

BM7 Series Slam-Shut Valve

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INTRODUCTION

Scope of Manual

This manual provides instructions for installation, startup, maintenance and spare parts ordering for the BM7 Series slam-shut valves.



Figure 1. BM7 Series Slam-Shut Valve

Product Description

The BM7 Series slam-shut valves are automatic isolating elements suitable for installation as safety devices in regulating stations.

The slam-shut valves in the BM7 series are used in filtered natural gas reduction stations.

This product has been designed to be used with fuel gases of 1st and 2nd family according to EN 437, and with other non aggressive and non fuel gases. For any other gases, other than natural gas, please contact your local sales agent.

The slam-shut valves used in the assemblies dealt with into EN 12186 and EN 12279 are considered standard gas pressure devices.

In the safety slam-shut valves manufactured by Emerson Process shall be used additional pressure accessories (e.g. controller or filters) manufactured and labeled by Emerson Process.

Emerson Process will be not responsible for any possible inefficiency due to installation of not own production additional pressure accessories.

When pressure containing parts of the product have different maximum allowable pressures (PS), the slam-shut valve is differential strength type.

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PED CATEGORIES AND FLUID GROUP

According to EN 14382, only in Class A configuration (when both over and under pressure protections are set up), this slam-shut valve can be classified like a safety accessory according to PED.

The minimum PS between SSD valve and controller shall be the PS of the safety accessory to comply the provisions of EN 14382 about integral strength type.

This product in its Class A configuration is a safety accessory for pressure equipment in the following Pressure Equipment Directive 97/23/EC categories.

For values of PS over 6 bar the BM7 slam-shut is differential strength.

Table 1. P.E.D. Category for BM7 Series Slam-Shut Valves

PRODUCT SIZE	CATEGORY	FLUID GROUP
DN 1 1/2" - 2" and DN 40-50	IV	1

Built-in pressure accessories (OS/66 controller) conform to Pressure Equipment Directive (PED) 97/23/EC Article 3 section 3 and were designed and manufactured in accordance with sound engineering practice (SEP).

Per Article 3 section 3, these "SEP" products must not bear the CE marking.

CHARACTERISTICS

Body Sizes and End Connection Styles

DN 1 1/2" - 2" GAS

DN 40 - 50 PN 16

DN 50 ANSI 150 (on request)



Maximum Operating Inlet Pressure⁽¹⁾

$p_{u,max} = 14 \text{ bar}$

Version with OS/66 controller

Underpressure Set Range

0.007 to 0.45 bar

Overpressure Set Range

0.022 to 0.6 bar

Version with OS/66-AP controller

Underpressure Set Range

0.1 to 2.5 bar

Overpressure Set Range

0.2 to 5 bar

Minimum/Maximum Allowable Temperature (TS)⁽¹⁾

See label.

- The pressure/temperature limits indicated in this instruction manual or any applicable standard or code limitation should not be exceeded.

Functional Features

Accuracy Class AG: $\pm 1\%$

Response Time t_a : $\leq 1 \text{ second}$

Temperature

Standard Version: Working -10° to 60°C

Low Temperature Version: Working -20° to 60°C

Materials

Threaded body: Spheroidal cast iron

Flanged body: Spheroidal cast iron or steel

Covers: Aluminium

Seat: Bras

Diaphragm: Fabric Nitrile (NBR) rubber

LABELLING

TARTARINI BOLOGNA ITALY **CE** Notified body XXXX APPARECCHIO TIPO / DEVICE TYPE Note 1
 MATRICOLA / ANNO SERIAL Nr. / YEAR / Note 2 DN1 []
 REAZIONE FAIL SAFE MODE FAIL OPEN FAIL CLOSE DN2 []
 NORME ARMONIZ. HARMONIZED STD. EN [] Wds [] bar
 CLASSE DI PERDITA LEAKAGE CLASS [] TIPO TYPE [] Wdso [] bar
 CLASSE FUNZIONALE FUNCTIONAL CLASS Note 3 Cg [] Wdsu [] bar
 FLUIDO GRUPPO FLUID GROUP 1 pmax [] bar DN seat [] pdo [] bar
 TS Note 4 °C PS Note 5 bar PSD Note 5 Bar PT= 1.5 x PS bar

Figure 2. Label for BM7 Series Slam-Shut Valves

Note 1: See "Characteristics"

Note 2: Year of manufacture

Note 3: Class A or Class B
Only valves with overpressure and underpressure settings can be classified in Class A.

