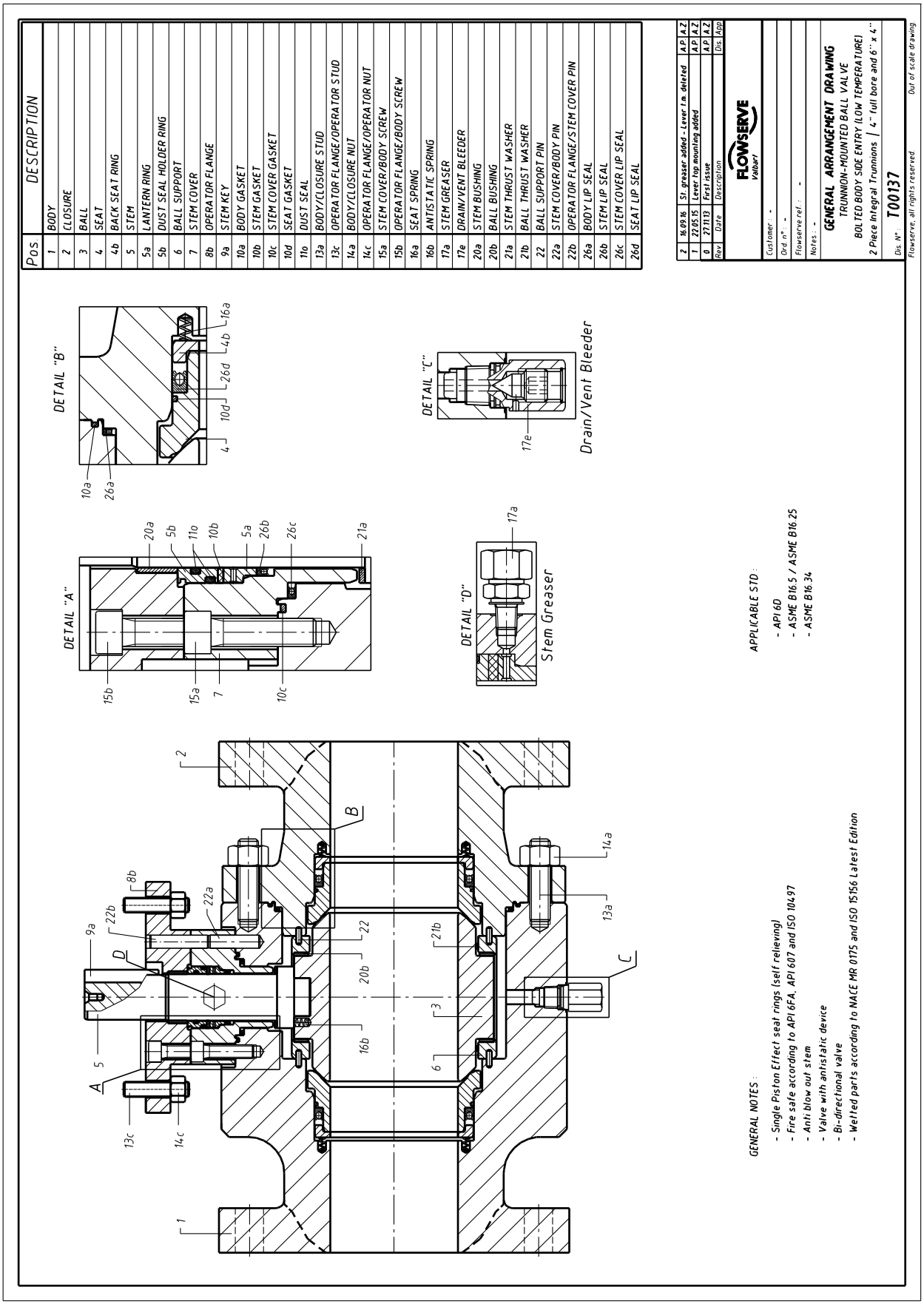


Figure 5: Sectional view and part list

8.3 Maintenance on disassembled parts

Inspection and maintenance procedure:

1. Wipe the metal parts with solvent by means of soft cloth.
2. Wipe lip seals and gaskets by means of soft cloth.
3. Check lip seals and gaskets, seat rings, stem and ball.
4. Replace the defective part with a new one.

⚠ Any work on the valve must be performed when it is at a standstill and de-energized state. It is imperative that the procedure for shutting down the machine is followed, as described in Chapter 6.

NOTICE	**After every disassembly, it is recommended to replace dust seals, lip seals and gaskets. Do not use dust seals, lip seals and gaskets with dimensions different from the original ones.**

8.4 Reassembly

To re-assemble the valve follow the disassembly steps backwards.

NOTICE	**During re-assembly be very careful to not damage lip seals. In the case of valves equipped with operator do not move absolutely the operator end stops (their position must be re-checked and eventually reset on the assembled valve).**

8.5 Spare parts stocking recommendation

When ordering spare part, the following information should be provided to Flowserve:

a) Product serial number
b) Product size
c) Part name – taken from the parts list/sectional drawing
d) Part number – taken from the parts list/sectional drawing
e) Number of the parts required

The product size and serial number are provided on the nameplate.

To ensure continued satisfactory operation, replacement parts to the original design specification should be obtained from Flowserve. Any change to the original design specification (modification or use of non-standard part) will invalidate the product safety certification.)

9 Troubleshooting Guide

WARNING	**Depressurize the line before starting any maintenance activity. Failure to do so may cause serious personal injury and-or equipment damage.**

Table 8: Troubleshooting recommendations

SCENARIO		CAUSES	REMEDIES
EXTERNAL LEAK	**SEALANT INJECTORS ARE LEAKING**	Dirty particles are present inside check valve of fitting. Dirty particles or damaging under needle protection cup. Leaks from the NPT thread.	Inject a small amount of valve cleaner inside the fitting until the leakage has stopped. Remove the cup, inspect and clean the needle area. If damaged replace with a new one. Tighten the fitting until the leakage disappears. If the problem persists replace the fitting when the line is not under pressure.
	THE STEM IS LEAKING	The stem seals are damaged.	Inject sealant into injection fitting. Replace the stem gasket or stem seals (ref to relevant procedures).
	VALVE BODY FLANGED CONNECTION LEAKAGE	Seals and gasket are damaged. Seals housings are corroded.	Bolts tightening of the flanged connection should be verified. Valve should be removed from the line for maintenance. Contact Valbart after sales service.
	VENT AND/OR DRAIN BLEEDER ARE LEAKING (SAFETY PLUGS)	Needle screws are not properly closed.	Check that the needle is properly closed tightening it. Try to re-open and re-close the needle. If the problem persists replace the fitting when the line is not under pressure.
		Leaks from the NPT thread.	Tighten the fitting per table 7. If the leak does not stop, use a sealant applied on the threads (temporary solution). If the problem persists replace the fitting when the line is not under pressure.

SCENARIO		CAUSES	REMEDIES
INTERNAL LEAK	**SEAT OR SEATS ARE LEAKING**	The valve is not fully closed position.	Check the ball position. Remove position indicator and check that stem key is 90° deg with reference to the line. Try to move the ball around closed position checking that leak has stopped through bleeding the body cavity.
		Operator stops are incorrectly adjusted.	Properly adjust the operator stops. Verify the correct position bleeding the body cavity.
		Seats are dirty or damaged.	Try to clean the seat/ball contact surfaces injecting a valve cleaner product (ref to cleaning procedure). Inject valve lubricant/sealant product (ref to seat sealant injection procedure). If the leakage doesn't stop the valve should be removed from the line for maintenance. If necessary contact Valbart after sales service.
OPERATION	**VALVE IS HARD/DIFFICULT TO OPERATE**	The operator is damaged or malfunctioning.	Check the operator. Refer to operator maintenance instruction.
		Debris is present between seat and ball contact areas or within seat pockets.	Flush seats with valve cleaner. If problem is solved after cleaning inject lubricant in order to protect flushed cavities from corrosion. If problem is not solved the valve should be removed from the line for maintenance. Contact Valbart after sales service.

10 Returns and Disposal

10.1 Returns

The valve shall be emptied, cleaned, and preserved before returning the equipment to the manufacturer. The manufacturer will only open the returned equipment if the contamination declaration is present.

(Note: the terms and conditions associated with returning a valve shall be addressed within the purchasing agreement or contract, and not part of the User Instruction.)

10.2 Disposal and recycling

At the end of the equipment service life, the relevant materials and parts should be recycled or disposed of using local environmental regulation methods. If the product contains substances which are harmful to the environment, then the removal or disposal of the equipment must be in accordance with local/regional regulations. This includes any liquid and/or gas in the "seal system" or utility.

(Add additional information if necessary. If the valve is not meant to recycle, remove all references to recycling from this section.)

 Refer to Safety Data Sheets and make sure that hazardous substances or toxic fluids are disposed of safely and that the correct personal protective equipment is used. All activities involving hazardous substances or toxic fluids must be in compliance with published safety standards.

11 Technical Data

11.1 Nameplate

Specific nameplates, standard and additional (if applicable), are applied for each project and are configured on the basis of the project requirements.

