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APPLICATION

- In measuring circuits of systems of industrial automation with higher temperature of the operation liquid;
- For fast complete closing or opening of flow of the operation liquid, which can flow through the ball cock in both directions; the recommended direction is identified with an arrow on the body;
- As selected equipment BT2 and BT3 pursuant to the Decree No. 214/1997 Coll. on ensuring quality in activities related with the use of nuclear energy and activities resulting in radiation and on establishment of criteria for inclusion and classification of selected equipment into safety classes;
- As pressure equipment of category III pursuant to the Decree of the Government 26/2003 Coll. (compliance assessment module B+D);

The ball cocks may not be used for regulating the flow; it concerns a closing full-flow armature.
The ball cocks are rated products pursuant to the Act No. 22/1997 Coll. and the Declaration of Conformity **EC-973000** is issued for them.

DESCRIPTION

The basis of the cock consists of a body, in which the stop ball is located. With the use of a spindle, it is connected with handle to for manual control of the cock.
The positions of the cock “CLOSED” - “OPEN” (OFF-ON) are achieved by the movement of the handle to the stop.
Antistatic design of the cock ensures electric interconnection of all parts, which are in contact with the operation liquid and jacket (body) of the armature.
The cock design also ensures protection against possible pushing out of the control mechanism from the cock body.
The cock body does not contain “dead areas”, in which residue of operation liquids could remain or where their solid compounds could be deposited.
Flanges with weld-on optional inlet and outlet connecting terminals are screwed to the body.
The cocks are also made with the design with extended spindle; these cocks are suitable for the installation into the piping with reinforced insulation.
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 cock.
The cock is closed (opened) by turning the handle to the right (left) by 90° up to the stop, which results in full closure or opening of the ball cock.

TECHNICAL DATA

Technical requirements for ball cocks are specified in ČSN 13 4103**.**

Operation position: discretionary
Weight: direct cock approx. 0.6 kg
direct cock with extended spindle approx. 0.7 kg
Type of operation: continuous
Connection to piping: optional input and output connecting terminals

OPERATION CONDITIONS

Ball cocks are designed for the environment defined by the group of parameters and their severity grades IE36 pursuant to standard ČSN EN 60721-3-3 and the following operation conditions.
Nominal inner diameter: DN 10
Nominal pressure: PN 63
Maximum operation temperature:
220 °C - with sealing from material PEEK
350 °C - with sealing from material GRAPHITE
Operation liquid: technical water, petrol, kerosene, crude oil, circulation oil (H_2) and others