Note 4: Class 1: $-10^\circ/60^\circ\text{C}$
Class 2: $-20^\circ/60^\circ\text{C}$

Note 5: PS: 14 bar
PSD: 6 bar
(differential strength configurations)

OVERPRESSURE PROTECTION

The recommended maximum allowable pressures are stamped on the slam-shut valve label.

Upstream overpressure protection shall be provided if the inlet pressure is greater than the maximum operating inlet pressure ($p_{u,max}$) and than the maximum allowable pressure (PS, PSD).

Downstream side pressure after slam-shut valve's intervention shall stay within the actual maximum operating set-up range to avoid anomalous back pressures that can damage the slam-shut controller.

Downstream overpressure protection shall be also provided if the slam-shut valve outlet pressure can be greater than the PS of the slam-shut controller (differential strength type).

Slam-shut valve operation below the maximum pressure limitations does not preclude the possibility of damage from external sources or debris in the line.

The slam-shut valve should be inspected for damage after any intervention

TRANSPORT AND HANDLING

Established transport and handling procedures shall be followed to avoid any damage on the pressure containing parts by shocks or anomalous stresses.

Built-up sensing lines and slam-shut controller shall to be protected by shocks or anomalous stresses

ATEX REQUIREMENTS



WARNING

If the provisions of EN 12186 & EN 12279, national regulations, if any, and specific manufacturer recommendations are not put into practice before installation and if purge by inert gas is not carried out before equipment's start-up and shut-down operations, a potential external and internal explosive atmosphere can be present in equipment & gas pressure regulating/measuring stations/installations.

If a presence of foreign material in the pipelines is foreseen and purge by inert gas is not carried out, the following procedure is recommended to avoid any possible external ignition source inside the equipment due to mechanical generated sparks:

- drainage to safe area via drain lines of foreign materials, if any, by inflow of fuel gas with low velocity in the pipe-work (5m/sec)

In any case,

- provisions of Directive 1999/92/EC and 89/655/EC shall be enforced by gas pressure regulating/measuring station/installation's end user
- with a view to preventing and providing protection against explosions, technical and/or organizational measures appropriate to the nature of the operation shall be taken (e.g. : filling/exhausting of fuel gas of internal volume of the isolated part/entire installation with vent lines to safe area - 7.5.2 of EN 12186 & 7.4 of EN 12279 ; monitoring of settings with further exhaust of fuel gas to safe area ; connection of isolated part/entire installation to downstream pipeline;)
- provision in 9.3 of EN 12186 & 12279 shall be enforced by pressure regulating/measuring station/installation's end user
- external tightness test shall be carried out after each reassembly at installation site using testing pressure in accordance with national rules
- periodical check/maintenance for surveillance shall be carried out complying with national regulations, if any, and specific manufacturer recommendations.

SLAM-SHUT CONTROLLER

The following controllers are used with B/240 series regulator with built-in slam-shut:

- OS/66 Series spring loaded controllers



Figure 3. OS/66 Slam-Shut Controller

Table 2. OS/66 Characteristics

MODEL	BODY RESISTANCE bar	OVERPRESSURE SET RANGE W_{do} bar		UNDERPRESSURE SET RANGE W_{du} bar	
		Min.	Max.	Min.	Max.
OS/66	6	0.022	0.6	0.007	0.45
OS/66-AP	6	0.2	5	0.1	2.5

Materials

Body: Aluminium

Cover: Steel

Diaphragm: NBR rubber

For further informations please see the Instruction Manual 0048EN-OS66-IM.