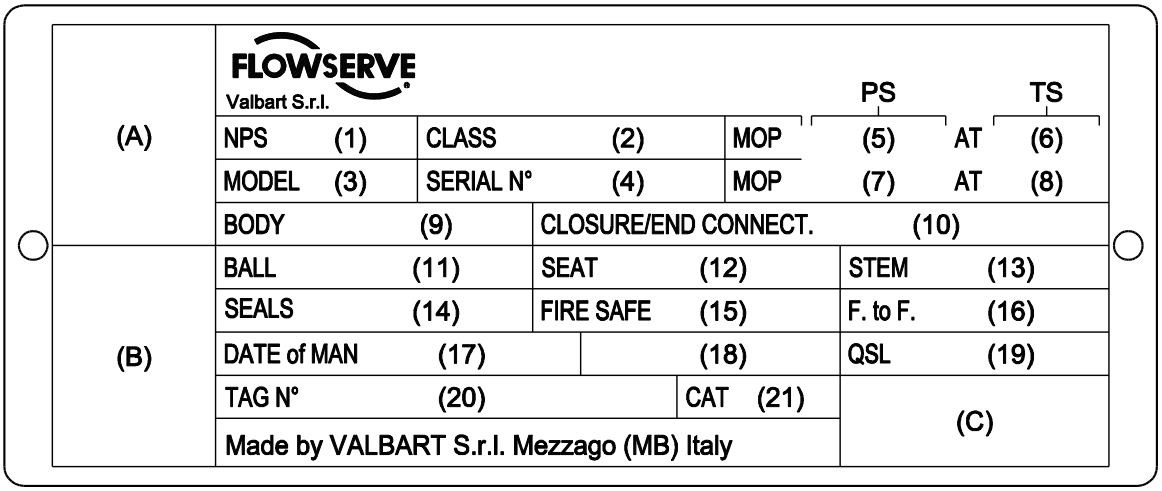


Figure 6: typical nameplate drawing (shown for general reference)

(A) CE marking with Notified Body Number and Fluid Group (when applicable);
(B) API monogram with License Number (when applicable);
(C) ATEX marking with temperature class Tx - referred to(6) - (when applicable);
(1) Valve nominal diameter;
(2) Pressure class;
(3) Valve model;
(4) Valve assembly serial number;
(5) Maximum Permissibile Pressure at Maximum Permissibile Temperature [bar];
(6) Maximum Permissibile Temperature [°C];
(7) Maximum Permissibile Pressure at Minimum Permissibile Temperature [bar];
(8) Minimum Permissibile Temperature [°C];
(9) Body material;
(10) Closure/End Connection material;
(11) Ball material;
(12) Seat material;
(13) Stem material;
(14) Seals material;
(15) Fire safe standard;
(16) Face-to-Face/End-to-End (if applicable);
(17) Month and year of manufacture;
(18) Seat feature (if required);
(19) Quality Specification Level (if applicable);
(20) Tag number;
(21) PED Risk Category (if applicable).

11.2 Operating limits

The limits of temperature and pressure are clearly indicated on the name plate, Valbart declines any responsibility for any use outside the above limits.

11.3 Torque requirements

Refer to Section 8.2 for torque requirements.

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SNA250 / SNA300

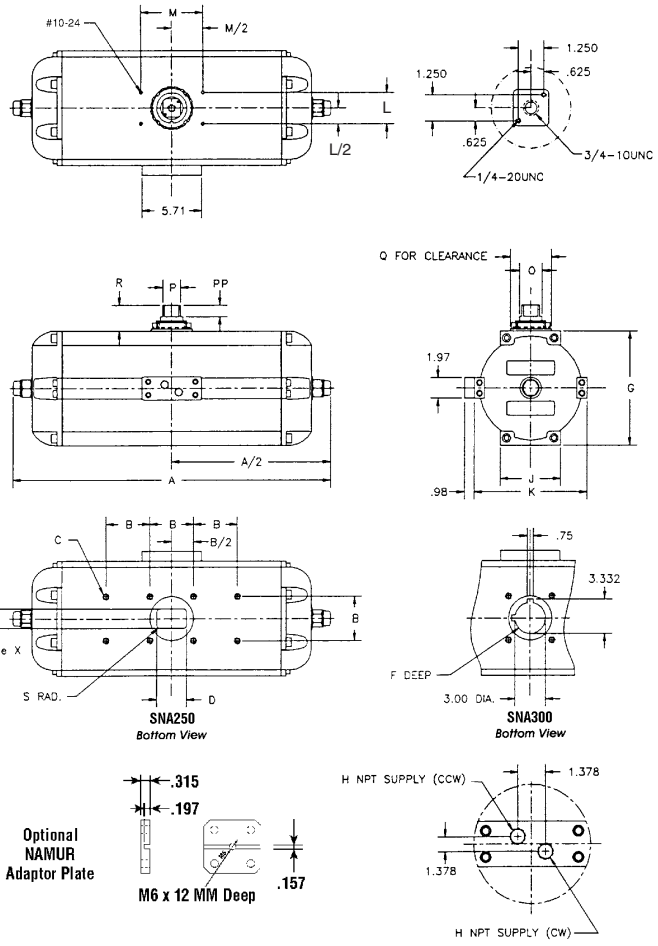
All actuators are factory lubricated for life, but still should be protected from the elements and stored indoors until ready for use. The ports of the actuator are plugged as supplied from the factory. If actuators are stored for a long period of time prior to installation, the units should be stroked periodically to prevent the seals from taking a set.

Prior to assembly, check the mounting surfaces, the stem adaptor and the bracket to assure proper fit. Manually open and close the valve to insure freeness of operation. Be sure the valve and Automax actuator rotate in the same direction and are in the same position (i.e., valve open, actuator open). Secure the valve with the stem vertical. Bolt the bracket to the valve and place the stem adaptor on the valve stem. Position the actuator over the valve and lower to engage the stem adaptor to the actuator shaft.

Continue to lower until the actuator seats on the bracket mounting surface. In order to align the bolt holes, it may be necessary to turn or stroke the actuator a few degrees and/or adjust the actuators travel stops. Bolt the actuator to the bracket.

After consulting the valve manufacturer's recommendations, adjust the travel stop bolts of the actuator for the proper open or closed valve position. Adjust the Stop Bolt (8) until the desired travel is obtained and reinstall O-ring (10) and Nut (9). Pneumatically stroke the actuator several times to ensure proper operation with no binding of the stem adaptor. If the actuator is equipped with an UltraSwItch or other accessories, adjust them at this time.

To prolong actuator life use only clean, dry plant air. Lubricated air is not required, however it is recommended particularly for high cycle applications. *CAUTION: Do not use lubricated air with positioners.*



Dimensional Information

MODEL	SNA250	SNA300
A (DA & SR)	27.32	32.60
180°	39.14	44.00
B	4.250	5.000
C	5/8 - 11x.63	5/8 - 11x.86
D	2.87	N/A
E	1.850	N/A
F	1.81	2.50
G	11.02	13.39
H(NPT)	1/2	1/2
J	5.91	6.30
K	11.02	13.39
L	1.181	1.181
M	5.118	5.118
N②③	10 - 24	10 - 24
OØ	2.20	2.44
P	1.969	1.969
PP	0.98	0.98
QØ	3.75	3.75
R	1.65	1.65
S	0.24	N/A
Wts. lbs. (DA)	137	217
Wts. lbs. (SR)	172	288
Volume (IN^3) CW	757	1403
Volume (IN^3) CCW	720	1019

Notes:
① Actuators shown in the full clockwise (CW) position as viewed from the accessory side.
② Accessory mounting holes not for gear override or stop block. Consult factory.
③ Use studs only to mount. Bolts are not recommended.
④ Air consumption per 90° (Standard cubic feet) $= \frac{V}{1728}\left(\frac{\text{Supply Pressure} + 14.7}{14.7}\right)$

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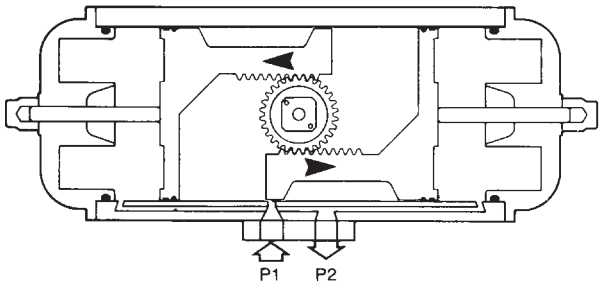
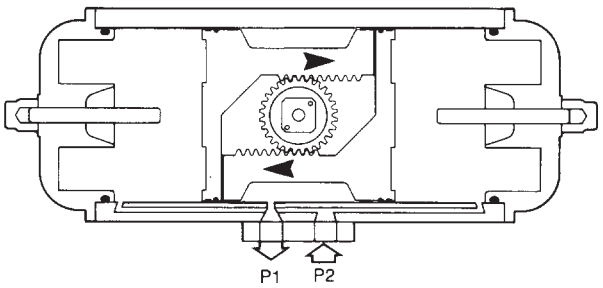
Operation (as viewed from top of actuator)

Double Acting

Applying air pressure to Port 1 drives the pistons outward, which turns the pinion counterclockwise as the air volume on the outside of the pistons exhausts through Port 2.