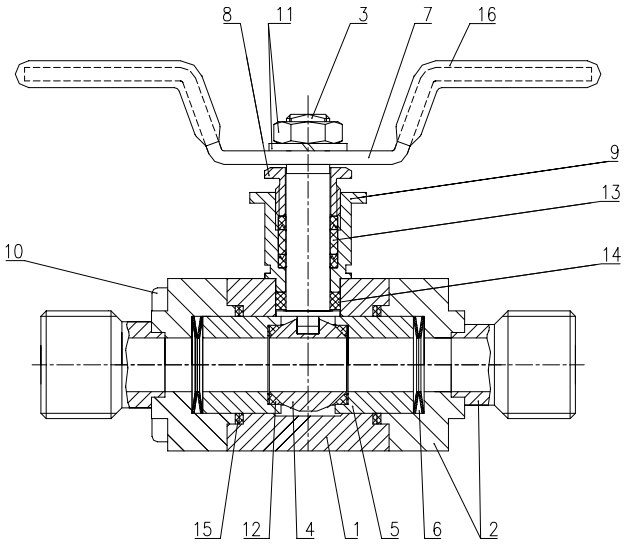


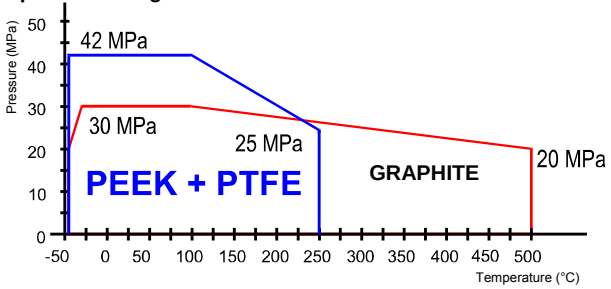
TABLE OF APPLIED MATERIALS

Position	Name of part		Material
1	body		1.4541 *
2	flanges and terminals		1.4541 *
3	spindle		1.4541 *
4	ball		AISI 316Ti *
5	thrust pistons		1.4541 *
6	disc spring	for 220 °C	1.4310
		for 350 °C	1.4122
7	handle		1.4541 *
8	nut of seal		1.4541 *
9	shaft bush		1.4541 *
10	screws		stainless steel A2
11	nut, washer		stainless steel A2
12	seat	for 220 °C	PEEK+PTFE
		for 350 °C	GRAPHITE
13	seal	for 220 °C	PEEK+PTFE
		for 350 °C	GRAPHITE
14	spindle sealing	for 220 °C	PEEK
		for 350 °C	GRAPHITE
15	sealing of piston and flange		GRAPHITE
16	handle roll-on	for 220 °C	VINYL
		for 350 °C	high temperature colour paint

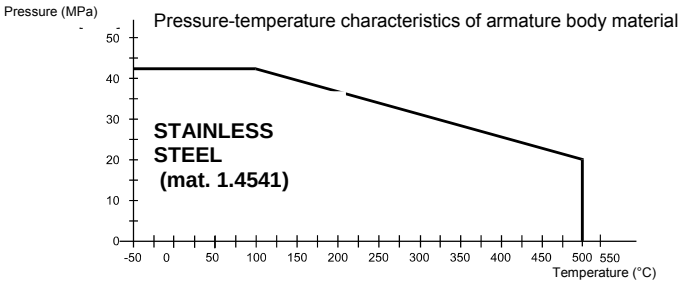
*) The manufacturer has the relevant certificate 3.1 for these materials pursuant to ČSN EN 10204

PRESSURE AND TEMPERATURE CHARACTERISTICS
Values of pressure and temperature of operation medium, for which the armature may be used, are determined, in particular, by the material of seat sealing and seal of the ball cock and also by material of the cock body.
When identifying the operation conditions, it is necessary to consider both charts. Operation characteristics of the armature are determined by the material with worse parameters.

Pressure-temperature characteristics of materials of spindle sealing



Pressure-temperature characteristics of armature body material



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		GRAPHITE	PTFE	PEEK
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

DESIGNATION

(pursuant to ČSN 13 3005-1)

Data on cock body

- Trade mark of the manufacturer
- Product ordering number
- Time code (manufacturing number for orders pursuant to Decree 214/1997 Coll.)
- Nominal inner diameter
- Nominal pressure
- Maximum operation temperature
- Body material
- Casting number of body material
- Mark of performed pressure test
- Code of spindle and seat seal sealing
- Arrow indicating recommended direction of medium flow
- CE mark 1015

Data on cock handle

- Arrows and terms OFF – ON identifying direction of CLOSING – OPENING the cock

DELIVERY

Unless agreed otherwise with the customer, each delivery includes

- Delivery note
- Products pursuant to the purchase order
- Accompanying technical documentation in Czech:
  - Product quality and completeness certificate, which also serves as the warranty certificate
  - EC Declaration of Conformity
  - Test report and list of used materials
  - Product manual

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 ČSN EN 10204 for body material and other parts according to the table of used materials with casting number
- Declaration of Conformity with purchase order 2.1 pursuant to ČSN EN 10204

CERTIFICATION

- Pressure equipment of category III pursuant to the Decree of the Government 26/2003 Coll. (compliance assessment module B+D) EC-Type examination certificate SZÚ Brno

PLACING AN ORDER

The purchase order shall specify:

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

PURCHASE ORDER EXAMPLE

Standard design:

1. Ball cock PN 63 for high temperatures
   973 11 15 15 W4 BM1
   20 pcs
2. Ball cock PN 63 for high temperatures
   973 11 15 21 W6 BZ1 KKU5
   20 pcs

Special requirement:

Ball cock PN 63 for high temperatures
973 71 99 99
5 pcs

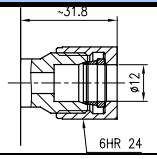
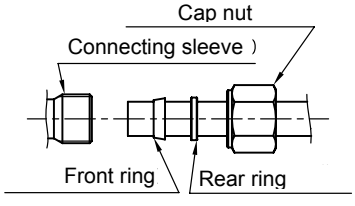
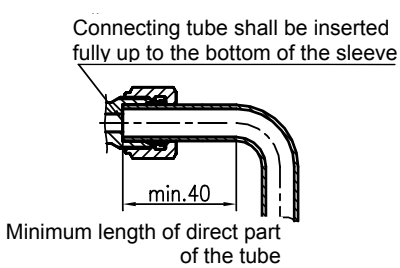
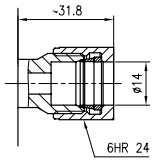
TABLE 1 - DESIGN OF BALL COCKS, TYPE 973

SPECIFICATIONS			ORDERING NUMBER							
			973	x	1	xx	xx	xx	xxx	acces 1)
DESIGN OF COCK	direct			1						
	direct with extended spindle			7						
CONNECTING TERMINALS pursuant to table 2		OF INLET				xx				
		OF OUTLET					xx			
SEALING OF SEAL, SPINDLE AND SEAT	seal from Graphite + 1.4541	(max. 350°C)						W4		
	seal from PEEK (resistant to gamma radiation)	(max. 220°C)						W6		
COLOUR OF HANDLE ROLL-ON	green								BZ1	
	red								BR1	
	blue								BM1	
	yellow								BY1	

1) - Behind the ordering number, you can add codes of accessories pursuant to table 3 - OVERVIEW OF OPTIONAL ACCESSORIES

TABLE 2 - OVERVIEW OF CONNECTING TERMINALS

All specified connecting terminals (with the exception of terminals with codes 31, 35 and 37) are designed for full flow-though with nominal inner diameter DN 10.

CODE	DRAWING	INSTALLATION PROCEDURE OF CONNECTING TERMINALS WITH THREADED RINGS
14		By means of a cap nut and two rings, a tube made of stainless steel (pursuant to ČSN EN 10216-5 or ČSN 42 6750) or carbon steel (pursuant to ČSN 42 6711) with Ø12 or Ø14 mm with tolerance of outside diameter ± 0.3 mm can be installed in a way that enables further uninstallation. **FIRST INSTALLATION:** 1. 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! 2. Insert the end of the tube with rings into connecting sleeve up to the bottom and tighten the cap nut by hand. 3. Tighten the cap nut with a torque-limiting wrench with the following torque 60 Nm (for tube Ø 12 mm) or 65 Nm (for tube Ø 14 mm). **UNINSTALLATION + REPEATED INSTALLATION:** 1. Uninstallation shall be realized by complete unscrewing of the cap nut after pressure has been completely discharged from the system. 2. 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! 3. 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. 4. 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. 5. 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). **WARNING:** THE CAP NUT MAY NEVER BE TIGHTENED (RELEASED) UNDER PRESSURE – it could cause lethal injury!!! 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. 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.  
15		