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DIMENSIONS AND WEIGHTS

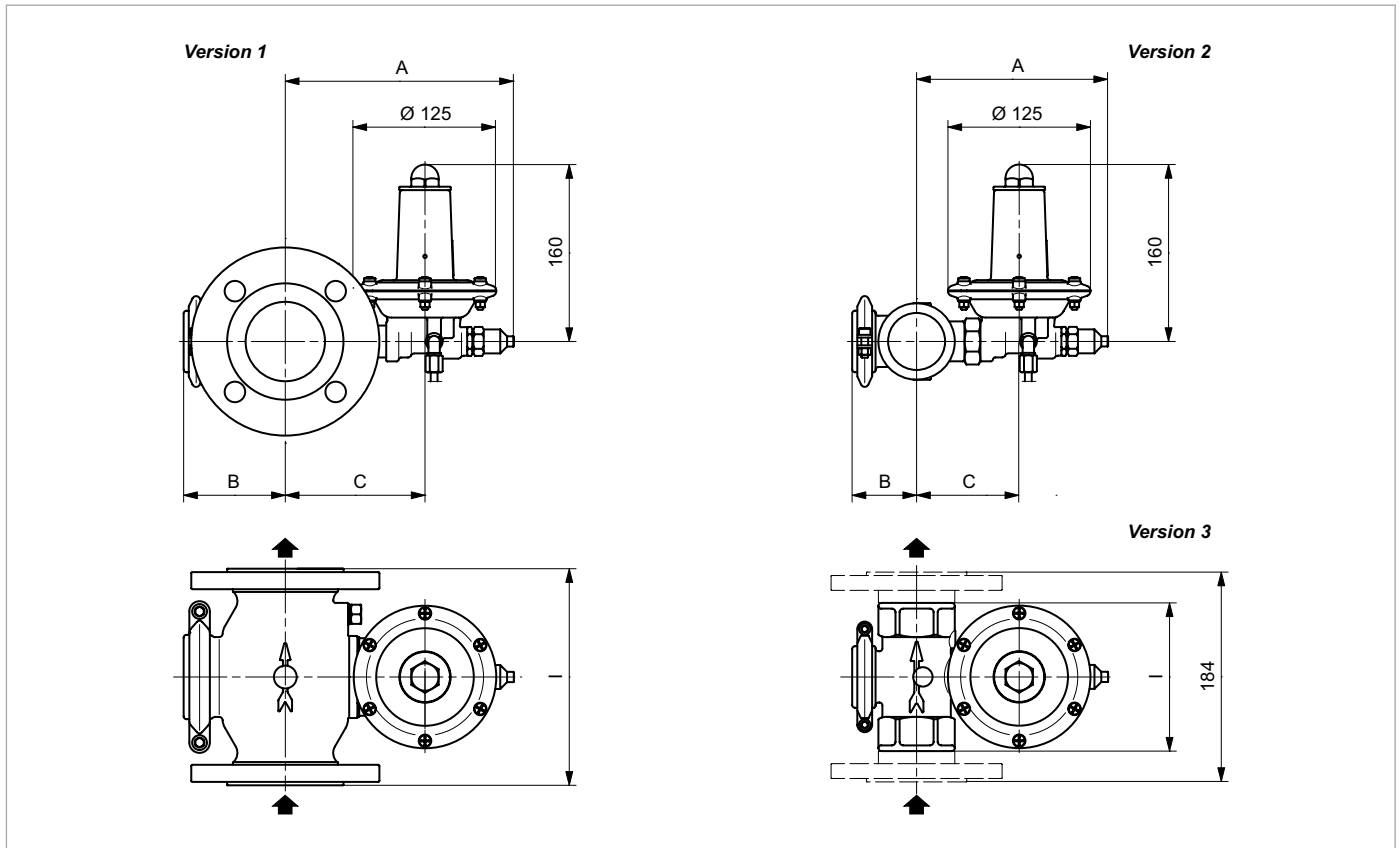


Figure 4. Type BM7 Series Dimensions

Table 3. Type BM7 Series Dimensions (mm) and weights (kg)

TYPE	A	B	C	I	Version	Weight
BM7/ 1 1/2"	165	57	90	130	2	3
BM7/40-FS	165	57	90	184	3	7
BM7/2"	190	85	120	160	2	5
BM7/50-F	195	90	125	190	1	13

INSTALLATION

- Ensure that the data found on the slam-shut valve label are compatible with usage requirements.
- Make sure that slam-shut controller is installed up-right.
- Ensure that the slam-shut valve is mounted in accordance with the direction of flow indicated by the arrow.
- Make the connection of the pressure control pipe (B), taking it off a straight section of the downstream pipe, if possible far from narrow sections, curves, or branches, to avoid variations in the release values of slam-shut device caused by turbulence.