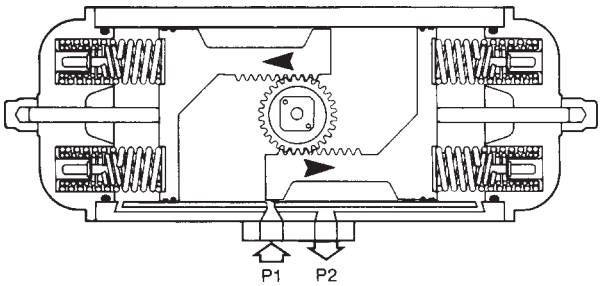


Applying air pressure to Port 2 drives the pistons inward, which turns the pinion clockwise as the air volume on the inside of the pistons exhausts through Port 1.

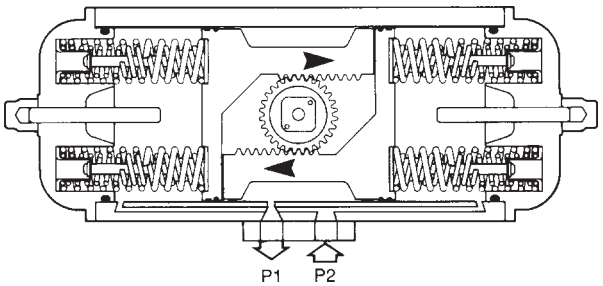


Spring Return (Fail CW)

Applying air pressure to Port 1 drives the pistons outward, which compresses the springs and turns the pinion counterclockwise as the air volume on the outside of the pistons exhausts through Port 2.

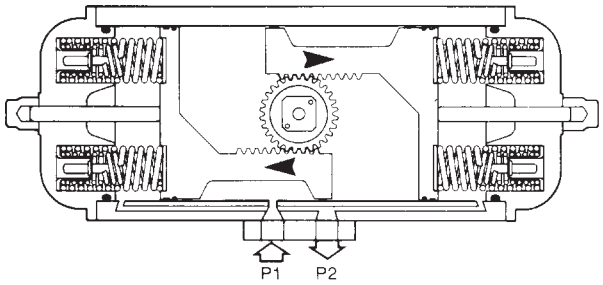


Exhausting the air pressure from Port 1 allows stored energy of the springs to drive pistons inward, turning the pinion clockwise. Air volume on outside of pistons vents through Port 2.

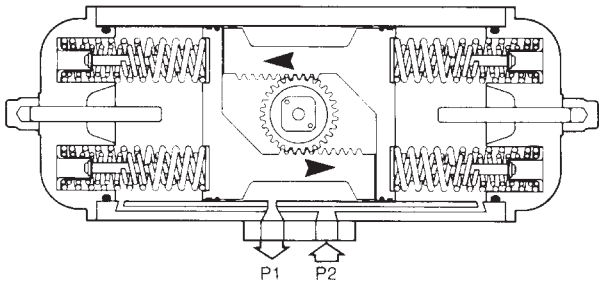


Spring Return (Fail CCW)

Applying air pressure to Port 1 drives the pistons outward, which compresses the springs and turns the pinion clockwise as the air volume on the outside of the pistons exhausts through Port 2.



Exhausting the air pressure from Port 1 allows stored energy of the springs to drive pistons inward, turning the pinion counterclockwise. Air volume on outside of pistons vents through Port 2.



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Maintenance Instructions

Disassembly Procedures

1. Disconnect all air and electrical supplies from actuator.
2. Remove all accessories from actuator and dismount actuator from valve.
3. Remove the 16 Endcap Screws (11, 12). When removing endcap screws on the supply side, apply low heat to loosen. Failure to apply heat may result in broken bolts.

WARNING: Loaded Springs in Endcaps, should be removed with caution.

4. SR - The Springs (21-24) will push the Endcaps off, releasing the spring load prior to the disengagement of the Endcap Screws (11, 12). Remove the Endcaps (2) and Spring Cartridge (21-24).
   DA- Remove the Endcaps (2). Step 6 will push the Endcaps (2) from the Body (1).
5. Rotate Pinion (3) counterclockwise (DA & SR-FCW) or clockwise (DR & SR-FCCW) to drive the Pistons (16) off the end of the rack. Pull the Left Piston (16) from the Body (1).
6. Remove the Right Piston (16) by pushing out through inside of Body (1).
7. Remove the Pinion Snap Ring (7), and pinion washer (6).
8. Tap Pinion (3) lightly with plastic mallet to remove.

Changing Pinion Orientation

1. Disconnect all air and electrical supplies from actuator.
2. Remove all accessories from actuator and dismount actuator from valve.
3. Remove the Pinion Snap Ring (7) and Pinion Washer (6).
4. Tap Pinion (3) lightly with plastic mallet to remove.
5. Reverse Steps 3 & 4 with new Pinion (3) orientation.

Reassembly Procedures

1. Inspect all parts for wear and replace any worn parts as needed. Replace all 'O'-rings.
2. Clean all components and lightly grease cylinder bore, pinion and seals per temperature rating notes. See page 4.
3. Reverse the disassembly procedures to reassemble.
4. The standard Pinion (3) orientation is with the drive pocket parallel with the Body (1) in the CW position.
5. When fitting the Pistons (16) ensure the teeth engage the Pinion (3) at the same time by measuring in from the edge of the Body (1) the same distance from each end. Note: the orientation of the pistons will determine the operation of the actuator. Refer to the diagrams under "Operation" for correct piston position.
6. When assembling a spring return actuator, stand actuator cylinder vertical when inserting spring cartridges. If this is not possible, make sure spring cartridges are fully seated in piston pockets when installing Endcap.
7. Adjust the Stop Bolt (8) until the desired travel is obtained and reinstall O-ring (10) and Nut (9).
8. Test the actuator for smooth operation and air leakage at service pressure before reinstalling.

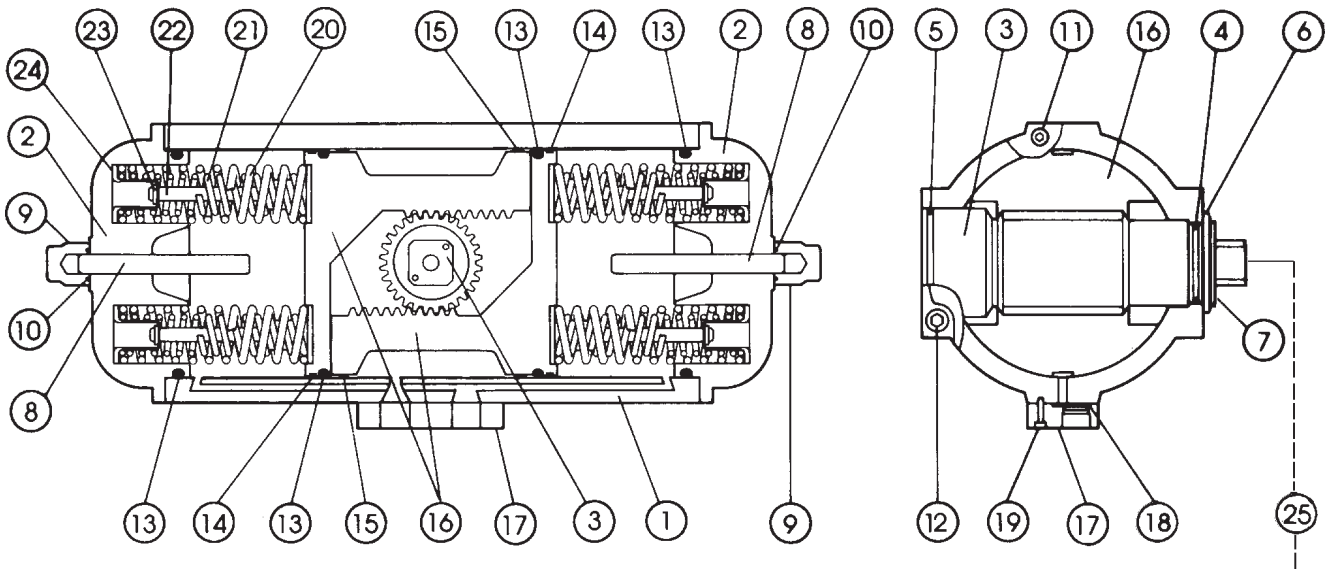
Changing Number of Springs

1. Follow the Disassembly Procedures through step 5.
2. Determine spring combination, consult catalog torque charts, distributor or factory. Simply add or remove one or more of the spring cartridges.
3. Reassemble the actuator, paying special note to step 6 in reassembling procedures.