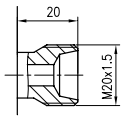
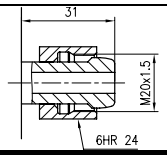
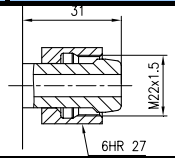
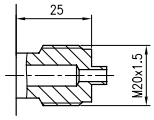
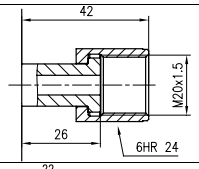
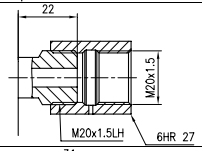
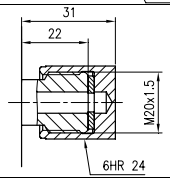
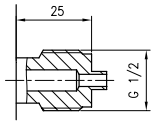
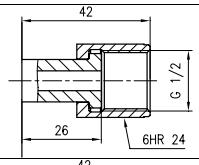
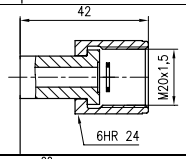
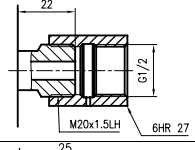
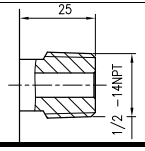
CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
21		**SCREW-JOINT FOR CONE** 1. Put a cap nut on the cone 2. Weld the cone on the tube end 3. By means of a nut, screw the tube to the sleeve, hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.
22		**WELD-ON CONE WITH CAP NUT M20x1.5** By means of the nut, screw the armature to the screw joint for a cone, which forms a part of e.g. condensation tank, another valve, etc., hold the cock flange with a side wrench 32 and tighten the nut with torque of 120 Nm.

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

CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
23		**WELD-ON CONE WITH CAP NUT M22x1.5** By means of the nut, screw the armature to the screw joint for a cone with the corresponding thread, which forms a part of e.g. piping, hold the cock flange with a side wrench 32 and tighten the nut with torque of 150 Nm.
31		**MANOMETRIC SCREW-JOINT M20x1.5** 1. Put a cap nut on the sleeve 2. Weld the sleeve on the tube end 3. Put a metal sealing on the screw joint 4. By means of a nut, screw the piping to the screw joint, hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.
32		**WELD-ON SLEEVE WITH CAP NUT M20x1.5** By means of a nut, screw the armature to the manometric screw joint with the corresponding thread, hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.
33		**SCREW-JOINT WITH MANOMETRIC CONNECTION M20x1.5 LH / M20x1.5** The screw joint is used to connect a manometer or valve with this screw joint. 1. Put a metal sealing on the screw joint of the manometer. 2. Screw the manometer and the armature together with the use of a sleeve coupling (it is delivered with the armature), hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.
34		**TEST SCREW-JOINT M20x1.5** The screw joint is used to connect control manometer. It is delivered including the plug with sealing. Recommended torque is 120 Nm.
35		**MANOMETRIC SCREW-JOINT G1/2** 1. Put a cap nut on the sleeve 2. Weld the sleeve on the tube end 3. Put a metal sealing on the screw joint 4. By means of a nut, screw the piping to the screw joint, hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.
36		**WELD-ON SLEEVE WITH CAP NUT G1/2** By means of a nut, screw the armature to the manometric screw joint with a corresponding thread, hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.
37		**WELD-ON SLEEVE WITH CAP NUT M20x1.5** **WITH SEALING PURSUANT TO STANDARD SHELL** By means of a nut, screw the armature to the manometric screw joint, hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm. Tightness is ensured with stainless sealing ring made of soft steel.
39		**SCREW-JOINT WITH MANOMETRIC CONNECTION M20x1.5 LH / G1/2** The screw joint is used to connect a manometer or valve with manometric screw joint G1/2. 1. Put a metal sealing on the screw joint of the manometer. 2. Screw the manometer and the armature together with the use of a manometric connection (it is delivered with the armature), which shall be tightened with torque of approx. 120 Nm.
42		**EXTERNAL THREAD 1/2 - 14 NPT** 1. Wind up sealing tape of PTFE on the thread. 2. Screw the armature into the hole with corresponding internal thread, hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.

