

APPLICATION

- In common measuring circuits of systems of industrial automation;
- For fast complete closing or opening of flow of the operation liquid, which can flow through the ball valve in both directions; the recommended direction is identified with an arrow on the body;
- In design with test and venting valve for venting the piping or inspection (TEST) of the measuring equipment (manometer) during the operation;
- As special design in purity grade for oxygen (O₂), this armature is delivered perfectly degreased and provided with suspended blue tag (code P2S);
- As special design with purity of inner surfaces of grade I pursuant to TPE 10-40/1926/85 (code PC1).
- For industrial environment with concentration of SO₂ and environment with sea climate.

The ball valve may not be used for regulating the flow; it concerns a closing full-flow armature.

DESCRIPTION

The basis of the ball valve consists of a body, in which the stop ball is located. With the use of a shaft, it is connected with a handle for manual control of the valve.

The positions of the ball valve "CLOSED" - "OPEN" (OFF-ON) are achieved by the movement of the handle to the stop.

The design of the ball valve is antistatic and ensures electric interconnection of all parts, which are in contact with the operation liquid and jacket (body) of the armature.

The ball valve design also ensures protection against possible pushing out of the control mechanism from the ball valve body. The ball valve in open position does not contain "dead areas", in which residue of operation liquids could remain or where their solid compounds could be deposited.

The stop element of the armature (ball) revolves around its axis that is vertical to the direction of flow and in the open position, the operation liquid flows through the ball valve.

The ball valve is closed (opened) by turning the handle to the right (left) by 90° to the stop, which results in full closure or opening of the ball valve.

TECHNICAL DATA

Nominal internal diameter pursuant to EN ISO 6708:
DN 15

Nominal pressure pursuant to EN 1333: PN 160

Operation position: discretionary

Weight: approx. 0.9 kg

Type of operation: continuous

Connection to piping: optional input and output connecting terminals pursuant to tab. 2

OPERATION CONDITIONS

Ball valves are designed for the environment defined by the group of parameters and their severity grades IE36/3C4 for SO₂ pursuant to EN 60721-3-3 and the following operation conditions, (i.e. in places with minimum protection against daily fluctuations of the outside climate, exposed to sunshine, with effects of precipitations carried by rain.

Ball valves can be exposed to sea climate from time to time pursuant to EN 60068-2-52, severity grade 2.

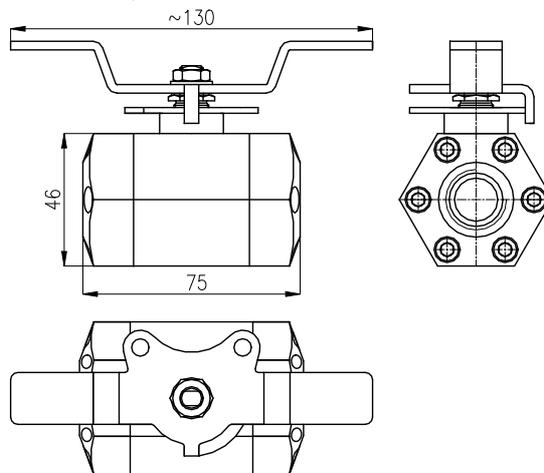
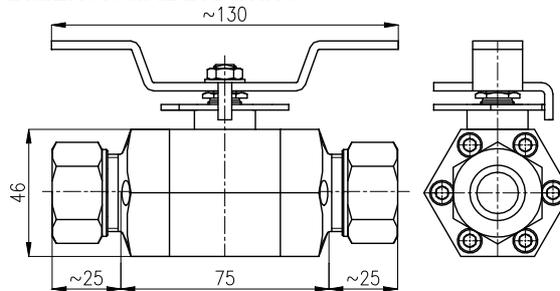
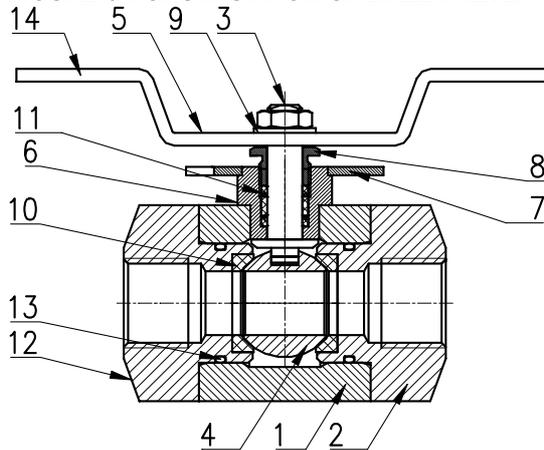
Relative ambient humidity:

10 to 100 % with condensation, with upper level of water content 29 g H₂O/kg of dry air

Atmospheric pressure: 70 to 106 kPa

Maximum operation temperature: 150 °C

Operation liquid: technical water, other liquids and gaseous fuels

FIGURE 1 BALL VALVE DIRECT WITH INTERNAL THREADS , DIMENSIONAL DRAWING**FIGURE 2 BALL VALVE DIRECT WITH TERMINALS , DIMENSIONAL DRAWING****FIGURE 3 CONSTRUCTION OF BALL VALVE**

Position	Name of part	Material
1	Body	1.4541 *
2	Flanges and terminals	1.4541 *
3	Shaft	1.4541 *
4	Ball	AISI 316Ti *
5	Handle	1.4541 *
6	Shaft case	1.4541 *
7	Stop of handle	1.4541 *
8	Nut	1.4541 *
9	Nut, washer	Stainless steel A2
10	Seat	PTFE
11	Seal	PVDF+ PTFE
12	Distance ring	PVDF
13	Screws M5	Stainless steel A2
14	Handle roll-on	VINYL

*) The manufacturer has the relevant certificate 3.1 for these materials pursuant to EN 10204

CHEMICAL RESISTANCE OF SEALING MATERIALS

Chemical resistance of materials of sealing elements represents an important parameter, which determines reliability of the valve. The following table includes informative data of the most frequently used substances together with chemical resistance of sealing element materials. If other substances are used, chemical resistance tests shall be performed directly at the customer in the expected operation conditions (temperature, pressure, concentration ...)

Medium		FPM	NBR	PTFE	PVDF	
Acetone		-	-	*	+	
Acetylene		+	+	+	+	
Petrol		+	*	+	+	
Ammonia	aqueous solution	-	-	+	+	
	liquid	-	*		+	
	gaseous	*	*		+	
Ethylene		+	+		+	
Hydraulic fluids	not flammable	*	-		+	
Hydroxides		*	*		+	
ACIDS	Boric	+	+	+	+	
	Citric	+	+	*	+	
	Nitric	-	+	-	+	
	Hydrofluoric	< 65%	*	+	-	+
		> 65%	*		-	
	Phosphoric	10%	+	+	+	+
		concentrate boiling conc.	+	+	+	+
	Hydrochloric	10%, 80°C	*	+	-	+
		36%, 20°C	*	+	*	+
	Chromic		+		-	
	Malic		+	+	+	+
	Carbolic		-		-	
	Hydrocyanic		+		*	
	Butyric		*		*	
	Lactic		+	+	*	+
	Formic	10%	-	+	-	+
	Acetic	10%	-	+	-	+
		concentrate	-		-	
	Salicylic		+	+	+	+
	Sulphuric	25%	*	+	*	+
80%		-	*	-	*	
Oxalic	10%	+	+	+	+	
Carbonic		+	+	+	+	
Tartaric		+	+	+	+	
Oxygen		+	-	+	+	
Oils		+	*	+	+	
Steam	< 200°C	*	-		+	
	> 200°C	-	-	-	-	
Perchloroethylene		+	*	+	+	
Kerosene		+	*	+	+	
Gaseous fuels		+	+	+	+	
Radioactive radiation		*	*	-	-	
Compressed air		+	+	+	+	
Toluene, trichloroethylene		*	-	+		
Hydrocarbons		+	+	+	+	
Water	< 80°C	+	+	+	+	
	> 80°C	+	*	+	+	
Hydrogen	cold	+	+	+	+	
	hot	+	*	+	+	

- + great resistance
 - not resistant
 * good or conditional resistance
 vacant no information is available

RELIABILITY

Reliability indicators in the operating conditions and environmental conditions in this manual

- Mean operating time between failures of 96,000 hours (inf.value)
 -the estimated life span of 10 years

DESIGNATION

(pursuant to ČSN 13 3005-1)

Data on ball valve body

- Trade mark of the manufacturer
- Product ordering number
- Time code (serial number for design for O₂ and for design with code PC1)
- Nominal internal diameter
- Nominal pressure
- Maximum operation temperature
- Body material
- Casting number of body material
- Mark of performed pressure test
- Code of shaft seal sealing
- Arrow indicating recommended direction of medium flow

DELIVERY

Unless agreed otherwise with the customer, each delivery includes

- Delivery note
- Products pursuant to the purchase order
- Accompanying technical documentation in Czech:
 - o Product quality and completeness certificate, which also serves as the warranty certificate
 - o Test report and list of used materials
 - o Product manual
 - o Inspection report for design for O₂ (only in case of armature with code P2S)
 - o Inspection report about purity of internal surfaces (only in case of armature with code PC1)