Flowserve Corporation
Flow Control Division
www.flowserve.com

1350 N. Mountain Springs Parkway
Springville, Utah 84663-3004
Phone: 801 489 2233

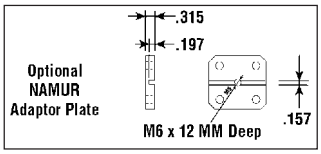
1978 Foreman Dr.
Cookeville, TN 38501
Phone: 931 432 4021



Item No.	Part Description	Qty.	Materials
1	Body	1	Extruded hard anodized aluminum
2	Endcap	2	Die Cast Aluminum.Electrostatic Poly
3	Pinion	1	Nickel Plated Steel
4	Upper pinion 'O'-ring ①	1	Nitrile rubber
5	Lower pinion 'O'-ring ①	1	Nitrile rubber
6	Pinion washer ①	1	Nylon
7	Pinion snap ring ①	1	Steel / plated
8	Stop bolt	2	Steel / plated
9	Stop bolt retaining nut	2	Steel / plated
10	Stop bolt 'O'-ring ①	2	Nitrile rubber
11	Endcap screw	8	Stainless steel
12	Endcap screw	8	Stainless steel
13	Piston and Endcap seal ①	4	Nitrile rubber
14	Piston guide band	2	PTFE
15	Piston guide	2	PTFE
16	Piston	2	Extruded aluminum
17	Connection base	1	Extruded aluminum, anodized
18	Connection base seal ①	2	Nitrile rubber
19	Connection base screw	4	Stainless steel
20	Spring ②	12	Steel electrostatic resin coated
21	Spring ②	12	Steel electrostatic resin coated
22	Spring Cartridge ②	12	Steel / plated
23	Spring Cartridge ②	12	Steel / plated
24	Spring Cartridge ②	12	Steel / plated
25	NAMUR adaptor plate	1	Aluminum / Anodized

Note:

① Parts included in a Seal Kit
② See Torque Chart for available combinations



SNA250 / SNA300 Seal Kits

Buna Seal Kit Number	NN - (Actuator Model No.) - SK B
Buna Seal Kit Number	NN - (Actuator Model No.) - SK V

Seal kit consists of all sealing parts.

Pressure Rating

150 psig maximum

Temperature Ratings

Standard[1]	Nitrile	-20° F to +175°F
High Temp[2]	Viton	0°F to +300°F
Low Temp[2]	Silicon-based	-55°F to +175°F

Notes:

1 For standard applications, use multi-purpose polymer fortified grease, such as Dubois Chemicals MPG-2.
2 For low temperature and high temperature applications, use special formulated grease such as Dow Corning® 55.

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INSTRUÇÕES PARA O USUÁRIO

Sistemas de Automação de Válvulas Automax

UltraSwitch™ XCL/XML

Instalação

Operação

Manutenção

FCD AXPTIM0120-02

Descrição:

As caixas de chave de fim de curso Automax UltraSwitch™ indicam a posição local e remota de válvulas automatizadas. Geralmente oferecem um indicador visual sendo: vermelho (fechado) e verde (aberto) para que, no caso de dúvida, a posição local seja determinada intuitivamente. A UltraSwitch™ está disponível em diversas opções de chave de fim de curso com indicação remota em várias aplicações elétricas. Também podem ser utilizadas como caixa de junção para instalação direta de válvulas solenóides.

Instalação:

As UltraSwitches podem ser instaladas em válvulas ou atuadores de válvula com diversos componentes de montagem. Para melhores resultados, especifique a opção de eixo e componente de montagem NAMUR ao instalar o produto em um atuador NAMUR compatível. Essas opções permitem conexão direta nos atuadores sem acoplamento, reduzindo a banda morta.

Basta parafusar o suporte no atuador e a UltraSwitch™ no suporte, apertando os parafusos manualmente. Para aplicações NAMUR, o eixo UltraSwitch™ possui um pino de alinhamento integral. Esse pino fixa o furo rosqueado no eixo do atuador. Para outras aplicações, certifique-se de instalar adequadamente um acoplamento entre a UltraSwitch™ e o atuador. Quando a UltraSwitch™ estiver instalada com fixadores ligeiramente soltos, bata duas ou três vezes no atuador para alinhar o suporte. Em seguida, aperte todos os fixadores.

Instruções para Fiação:

As caixas do UltraSwitch™ oferecem chaves pré-conectadas. Todas as conexões do usuário são feitas em um borne com terminais numerados. Os locais de ligação e aterramento externo e interno foram feitos para serem utilizados na instalação.Há um diagrama para a fiação localizado na parte interna da tampa e indica quais terminais correspondem aos contatos da chave: normalmente aberta, normalmente fechada, comum, etc. Siga o diagrama e o código elétrico para conectar os chaves ao seu sistema.

Nota: para todas as chaves de proximidade acionadas magneticamente, a chave superior (chave superior e terceira chave para as versões com 4 chaves) deve ser utilizada para indicar a posição no sentido horário. A chave inferior (segunda e quarta chaves para as versões com 4 chaves) deve ser utilizada apenas para indicar a posição no sentido anti-horário. Qualquer desvio desses ajustes pode resultar em indicação errada.

As solenóides também podem ser conectadas através da caixa da UltraSwitch™. Pelo menos dois terminais auxiliares são fornecidos como padrão.

Um parafuso de aterramento também é incluído. Conecte a solenóide nos terminais auxiliares e, em seguida, conecte os condutores de energia no lado oposto do terminal. Certifique-se de ter aterrado apropriadamente a solenóide no terminal de aterramento fornecido.

As caixas UltraSwitch ™ série XCL incluem duas entradas para conduites 3/4" NPT e as da série XML possuem duas entradas para conduítes M25x1.5. A instalação deve ser conforme os requisitos do Código Nacional de Instalação Elétrica, normas locais e instruções do fabricante. Em todos os casos, use selos contra os elementos ambientais para evitar entrada de água através do conduite.

Instruções Especiais sobre Locais Classificados (de Risco):

Para instalações na América do Norte, instale uma conexão de vedação do conduíte em uma distância de até 18 polegadas da caixa para atender os requisitos da NEC.
Para instalações da ATEX e IECEx é obrigatório o uso de um prensa-cabo de classificação adequada. Qualquer entrada de conduite não utilizada deve ter um elemento de bloqueio devidamente classificado.

CUIDADO: ⚠

- A substituição de componentes pode prejudicar a adequabilidade da Segurança Aumentada de Área 2.
- Não desconecte o equipamento a menos que energia tenha sido desligada ou se a área não for considerada classificada (de risco).
- A limpeza por fricção deste compartimento deve ser feita em uma área fora da área classificada (de risco).
- Risco potencial de carga eletrostática; limpe somente com um pano úmido. Perigo de propagação de descarga.
- Siga todos os requisitos de instalação para aterramento e ligação elétrica.
- Toda a instalação, inspeção e manutenção do equipamento devem ser realizadas por pessoal com treinamento adequado. Além disso, para satisfazer os requisitos da ATEX, toda a instalação, inspeção, manutenção e reparo devem ser realizados por pessoal com treinamento adequado. Para mais informações, consulte EN 60079-14:1997, EN 60079-17, EN 60079-19
- As peças de reposição não invalidam a certificação e somente devem ser obtidas direto do fabricante.

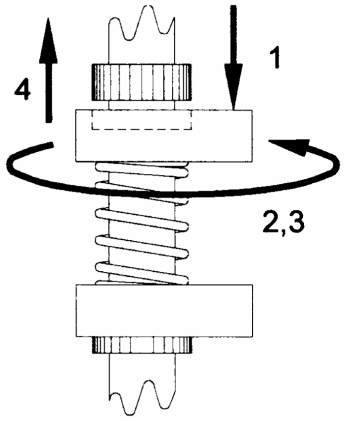
Ajuste de Chaves de Fim de Curso:

As caixas da Switch™ possuem cames de ajuste rápido utilizados para deslocar as chaves de fim de curso. Esses cames são facilmente ajustados sem a necessidade de ferramentas. Cuidado: antes de remover a tampa, desconecte a energia quando instalado em locais classificados (de risco). Remova a tampa e a separe. Gire completamente o atuador/válvula no sentido horário. Ajuste a(s) cames associada(s) ao sentido horário como segue:

1. Empurre ou puxe a came contra a mola para desprendê-lo das ranhuras.
2. Gire a came no sentido horário rompendo o contato com a chave (ou afastando o ímã da chave).
3. Continue girando a came no sentido horário até que a chave se deslocar.
4. Solte a came e prenda-o novamente com as ranhuras.

Gire completamente o atuador/válvula no sentido anti-horário. Ajuste a(s) came(s) associada(s) ao sentido anti-horário conforme descrito nos passos de 1 a 4, porém, gire a(s) came(s) no sentido anti-horário.

Nota: ajuste de fábrica para a chave superior = sentido horário (CW) (fechada); 2ª. chave = sentido anti-horário (CWW) (aberto); 3ª chave = sentido horário (CW) e 4ª. chave = sentido anti-horário (CWW).



Ajuste Fino da Came:

Algumas cames têm a disponibilidade de ajuste fino. Essas cames possuem um parafuso pequeno embutido na lateral. Ajustar esse parafuso para dentro ou para fora deformará a came, alterando ligeiramente o ponto de deslocamento.