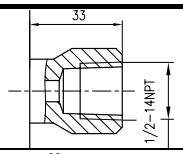
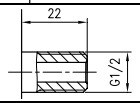
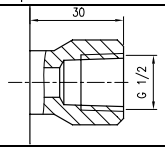
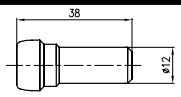
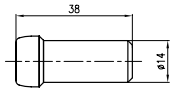
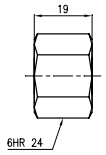
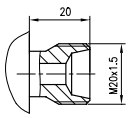
54		**INTERNAL THREAD 1/2 - 14 NPT** The thread is cut in the weld-on terminal. 1. Wind up sealing tape of PTFE on a corresponding external thread 2. Screw the screw joint or tube into the hole in the armature, hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.
62		**EXTERNAL THREAD G1/2** Wind up sealing tape of PTFE on the thread. Hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.
72		**INTERNAL THREAD G1/2** The thread is cut in the weld-on flange. 1. Wind up sealing tape of PTFE on a corresponding external thread 2. Screw the screw joint or tube into the hole in the weld-on terminal 3. Hold the cock flange with side wrench 32 and tighten the nut with torque of 120 Nm.
99		**ANOTHER CONNECTING TERMINAL**

TABLE 3 OVERVIEW OF OPTIONAL ACCESSORIES

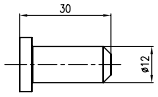
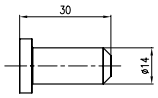
WELD-ON CONE WITH CAP NUT

CODE	MATERIAL		INNER DIAMETER	DRAWING
KU1	carbon steel	11 523	7	
KU2	stainless steel	1.4541		
KU3	creep-resisting steel	15 128		
KKU4	carbon steel	11 523	10	
KKU5	stainless steel	1.4541		
KKU6	creep-resisting steel	15 128		

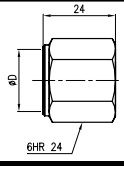
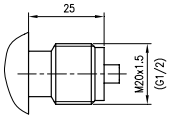
The cone is delivered by 1 piece, welded in a PE bag together with the relevant cap nut.
After putting the cap nut on the cone and welding the cone on the piping, it is possible to connect an armature to the cone, which is provided with a corresponding screw joint for the cone according to the dimensional drawing of the screw joint.

MATERIAL OF NUT	DRAWING OF NUT	DRAWING OF SCREW JOINT
Stainless steel 1.4541		
Carbon steel 11 109.0 (only for KU1 and KU4)		

WELD-ON SLEEVE WITH CAP NUT AND SEALING

CODE	MATERIAL OF SLEEVE		THREAD OF NUT	SLEEVE	
				INNER DIAMETER	DRAWING
NA1	carbon steel	11 523	M20 x 1.5	6.5	
NA2	stainless steel	1.4541			
NA3	creep-resisting steel	15 128			
NAG1	carbon steel	11 523	G 1/2		
NAG2	stainless steel	1.4541			
NAG3	creep-resisting steel	15 128			
NA4	carbon steel	11 523	M20 x 1.5		
NA5	stainless steel	1.4541			
NA6	creep-resisting steel	15 128			
NAG4	carbon steel	11 523	G 1/2		
NAG5	stainless steel	1.4541			
NAG6	creep-resisting steel	15 128			

The sleeve is delivered by 1 piece, welded in a PE bag together with the relevant cap nut and aluminium sealing. After putting the cap nut on the sleeve and welding the sleeve on the piping, it is possible to connect an armature, which is provided with a corresponding screw joint for the sleeve according to the dimensional drawing of the screw joint, to the piping.

MATERIAL OF NUT	DIMENSIONAL DRAWING OF NUT	DRAWING OF SCREW JOINT
Stainless steel 1.4541		
Carbon steel 11 109.0 (only for NA1, NAG1 NA4 and NAG4)		

Sealing rings made of other materials can also be ordered independently according to the following ordering numbers.