WARNING

Only qualified personnel should install or service a slam-shut valve. Slam-shut valve should be installed, operated, and maintained in accordance with international and applicable codes and regulations.

If the slam-shut valve vents fluid or a leak develops in the system, it indicates that servicing is required.

Failure to take the slam-shut valve out of service immediately may create a hazardous condition.

Personal injury, equipment damage, or leakage due to escaping fluid or bursting of pressure-containing parts may result if this slam-shut valve is overpressured or is installed where service conditions could exceed the limits given in the “Characteristics” section, or where conditions exceed any ratings of the adjacent piping or piping connections.

To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation, or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the slam-shut valve could result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the slam-shut valve in a safe location.

Before installation, check shall be done if service conditions are consistent with use limitations and if its slam-shut device set-up is in accordance with service conditions of protected equipment.

All means for venting have to be provided in the assemblies where the pressure equipment are installed (ENs 12186 & 12279).

All means for draining have to be provided in the equipment installed before the slam-shut valve (ENs 12186 & 12279).

Further the ENs 12186 & 12279, where this product is used:

- Provide the cathodic protection and electrical isolation to avoid any corrosion
- In accordance with clause 7.3/7.2 of afore-said standards, the gas shall be cleaned by proper filters/separators/scrubbers to avoid any technical & reasonable hazard of erosion or abrasion for pressure containing parts

Slam-shut valve shall be installed in non-seismic area and hasn't to undergo fire and thunderbolt action.

Clean out all pipelines before installation of the slam-shut valve and check to be sure the slam-shut valve has not been damaged or has collected foreign material during shipping.

Use suitable line gaskets and approved piping and bolting practices.

Installation must to be done avoiding anomalous stresses on the body and using suitable joint means (bolts, flanges, ...) according equipment dimensions and service conditions.

Install the slam-shut valve in any position desired, unless otherwise specified, but be sure flow through the body is in the direction indicated by the arrow on the body.

User has to check and carry out any protection suitable for assembly's specific environment.

For outdoor installations, the slam-shut valve should be located away from vehicular traffic and positioned so that water, ice, and other foreign materials cannot enter into the pilot mechanism.

Avoid placing the slam-shut valve beneath eaves or downspouts, and be sure it is above the probable snow level.

STARTUP

The built-in slam-shut controller is factory set at approximately the midpoint of the spring range or the pressure requested, so an initial adjustment may be required to obtain desired results.

- loosening cap (C) and then screwing it onto the stem, after which pull cap outwards until a click is heard, indicating that balls are duly engaged.
- Slightly and very slowly open inlet shut-off valve.
- Wait for outlet pressure to stabilize.
- Finally, slowly open outlet valve fully.

OS/66 SLAM-SHUT CONTROLLER ADJUSTMENT

To change the set-points (overpressure and/or underpressure), remove the spring closing cap of the pilot and turn the adjusting screws clockwise to increase outlet pressure or counter-clockwise to decrease pressures.

Monitor the outlet pressure with a test gauge during the adjustment.

Replace the closing cap to maintain the desired setting

SHUTDOWN



WARNING

To avoid personal injury resulting from sudden release of pressure, isolate the slam-shut valve from all pressure before attempting disassembly and release trapped pressure from the equipment and pressure line. In case of disassembly of main pressure retaining parts for checks and maintenance procedures, external and internal tightness tests have to be done according to applicable codes.

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MAINTENANCE (SEE FIGURE 5)



WARNING

All maintenance procedures must be carried out only by qualified personnel.

If necessary, contact our after sale support representatives or our authorized dealers.

The valve and its pressure accessories are subject to normal wear and must be inspected periodically and replaced if necessary.

The frequency of inspection/checks and replacement depends upon the severity of service conditions and according to applicable National or Industry codes, standards and regulations/recommendations.

In accordance with applicable National or Industry codes, standards and regulations/recommendations, all hazards covered by specific tests after final assembling before applying the CE marking, shall be covered also after every subsequent reassembly at installation site, in order to ensure that the equipment will be safe throughout its intended life.