Ajuste do Indicador de Posição UltraDome:

Os indicadores visuais UltraDome são facilmente ajustados para combinar as janelas translúcidas do domo com as seções coloridas do rotor. O domo é fixado na caixa da UltraSwitch com parafusos montados através de furos oblongos. Os furos oblongos permitem ajuste de cerca de 20° do domo. Além disso, o domo pode ser totalmente removido e redirecionado em incrementos de 45° e 90°. O rotor pode ser redirecionado com relação ao eixo, removendo o acoplador do eixo e girando 90º antes da reinstalação. Isso pode ser necessário para obter a orientação correta das janelas em uma aplicação de múltiplas vias.

Calibração do Transmissor 4-20 mA:

Ajuste da ação direta/reversa: O ajuste da micro chave (dip-switch) controla a direção do deslocamento. Para 4mA no sentido horário total, selecione "D"; para 4mA no sentido anti-horário total, selecione "R".

Ajuste do ponto zero/escala (span):

1. Fixe um medidor mA CC nos terminais +/-.
2. Opere a válvula/chave para a posição correspondente a 4mA.
3. Ajuste o potenciômetro para 4mA. (Gire no sentido horário para aumentar o valor; gire no sentido anti-horário para diminuir o valor).
4. Opere a válvula/chave para a posição correspondente a 20mA.
5. Ajuste o potenciômetro para 20mA. (Gire no sentido horário para aumentar o valor; gire no sentido anti-horário para diminuir o valor).
6. Os ajustes do ponto zero/escala span são interativos. Repita os passos 1 a 5, conforme necessário.

Nota: Se tiver dificuldade para ajustar o transmissor (ou seja, se não conseguir regular com o potenciômetro), recomece centralizando o potenciômetro. Isso é feito girando-o em uma direção 20 voltas e invertendo a direção em 10 voltas.

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Especificações de Opção de Chave:

Opção da Chave	Fabricante	No. da Peça	Capacidade de Carga
SPDT - M1 - Mecânica	Honeywell MicroSwitch	V7-1C13D8-201	15,1A (1/2 HP) a 125/250VCA; ½ A a 125VCC; 1/4A a 250VCC; 5A a 120VCA
MC-SPDT 250℉ - Mecânica	Honeywell MicroSwitch	V7-1C13D8-201	15,1A (1/2 HP) a 125 VCA; ½ A a 125VCC; 1/4A a 250VCC; 5A a 120VCA
MG – SPDT Dourada - Mecânica	Honeywell MicroSwitch	V7-1D19D8-201	1A a 125VCA/50 mA a 24VCC
MA de 3 Posições - Controle	Honeywell MicroSwitch	V7-1C13D8-201	15,1A (1/2 HP) a 125 VCA; ½ A a 125VCC; 1/4A a 250VCC; 5A a 120VCA
M3 – DPDT - Mecânica	Cherry	E19-00A	15A, 125/250 VCA 3/5CV
MB – DPDT - Mecânica	Licon	22-104	10A (1/2 HP) a 125VCA
MD – 3 Posições Controle c/ Indicação (DA)	Licon	22-104	10A (1/2 HP) a 125VCA
MS – 3 Posições Controle c/ Indicação (SR)	Licon	22-104	10A (1/2 HP) a 125VCA
P4 – SPST - Proximidade	Aleph	PS-6132	0,35A a 140VCA/.25A a 200VCC (50W Máx.)
P5 – SPDT - Proximidade	Hamlin	59135-030	0,25A a 120VCA/.25A a 28VCC (3W Máx.)
PE – SPDT Sabre - Proximidade	Flowserve	XA0199	1A a 120 VCA/2A a 24VCC
PP – SPDT Phazer - Proximidade	Flowserve	XA0155	3A a 120 VCA/2A a 24VCC
PL – SPDT Phazer c/ LED	Flowserve	XA0154	0,5A a 120 VCA/0,3A a 24VCC
PT – SPST BRS - Proximidade	Flowserve	XA0157	3A a 120 VCA/0,5mA a 24VCC
PX – SPST BRS c/ LED	Flowserve	XA0156	0,5A a 120 VCA/0,3A a 24VCC
N8 - Estado Sólido – Proximidade	Pepperl + Fuchs	NJ2-V3-N	Saída do Sensor NAMUR/ Fornecimento de 5 a 25VCC
NP - Estado Sólido – Proximidade	Pepperl + Fuchs	SJ3.5-N	
NQ - Estado Sólido – Proximidade	Pepperl + Fuchs	NJ4-12GK-N	
NR - Estado Sólido - Proximidade	Pepperl + Fuchs	NJ4-12GM40-E1	PNP Sinking / 200mA máx. Corrente /10 a 60VCC
NS - Estado Sólido – Proximidade	Pepperl + Fuchs	NJ4-12GM40-E2	NPN Sourcing / 200 mA máx. Corrente /10 a 60VCC
NT - Estado Sólido - Proximidade	Pepperl + Fuchs	NJ4-12GK40-E2	NPN Sourcing / 200mA máx. Corrente/10 a 60VCC
NU – SPDT GO - Proximidade	GO	35-13319-A1A	4A a 120VCA/2A mA a 240VCA
N9 - Estado Sólido – Proximidade	Pepperl + Fuchs	NBB3-V3-Z4	NPN/ Sourcing / 100mA máx. Corrente / 5 a 60VCC
SN – 3 vias - Pneumático	Favor consultar a fábrica para mais especificações técnicas.		
FZ - AS-I Bus Card	31VCC 28mA		

Especificações de Opção de Retroalimentação Analógica:

Opções T, D, E, S - 4-20 mA - Transmissor

Tensão: 6 a 30VCA
Impedância: 300 Ohms a 20mA

Opções A, B, C – Saída do Potenciômetro
Carga Máxima: 1 Watt

Classificações do Invólucro
NEMA 4, 4x, 7 e 9
IP67 (somente CSA)

Aprovações para Locais Classificados (de Risco):

Todas as Opções de Chaves
À prova de chama

	ATEX	IECEx
CE 0518 Ex	II 2 G Ex d IIB T5 II 2 D Ex tD A21 IP 65 T5 @ -20°C ≤ a ≤ +55°C, EN 60079-0:2004 EN 60079-1:2004 EN 61241-0:2006 EN 61241-1:2004	Ex d IIB T5 Ex tD A21 IP 65 T5 @ -20°C ≤ a ≤ +55°C, IEC 60079-0:2004 (Ed.4) IEC 60079-1:2003 (Ed.5) IEC 61241-0:2004 (Ed.1) IEC 61241-1:2004 (Ed.1

Opções de Chaves Mecânicas
À Prova de Explosão (UL/CSA)
Classe I, Divisão 1, Grupo C, D
Classe II, Divisão 1, Grupo E, F,G
Classe II, Divisão 2, Grupo F,G
Classe III (somente CSA)

Opções de Chave de Proximidade/Estado Sólido
À Prova de Explosão (UL/CSA)
Classe I, Divisão 1, Grupo C, D
Classe I, Divisão 2, Grupo A, B, C,D T3
Classe II, Divisão 1, Grupo E, F, G
Classe II, Divisão 2, Grupo F,G
Classe III (somente CSA)

NOTA: Ao utilizar uma chave de proximidade selada (P4, P5, PP e PL) nas aplicações da Divisão 2 na América do Norte, o uso da conexão da vedação não é obrigatório.

Nomenclatura do Produto:

☐ **Prefixo**

Em branco - Automax

☐ **TIPO DE EIXO**

D - Eixo "D" - Duplo
N - Eixo NAMUR
M - Eixo "D" - Duplo de 0,085

☐ **ESTILO DO CORPO**

XCL - Caixa de Alumínio à Prova de Explosão / à Prova de Chama, 2 conduítes ¾" NPT
XML – Caixa de Alumínio à Prova de Explosão/ à Prova de Chama, 2 conduíte M25

☐ **TIPO DO INDICADOR**

1 - Tampa Superior Plana, Sem Indicador
U - Ultradome Padrão (Verde/Vermelho)
3 - Ultradome de Quatro Janelas
C - Ultradome de 3 Vias de 90°
D - Ultradome de 3 Vias de 180°
E - Ultradome de Bloqueio Central de 3 Vias de 180°
F - Ultradome Passagem/Desvio
H - Ultradome Preto/Cinza/Amarelo
K - Ultradome Verde/Vermelho com Ektar
P - Seta Indicadora em Aço Inoxidável
R - Ultradome Reverso – vermelho = aberto / verde = fechado
W - Ultradome branco = fechado / azul = aberto
X - Ultradome de 3posições, tipo 6 – branco = fechado / azul = aberto