If it is established in the purchase contract or agreed otherwise, the following documentation can be also delivered with the product:

- Copy of inspection certificate 3.1 pursuant to EN 10204 for body material and other parts pursuant to the table of used materials with casting number
- Declaration of Conformity with the purchase order 2.1 pursuant to EN 10204
- Copy of the test report about resistance to surrounding conditions
- Supplier's declaration of conformity in accordance with ISO/IEC 17050-1
- Test report about the seismic and the vibration qualification

PACKING

Both products and accessories are delivered in a packing ensuring resistance to the impact of thermal effects and mechanical effects pursuant to controlled packing regulations.

TRANSPORT

The products may be transported on conditions corresponding to the set of combinations of classes IE 23 pursuant to EN 60721-3-2 but they may not be exposed to direct rain (i.e. by plains, trucks, trailers and semi-trailers, railway wagons with specially designed shock absorbers and ships, in premises that are without ventilation and protection against climatic effects).

STORAGE

The products may be stored on conditions corresponding to the set of combinations of classes IE 12 pursuant to EN 60721-3-1 but with ambient temperature from -30 to 55 °C (i.e. in places, where temperature and humidity are not regulated, with a threat of occurrence of condensation, dripping water and formation of ice, without a special threat of an attack with biological agents, with vibrations of small significance and not situated close to sources of dust and sand).

PLACING AN ORDER

The purchase order shall specify:

- Name
- Product ordering number
- Other (special) requirements
- Number of pieces

PURCHASE ORDER EXAMPLE

Standard design:

Ball valve PN 160
 978 11 52 17 W1 BZ1 PC1 VB
 20 pcs

TABLE 1 – DESIGN OF BALL COCKS, TYPE 978

SPECIFICATIONS			ORDERING NUMBER								
			978	1	1	xx	xx	xx	xxx	xxx	xx
DESIGN OF BALL VALVE	Direct			1	1						
	inlet	Terminals with threaded rings pursuant to table 2				17					
					18						
					19						
		1/2 – 14 NPT			52						
		G 1/2				74					
	outlet	Terminals with threaded rings pursuant to table 2					17				
							18				
							19				
1/2 – 14 NPT					52						
	G 1/2				74						
SHAFT SEAL	PEEK +PTFE							W1			
COLOUR OF HANDLE ROLL-ON	Green								BZ1		
	Red								BR1		
	Blue								BM1		
	Yellow								BY1		
SPECIAL TREATMENT *)	Cleanness of internal surfaces of equipment of grade I									PC1	

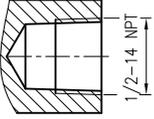
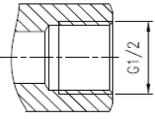
*) If the code is not specified, the fitting will be supplied without special modifications and without accessories

TABLE 2 - OVERVIEW OF CONNECTING TERMINALS

A two-digit code is specified for each type of the terminal in addition to its dimensional drawing, description and installation procedure. This code shall be specified in the relevant place of the ordering number of the armature. Along with the weld-on terminal, the relevant number of threaded rings, which are illustrated in the dimensional drawing, will be delivered according to its type for the armature.

CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
17		<p>TERMINALS WITH THREADED RINGS</p> <p>By means of a cap nut and two rings, a drawn, seamless tube made of plain carbon steel, alloy steel or stainless steel with Ø 6, 8, 10, 12, 14, 16, 18, 20 a 22 mm with tolerance of outside diameter and ovality ± 0.3 mm can be connected in a way that enables further uninstallation.</p> <p>FIRST INSTALLATION:</p> <ol style="list-style-type: none"> Slide the cap nut, rear (cylindrical) ring and front (conical) ring on the straight-cut end of the tube that is free of burrs – pay attention to its orientation! To ensure correct function, it is necessary to maintain the layer of grease applied by the manufacturer on the conical sealing surface, rear ring and threads! Insert the end of the tube with rings into the connecting sleeve up to the bottom and tighten the cap nut by hand. Tighten the cap nut with a torque-limiting wrench with the torque of 60 Nm (for tube Ø 12 mm) or 65 Nm (for tube Ø 14 mm).
		<p>UNINSTALLATION + REPEATED INSTALLATION:</p> <ol style="list-style-type: none"> Uninstallation shall be realized by complete unscrewing of the cap nut <u>after pressure has been completely discharged from the system.</u> Before repeated installation, check cleanness of the tube, threads and all sealing surfaces and pay attention to any possible damage. Rotation of the front threaded ring on the tube is not a defect! To ensure correct function, it is suitable to maintain the layer of grease applied by the manufacturer on the conical sealing surface, rear ring and threads; otherwise, they should be greased again. If required, this original grease can be ordered at the manufacturer of the armature. The installation is realized by inserting the end of the tube with rings and cap nut up to the bottom of the connecting sleeve. Tighten the cap nut by hand. By means of a torque wrench, tighten the nut by torque for repeated installation, i.e. 53 Nm (for tube Ø 12 mm) or 55 Nm (for tube Ø 14 mm). <p>WARNING: <u>THE CAP NUT MAY NEVER BE TIGHTENED (RELEASED) UNDER PRESSURE – it can result in a lethal injury!!!</u></p> <p>A failure to comply with the aforesaid torque (i.e. insufficient or excessive tightening of the cap nut) during the installation and with the minimum straight part of the tube from its end results in decreasing resistance of the connection to pressures and vibrations, which could then cause leakage of the connection.</p> <p>If vibrations of the piping system occur, the armature to be connected shall be fixed by means of a suitable holder and the connecting piping shall be attached in certain distances by tube fittings.</p>
18		<p>Connecting tube shall be inserted fully up to the bottom of the sleeve.</p> <p>Minimum length of direct part of the tube</p>
19		<p>Minimum length of direct part of the tube</p>

TABLE 2 - OVERVIEW OF CONNECTING TERMINALS – continuation from the previous page

CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
52		<p style="text-align: center;">INTERNAL THREAD 1/2 - 14 NPT</p> <p>The thread is cut directly in the flange.</p> <ol style="list-style-type: none"> 1. Wind up sealing tape of PTFE on the corresponding external thread. 2. Screw the screw joint or tube into the hole in the flange and tighten with torque of 60 Nm.
74		<p style="text-align: center;">INTERNAL THREAD G1/2</p> <p>The thread is cut directly in the flange.</p> <ol style="list-style-type: none"> 1. Wind up sealing tape of PTFE on the corresponding external thread. 2. Screw the screw joint or tube into the hole in the flange 3. With spanner 46 hold the ball valve flange and nut tighten with torque of 120 Nm.

INSTALLATION AND CONNECTION

The ball valve installation may be realized by a worker of the installation or service organization.

The operation liquid may flow through the ball valve in both directions. The arrow in the upper part of the body indicating the recommended direction of flow only serves for identification of inlet and outlet terminals in case they are different.

Installation of the ball valve shall be realized directly on the piping by means of inlet and outlet connecting terminals.

COMMISSIONING

After the installation (connection of the piping) and inspection of the correct position of the control handle (lockable design can be provided with a suitable padlock), the ball valve is prepared for operation.

OPERATION AND MAINTENANCE

The ball valve is closed (opened) by turning the handle to the right (left) by 90° to the stop, which results in full closure or opening of the ball valve. The positions of the ball valve "CLOSED" - "OPEN" (OFF-ON) are achieved by the movement of the handle to the stop. Intermediate positions are not recommended on principle – danger of damaging seats and losing tightness.

The ball valve may only be cleaned by service workers of the manufacturer.

SPARE PARTS

The ball valve design does not require any delivery of spare parts.

WARRANTY

The manufacturer warrants for technical and operation parameters of the product specified in the manual. The warranty period is 36 months from the receiving of the product by the customer, unless established otherwise in the contract. The manufacturer warrants for the parts, which are subjected to natural wear and are replaceable as a part of common maintenance of the product (seal sealing, sealing O-rings, etc.), for the period of 24 months.

Rejection of defects shall be enforced in writing at the manufacturer within the warranty period. The rejecting side shall identify the product name, ordering and manufacturing numbers, date of issue and number of the delivery note, clear description of the occurring defect and the subject of the claim. If the rejecting side is invited to send the device for repair, it shall do so in the original package of the manufacturer and/or in another package ensuring safe transport.

The warranty shall not apply to defects caused by unauthorized intervention into the device, its forced mechanical damage or failure to comply with operation conditions of the product and the product manual.

REPAIRS

The ball valve shall be repaired by the manufacturer. They shall be sent for repair in the original or equal package without accessories.

DISABLING AND LIQUIDATION

The product and its package do not include any parts that could impact the environment.

Products that are withdrawn from operation (including their packages) may be disposed of to sorted or unsorted waste pursuant to the type of waste.

The package of the product can be recycled completely. Metal parts of the product are recycled, non-recyclable plastic materials shall be disposed of in accordance with applicable legislation

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