Before proceeding with any maintenance work, shutoff the gas upstream and downstream from the valve, also ensure that there is no gas under pressure inside the body by loosening the upstream and downstream connections.

Upon completion, check for leaks using suds.

General Maintenance

- a. Remove the OS/66 (key 26) by the suitable sprigs.
- b. Unscrew plug (key 8), for BM//2"-F version remove it by removing the screws (key 23).
- c. Remove the screw (key 19), remove the clamp (key 18) and remove the seat (key 1).

TROUBLESHOOTING

Table 6. Troubleshooting for BM7 Series Slam-Shut Valve

SYMPTOMS	CAUSE	ACTIONS
Slam-shut device does not remain set	The actuator impulse intake (B) is not connected properly	Check connections (A)
	Downstream pressure coincides with the maximum or minimum slam-shut settings	Check slam-shut settings
	Slam-shut controller is not working properly	Check slam-shut controller
Sleeve does not seal properly	Pad unit (key 12) is worn	Replace pad unit
	Dirt deposit on seat (key 1)	Check seat

- d. Check and replace if is necessary the O-ring (key 2, 5, 6, 10, 16) and the pad Unit (key 12).

For the OS/66 maintenance please see the Instruction Manual 0048EN-OS66-IM.

Reassembly

Lubricate all seals with MOLYKOTE 55 M or equivalent, being very careful not to damage them when reassembling.

Reassemble the parts by reversing the above steps.

As you proceed, make sure that parts move freely and without friction.

In addition:

- a. Complete reassembly and make sure to tighten all screws uniformly.
- b. Upon completion of reassembling procedure, adjust slam shut valve set-points and check valve relatching.
- c. Reassemble the valve on the line and restore the connections.

SPARE PARTS

Spare parts storage shall be done by proper procedures according to national standard/rules to avoid over aging or any damage (Ref.:ISO2230).

PARTS LIST

Key Description

- 1 Seat
- 2* O-ring
- 3 Filter
- 4 Shaft
- 5* O-ring
- 6* O-ring
- 7 Spring carrier
- 8 Plug
- 9 Spring
- 10* O-ring
- 11 Pad holder
- 12* Pad unit
- 13 Elastic ring
- 14 Screw
- 15 Body
- 16* O-ring
- 17 Cap
- 18 Clamp
- 19 Screw
- 20 washer
- 21 Nut
- 22 Pipe fitting
- 23 Screw
- 24 Washer
- 25 Label
- 26 Slam-shut controller OS/66
- 27 Plug
- 28* Gasket
- 29 Sliding flange
- 30 Hub
- 31 O-ring

Rubber parts marked with (*) are supplied in the "spare parts kit", recommended as stock.

To order the kit it is necessary to communicate to us the type of the slam-shut valve or slam-shut controller and its serial number.