☐ **QUANTIDADE DE CHAVES**

0 - 0 Sem
1 - 1 Chaves
2 - 2 Chaves
4 - 4 Chaves

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☐ **TIPO DE CHAVE**

00	-	Sem Chaves (invólucro vazio)
M1	-	SPDT, Mecânico
MA	-	SPDT, Mecânico, com cames para controle (ver nota 1)
MD	-	DPDT, Mecânico, com cames para indicação (ver nota 1)
MS	-	DPDT, Mecânico, com cames para indicação (ver nota 1)
MC	-	SPDT, Mecânico – Construção para 250 °F
MG	-	SPDT, Mecânico – Contatos Dourados
M3	-	DPDT, Mecânico – Cherry
MB	-	DPDT, Mecânico – Licon
P4	-	SPST, Proximidade
P5	-	SPDT, Proximidade
PE	-	Sabre SPDT, Proximidade
PP	-	Phazer II SPDT, Proximidade
PL	-	Phazer II SPDT, Proximidade com LED
PT	-	Phazer II BRS SPST, Proximidade
PX	-	Phazer II BRS SPST, Proximidade com LED
N8	-	P&F NJ2-V3-N/NJ2-V3-N-V5 (NAMUR)
N9	-	P&F NBB3-V3-Z4
NQ	-	P&F NJ4-12GK-N (NAMUR)
NR	-	P&F NJ4-12GM40-E1 (NPN NO, 3 fios)
NS	-	P&F NJ4-12GM40-E2 (NPN NO, 3 fios)
NT	-	P&F NJ4-12GK40-E2 (NPN NO, 3 fios)
NP	-	P&F SJ3.5-N (NAMUR)
NU	-	GO SWITCH, Proximidade
SN	-	Válvulas Pneumáticas de 3 Vias
FN	-	Cartão Controlador Dispositivo de Rede, 4 entradas e 2 saídas, com 2 chaves do tipo 4
FZ	-	Cartão Controlador AS-i 2.1, 4 entradas e 2 saídas, com 2 chaves do tipo 4

☐ **CERTIFICAÇÕES**

	-	(ver nota 2)
-14	-	Uso Geral
-17	-	(CSA/UL) Classe I, Div. 1, CD; Classe I Div. 2, ABCD T3; Classe II Div. 1, EFG; Classe II Div. 2, FG; Classe III T5
-18	-	UL/CSA Cl I, Div. 1 Gr CD/Cl II Div. 1,2 Gr EFG/ ATEX II 2G Ex d IIB T5
-19	-	ATEX - II 2 G Ex d IIB T5; Classe II 2 D Ex tD A21 IP 65
-25	-	IECEx - Ex d IIB T5; Ex tD A21 IP 65
-26	-	InMetro – BR-Ex d IIB T5
-27	-	Factory Mutual/CUS I.S. Class I,II,II Div 1 Gr. A,B,C,D,E,F,G T5
-M1	-	Placa de Identificação de Metal UL/CSA Cl I Div 1 Gr CD/Cl II Div. 1,2 Gr EFG
-M2	-	Placa de Identificação de Metal UL/CSA Cl I Div 1 Gr CD Div. 2 Gr ABCD T3/Cl II Div. 1,2 Gr EFG

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☐ **OPÇÕES DE SAÍDA ANALÓGICA**

	-	(ver nota 3)
-0	-	Nenhuma
-T	-	Transmissor 4-20mA (curso de 40° a 100°)
-D	-	Transmissor de Curso de 180° e 4-20mA
-A	-	Potenciômetro 0-1 kOhm
-B	-	Potenciômetro 0-5 kOhm
-C	-	Potenciômetro 0-10 kOhm

☐ **OPÇÕES DE FIAÇÃO**

0	-	Nenhuma
1	-	Conectores Brad Harrison de 3 pinos
2	-	Conectores Brad Harrison de 5 pinos
3	-	Conectores Brad Harrison de 7 pinos
H	-	Bloco Terminal Serviço Pesado
P	-	Conectores vedados/revestidos (ver nota 4)

☐ **OPÇÃO MÍNIMA DE TERMINAIS ABERTOS**

2	-	2 (padrão – ver nota 5)
4	-	4
6	-	6
8	-	8

☐ **OPÇÕES ESPECIAIS**

0	-	Nenhuma
L	-	Parafusos da tampa lubrificados
N	-	Sem Silicone
P	-	Engrenagens do Potenciômetro de 180° (para opções analógicas A, B ou C)
V	-	Anéis-o de viton

☐ **OPÇÕES DE REVESTIMENTO**

0	-	Revestimento Resistente de Poliéster Preto
E	-	Revestimento de Epóxi Branco
K	-	Alojamento Revestido com Níquel
T	-	Alojamento Impregnado com Teflon
W	-	Epolon II Branco

Notas

1. O tipo de chave MA deve ser solicitado em quantidade de 2 chaves Os tipos de chaves MD e MS devem ser solicitados em quantidade de 4 chaves .
2. Certificações:

Os códigos de certificação válidos para Chaves Mecânicas (opções M1, MA, MD, MS, MC, MG, M3 e MB) incluem -14, -18, -19, -25, -M1.

Os códigos de certificação válidos para Chaves de Proximidade (opções P4, P5, PE, PP, PL, PT, PX, N8, NQ, NR, NS, NJ, NU incluem -14,-17, -18,-19,-25, -M2.

Os códigos de certificação válidos para Saída Analógica (opções T, D, A, B, D) incluem -14,-18,-19,-24, -M1,- M3.

3. Opção de transmissor disponível apenas para as opções de chave 00, M1, MG, N8. A quantidade máxima de chaves é 2.

4. Ao solicitar conectores potted, especifique o conduíte (esquerdo ou direito), a quantidade de conectores, o comprimento e a cor dos fios.

5. Alguns modelos possuem mais de 2 locais para terminais abertos como padrão. Consulte a fábrica para detalhes.

6. Opção de Chave FN (Dispositivo de Rede), F2, F4 (Foundation Fieldbus), SN (chave pneumática) não-aprovada pela ATEX ou IECEx.

Exemplo:
NXCLU2M1-18-00200 = marca Automax, eixo NAMUR, XCL, Indicador Ultradome, 2 chaves mecânicas SPDT e certificações UL/CSA e ATEX

Materiais de Construção:

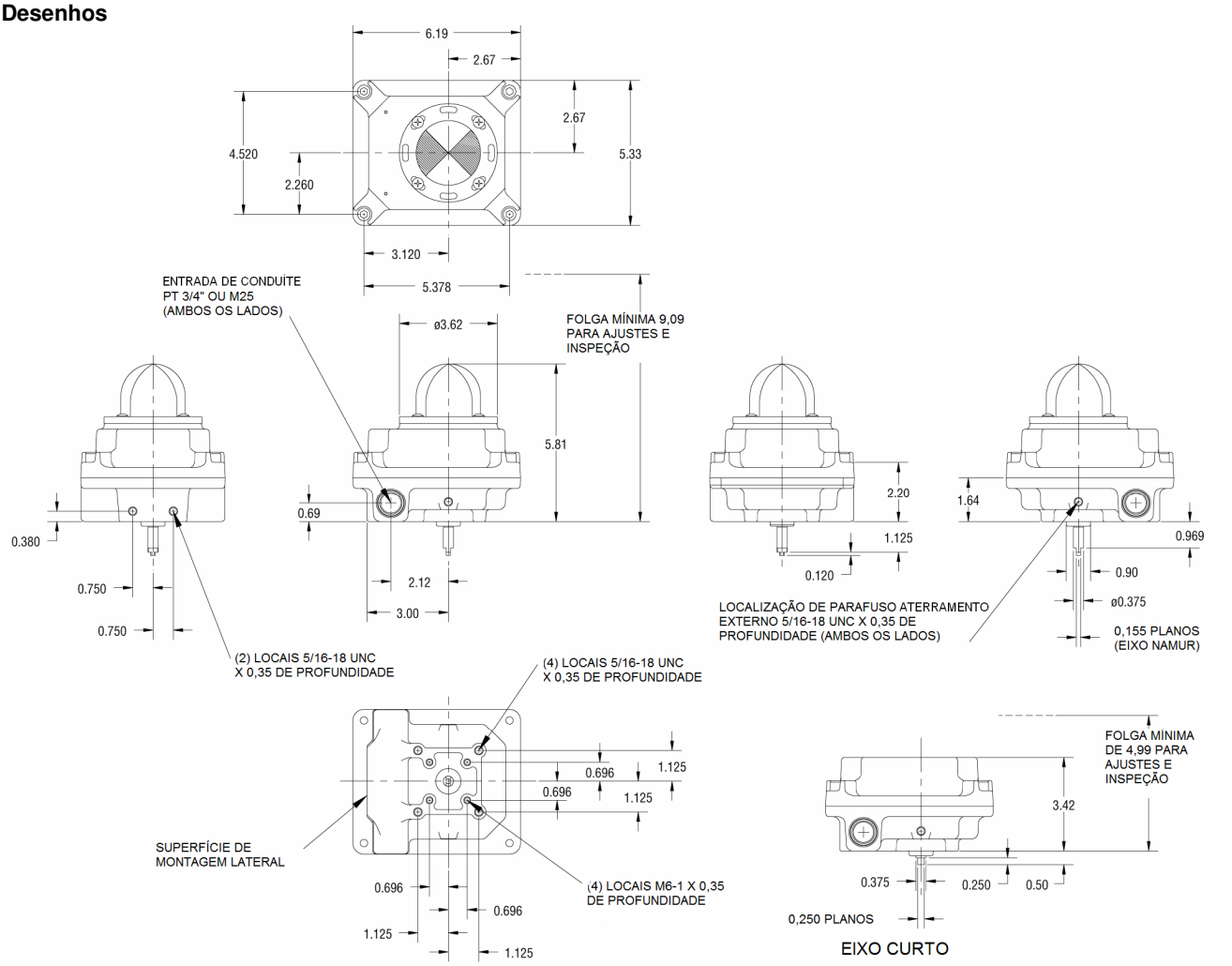
Peça	Material
Invólucro/Tampa	Alumínio com Dicromato e Revestimento Resistente de Poliéster
Eixo	Aço Inoxidável
Cames/Ranhuras	Náilon
UltraDome e Rotor	Policarbonato
Bloco de Terminal	Náilon – Série Buchanan TBS
Suportes Internos	Aço Inoxidável ou Aço Revestido
Todos os Fixadores Internos	Aço Inoxidável ou Aço Revestido
Todos os Fixadores Externos	Aço Inoxidável
UltraDome	Lexan ou Ektar™
Rotor	Policarbonato

- **No caso do equipamento entrar em contato com substâncias agressivas, o usuário deve adotar precauções adequadas para evitar danos, garantindo assim que a proteção fornecida pelo equipamento não seja comprometida.**

Folgas Máximas de Segurança:

Proteção Antichamas	Folga Máxima (mm)	Comentários
Tampa e base	0,038	Juntas flangeadas
Haste o e bucha da tampa	0,088	Junta do excêntrico cilíndrico
Tampa e bucha	0,00	Ajuste de interferência
Haste e bucha da base	0,088	Junta do excêntrico cilíndrico
Tampa e bucha	0,00	Ajuste de interferência

Desenhos



FLOWSERVE

INSTRUÇÕES PARA O USUÁRIO

Flowserve Corporation
1350 Mountain Springs Parkway
Springville, Utah, EUA, 84663
801 489-8611

Flowserve Corporation
1978 Foreman Drive
Cookeville, Tennessee, EUA, 38501
931 432-4021

Flowserve Flow Control UK Ltd
Hayward's Heath, West Sussex, Reino Unido
44 (0)1444 314400

Flowserve Corporation
12 Tuas Avenue 20
Cingapura
68798900

Flowserve Corporation
Rua Tocantins, 128
São Caetano do Sul, SP, Brasil
55 11 2169-6300

Flowserve Corporation
Korta Gatan 9
SE-171 54 Solna, Suécia
46 (0) 8 555 106 00

Boletim FCD AXENIM120-02

Para encontrar seu representante local Flowserve, utilize o Sistema de Busca do Suporte de Vendas localizado no site www.flowserve.com

Ou ligue gratuitamente para 1-801-489-8611

ASCOVAL
INDÚSTRIA E COMÉRCIO LTDA.

ASCO numatics

TERMO DE GARANTIA

A Ascoval assegura a **Garantia** contra qualquer não conformidade do equipamento ou de fabricação que nele apresentar, pelo período de 12 (doze) meses contados a partir da data de aquisição devidamente comprovada através da Nota Fiscal emitida.

Durante este período de vigência, comprometemo-nos a substituir ou consertar gratuitamente as peças não conforme, quando o seu exame técnico revelar a existência de não conformidade proveniente de matéria-prima ou de fabricação, reservando-nos o direito de utilizar as instalações de nossa fábrica ou revendedor mais próximo.

O mesmo não se aplica a quaisquer peças ou acessórios com não conformidade ou danos resultantes de uso indevido durante a instalação, manutenção, ou ainda em casos de imprevistos, quando as despesas inerentes ao transporte, embalagem e seguro correrão por conta do comprador.

Estes termos também tornam-se nulos e sem efeito, caso os produtos tenham sofrido alguma alteração ou modificação realizada por terceiros não autorizadas pela Ascoval.

***A validade será confirmada mediante a apresentação da Nota Fiscal de compra emitida contra o comprador inicial. Reservamo-nos o direito de promover alteração no produto, sem prévio aviso . ***

FABRICANTE: **ASCOVAL INDÚSTRIA E COMÉRCIO LTDA.**

NOME/COMPRADOR: _____

C.N.P.J. _____

ENDEREÇO DO COMPRADOR: _____

DATA DA COMPRA: _____ Nº NOTA FISCAL: _____

NOME / CARIMBO / DISTRIBUIDOR AUTORIZADO: _____

C.N.P.J. _____

ENDEREÇO DO DISTRIBUIDOR AUTORIZADO: _____

CÓDIGO DO PRODUTO: _____ VOLTAGEM: _____ Nº SÉRIE: _____

ASCOVAL INDÚSTRIA E COMÉRCIO LTDA.
Rodovia Pres. Castelo Branco, Km 20 - Jd. Santa Cecília - Cep 06465-300 - Barueri - SP
Tel.: (11) 4208-1700 - Fax: (11) 4195-3970 - e-mail : ascoval@emerson.com
SUBSIDIÁRIA DE ASCO Valve, Inc. - EMERSON ELECTRIC CO.

M-0003-REV. A - 12/2011

ASCOVAL
INDÚSTRIA E COMÉRCIO LTDA.

ASCO numatics

"MANUAL GERAL DE INSTALAÇÃO E MANUTENÇÃO VÁLVULAS SOLENÓIDE"

Este manual foi elaborado visando fornecer instruções gerais de instalação e manutenção de todas as válvulas Solenóide ASCO, fabricadas pela ASCOVAL INDÚSTRIA E COMÉRCIO LTDA.

IMPORTANTE:
Antes de instalar sua nova válvula e/ou fazer manutenção nas válvulas já existentes, leia atentamente as instruções deste manual bem como procure ter em mãos o nosso catálogo de válvulas solenóide, pois o mesmo é complemento indispensável para este manual. Mantenha sempre em seu poder este manual para futuros reparos nas válvulas solenóide.
Certifique-se que a rede elétrica esteja desligada, bem como não coloque pressão na linha antes de terminar a instalação.

OPERAÇÃO: Este produto foi projetado para operar dentro das condições do nosso catálogo. Caso necessite do catálogo, favor solicitar á nossa matriz, filiais ou a um de nossos Distribuidores Autorizados ou ainda acessar: www.ascoval.com.br. Todos nossos catálogos se encontram disponíveis em nosso site.

VÁLVULAS DE 2 VIAS
- Normalmente Fechada: A válvula é fechada quando a bobina está desenergizada, e aberta quando a bobina estiver energizada.
- Normalmente Aberta: A válvula é aberta, quando a bobina está desenergizada, e fechada quando a bobina estiver energizada.

Para maiores informações verifique a simbologia de válvulas de 2 vias, colocada no final deste manual.

VÁLVULAS DE 3 VIAS
- Normalmente fechada: Com a bobina desenergizada, o fluxo passa do acionador (A) ou (1) ao escape (E) ou (3), enquanto a entrada de pressão (P) ou (2) é bloqueada. Com a bobina energizada, o fluxo passa da entrada de pressão (P) ou (2) ao acionador (A) ou (1).
- Normalmente aberta: Com a bobina desenergizada, o fluxo passa da entrada de pressão (P) ou (3) ao acionador (A) ou (1). Com a bobina energizada o fluxo passa do acionador (A) ou (1) ao escape (E) ou (2), enquanto a entrada (pressão) é bloqueada.
- Universal: Uma construção que permite ser instalada como normalmente aberta ou fechada e ainda como convergente ou divergente de fluxo.

Consulte nosso catálogo e a simbologia de válvulas de 3 vias colocadas no final deste manual.

VÁLVULAS DE 4 VIAS
Quando a bobina está desenergizada, o fluxo passa da entrada de pressão (P) á um dos lados do acionador (A), enquanto o outro lado do acionador (B) está ligado com a exaustão (E). Com a bobina energizada, o fluxo passa da entrada de pressão (P) ao lado do acionador (B), enquanto o lado do acionador (A) será conectado com o escape (E). As válvulas de duplo solenóide tem funcionamento similar, porém o retorno não é feito por mola, e sim por outro solenóide. Logo, para cada reversão do sentido de fluxo é acionado um dos solenóides. Para válvulas de 4 vias, 3 posições e informações complementares das demais válvulas acima, consulte Simbologia de válvulas 4 vias colocada no final deste manual.

OPERADOR MANUAL
Este é um acessório que pode ser incorporado á grande maioria das válvulas, quando de sua fabricação, caso seja solicitado pelo cliente. Válvulas com sufixo "M.O." ou "M.S." identificam a existência de Operador Manual, que permite operar a válvula na ausência de comando elétrico ou interrupção de energia elétrica. Alguns modelos mais comuns de operador manual estão colocados no final deste manual. Caso necessite de informações adicionais, veja nosso catálogo ou solicite desenho da válvula específica.