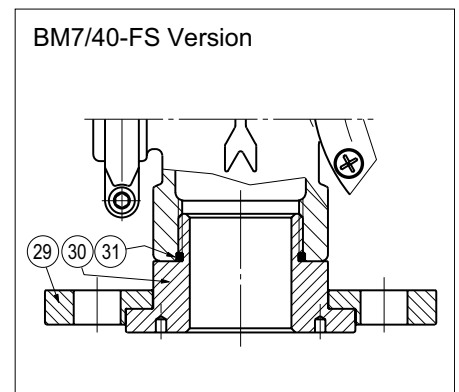
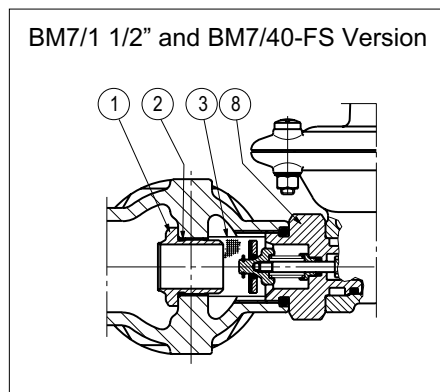
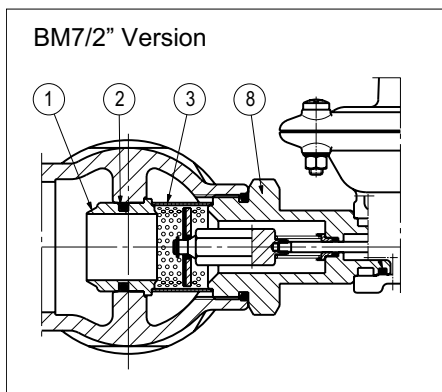
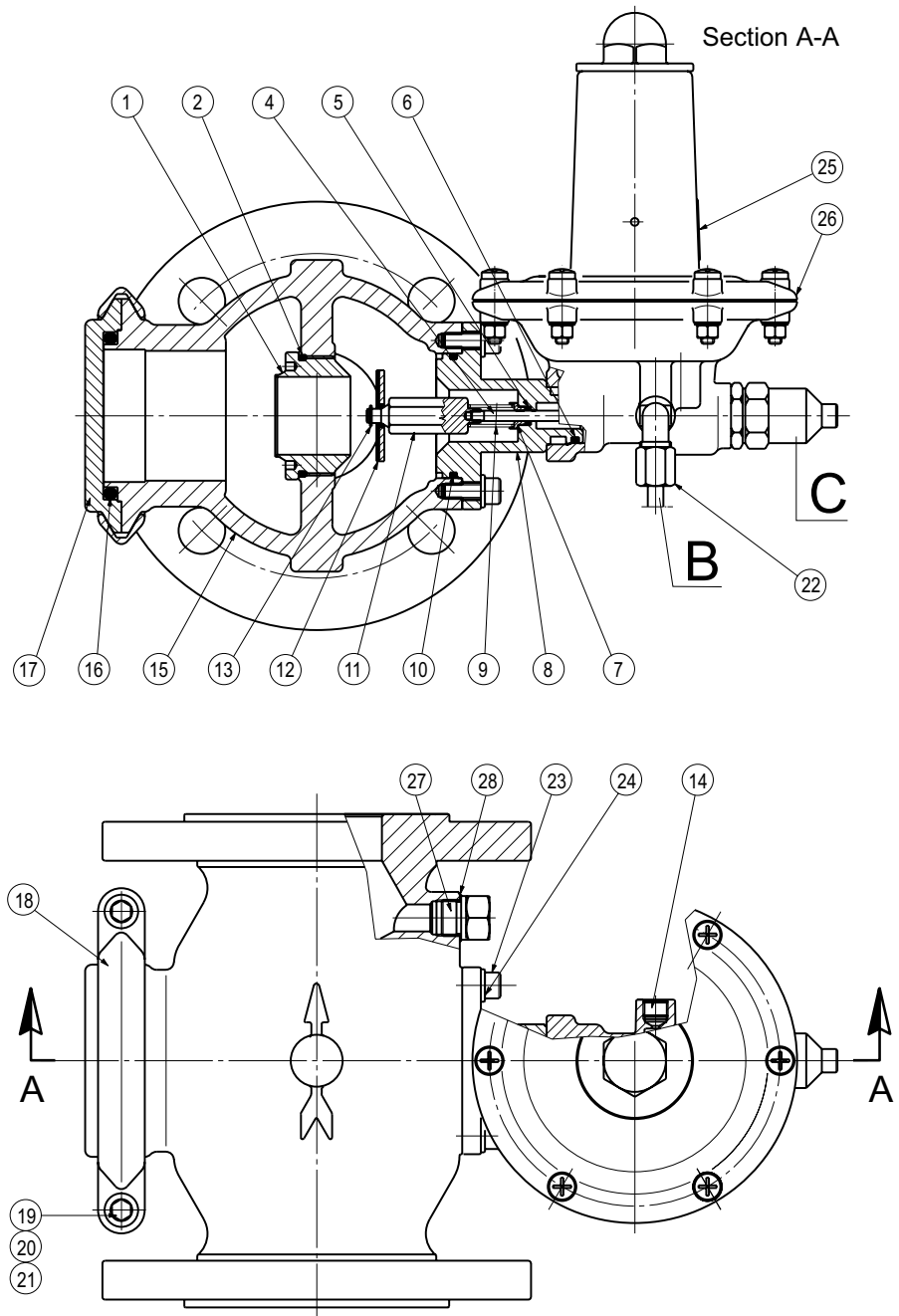


Figure 5. BM7 Series Slam-Shut Valve

Serie BM7

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