INSTALAÇÃO E MONTAGEM

Antes de instalar a válvula, verifique na placa de identificação, os dados de pressão, fluido e voltagem. A maior parte das válvulas podem ser montadas em qualquer posição, entretanto, as de boletins nº 8266, 8300, 8302, e 8215 e outras com indicação específica, deverão ser montadas com caixa do solenóide em posição vertical, para cima. Para maiores informações, consulte nosso catálogo.

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TUBULAÇÃO
Instale a tubulação de acordo com as indicações no corpo da válvula.

VÁLVULAS DE 2 VIAS: A conexão de entrada de pressão é indicada com “A”, “IN”, “EN” ou “PRESS”, bem como pode ter uma seta indicativa do sentido de fluxo. Refira-se a seção Operacão deste Manual.

VÁLVULAS DE 3 VIAS: Dependerá de sua construção, se Normalmente Aberta, Normalmente Fechada ou Universal. Refira-se a seção Operação deste Manual.

VÁLVULAS DE 4 VIAS: Sua ligação dependerá do lado do acionador que deverá estar com pressão com a bobina desenergizada. Refira-se a seção Operação deste Manual.
Nas válvulas piloto as linhas de entrada e saída devem estar completamente livres e a pressão diferencial mínima deve ser mantida, para garantir funcionamento adequado (manter áreas de passagem, evitando restrições).
Controles de fluxo para os acionadores, devem ser instalados entre o acionador e a conexão da válvula.
Utilize fita veda-rosca para a instalação de tubulações rosqueadas: aplique somente na rosca macho, deixe sempre o 1º fio de rosca livre. Evite aplicação de compostos químicos de vedação nas roscas, pois estes podem entrar na válvula e causar problemas de funcionamento. O peso próprio das tubulações, tensões e deformações das mesmas, não devem ser transmitidos ao corpo da válvula. Mantenha o alinhamento das tubulações e utilize suportes adequados. Quando apertar a tubulação, nunca utilize a válvula como alavanca.

INSTALAÇÃO ELÉTRICA
A instalação elétrica, deve atender ás Normas e Códigos Locais e Nacionais. Verifique a tensão indicada na placa de identificação. Para facilitar a instalação Elétrica, todas as caixas dos solenóides podem girar de 360° em torno de seu eixo. Os solenóides em corrente alternada e corrente contínua tem construção distinta. Para converter de C. A. em C. C. ou vice-versa, é necessário mudar a bobina e os componentes internos no solenóide. Consulte um Distribuidor Autorizado, nossas Filiais de Vendas ou nossa Matriz.

TEMPERATURA DO SOLENÓIDE
Todas as válvulas standards indicadas no Catálogo, são fornecidas com bobinas projetadas para serviço pesado contínuo. Quando o solenóide permanecer energizado por um longo período, a caixa do solenóide aquece, podendo ser tocada com as mãos, por alguns segundos. Esta é a temperatura normal do funcionamento e segurança, não indicando qualquer anormalidade, sendo que o excesso da temperatura será indicada por fumaça ou odor de queima de bobina. Cuidados especiais com classe de temperatura da Bobina devem ser tomados quando da sua especificação evitando a queima da bobina. Consulte nossos catálogos para maiores esclarecimentos.

MANUTENÇÃO
Antes de efetuar reparos, certifique-se que a parte elétrica está desligada e que não há mais pressão de fluido na entrada da válvula. Se achar necessário solicite o formulário com a vista explodida aos nossos Distribuidores Autorizados, Filiais ou nossa Matriz, informando modelo da válvula e nº de série que estão indicados no Termo de Garantia ou Placa de Identificação da Válvula. Faça manutenção preventiva e procure sempre repor peças do jogo de reparo original que pode ser encontrado em qualquer dos distribuidores Autorizados. Consulte nossos catálogos e Seção Operação irregular deste manual.

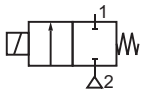
LIMPEZA
É recomendado uma limpeza periódica, o intervalo de tempo varia de acordo com fluido e as condições de operação.

OPERAÇÃO IRREGULAR
1 - Sistema elétrico: O correto funcionamento do solenóide, é indicado por um “Click Metálico” quando energizado: a ausência deste “Click” poderá ser causado por: Fusíveis queimados ou soltos; Fios de alimentação interrompidos ou mal conectados; Bobina queimada. Voltagem baixa: a voltagem deverá ser pelo menos 85% da indicada na placa de identificação - Pressão incorreta: a pressão deverá estar dentro dos limites especificados na Placa de Identificação.
2 - Vazamento Excessivo: Desmonte a válvula e limpe todas as peças.
3 - Maiores detalhes sobre condições de operação consultar nossos catálogos ou ainda nossos Distribuidores Autorizados, Filiais ou nossa Matriz.

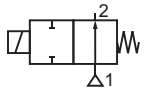
JOGOS DE REPARO
Todas as válvulas ASCO dispõem de jogos de reparo e bobinas sobressalentes. Quando pedir um jogo de reparo, especifique o número de válvula, o número de série, voltagem e frequência, que estão indicados na placa de identificação ou anotados no ato da compra no Termo de Garantia.
Nota : A descrição completa de qualquer válvula poderá ser encontrada em nossos catálogos e para consultar a relação de Distribuidores Autorizados acesse: www.ascoval.com.br.

SIMBOLOGIAS

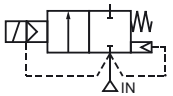
SIMBOLOGIA DE VÁLVULAS SOLENÓIDE 2 VIAS



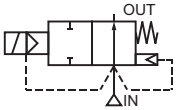
NORMALMENTE FECHADA
COMANDO SOLENÓIDE/
RETORNO MOLA



NORMALMENTE ABERTA
COMANDO SOLENÓIDE/
RETORNO MOLA

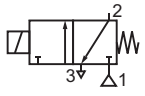


NORMALMENTE FECHADA
COMANDO SOLENÓIDE / PILOTO /
RETORNO MOLA / PILOTO



NORMALMENTE ABERTA
COMANDO SOLENÓIDE / PILOTO /
RETORNO / MOLA PILOTO

SIMBOLOGIA DE VÁLVULAS SOLENÓIDE 3 VIAS



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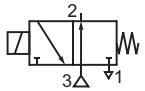
COMANDO SOLENÓIDE/
RETORNO MOLA



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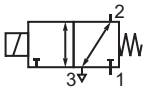
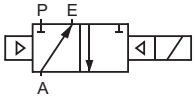


UNIVERSAL
COMANDO SOLENÓIDE /
RETORNO MOLA



NORMALMENTE FECHADA
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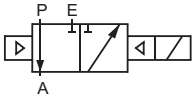
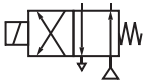
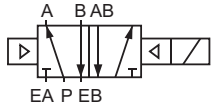
PILOTO / RETORNO PILOTO



NORMALMENTE ABERTA
COMANDO SOLENÓIDE
PILOTO / RETORNO PILOTO

SIMBOLOGIA DE VÁLVULAS SOLENÓIDE 4 VIAS


2 POSIÇÕES /
SIMPLES SOLENÓIDE COMANDO
SOLENÓIDE / RETORNO MOLA



2 POSIÇÕES /
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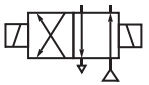
RETORNO PILOTO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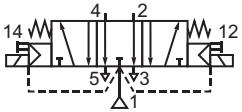
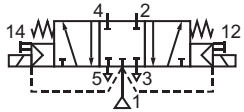
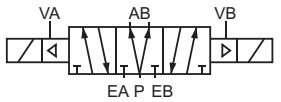
COMANDO SOLENÓIDE/
RETORNO SOLENÓIDE



3 POSIÇÕES / CENTRO ABERTO
COMANDO SOLENÓIDE / PILOTO /
RETORNO SOLENÓIDE / PILOTO

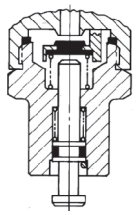


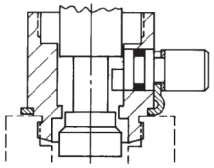
3 POSIÇÕES / CENTRO FECHADO
COMANDO SOLENÓIDE / PILOTO /
RETORNO SOLENÓIDE / PILOTO

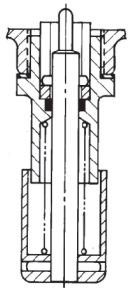


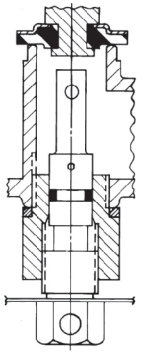
3 POSIÇÕES / PRESSÃO CENTRAL
COMANDO SOLENÓIDE / PILOTO /
RETORNO SOLENÓIDE PILOTO

ALGUNS MODELOS OPERADOR MANUAL


BOTÃO SEM TRAVA
APERTA E ACIONA
SOLTA E DESACIONA


ALAVANCA ROTATIVA


BOTÃO COM TRAVA
APERTA, GIRA E ACIONA
APERTA, GIRA E
DESACIONA


PARAFUSO

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