ORDERING NUMBER	MATERIAL SEALING		DRAWING SEALING
382 041	Al	EN AW-1050A	
382 063	Steel	1.4541	
382 096	Steel	1.4404	
276 067	Cu	42 3005	

Figure 1 - Ball cock - direct (973 11 ..), dimensional drawing

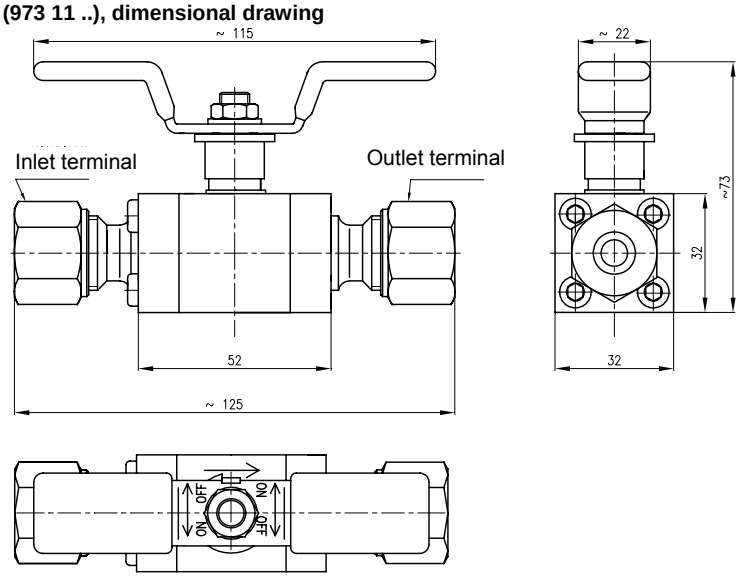
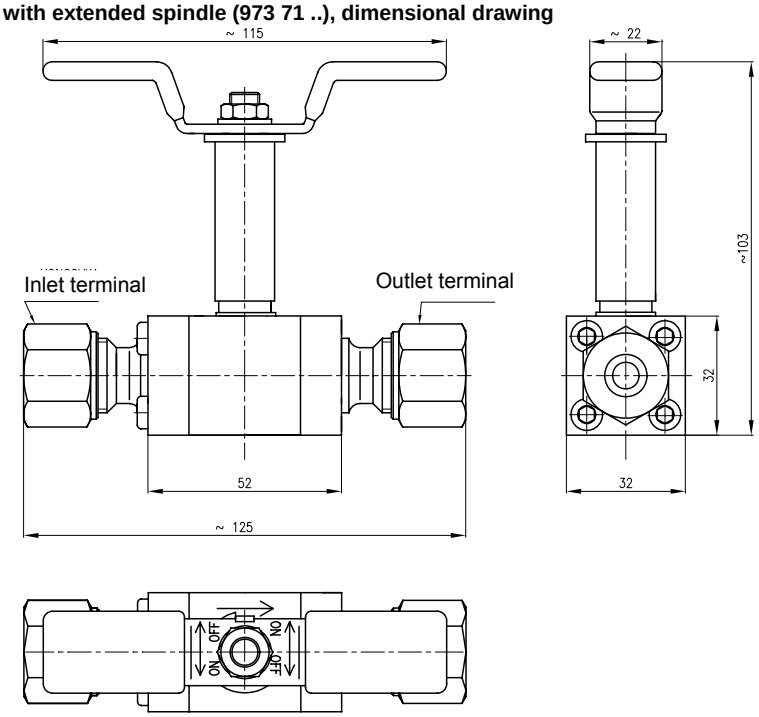


Figure 2 Ball cock – direct with extended spindle (973 71 ..), dimensional drawing



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 ČSN 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 ČSN EN 60721-3-1 but with ambient temperature from -30 to 45 °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).

INSTALLATION AND CONNECTION

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

Installation and uninstallation of the screw-joint of selected equipment pursuant to Decree 214/1997 Coll. for the connection of the ball cock, type 973 ZPA Nová Paka, a. s., their operation and maintenance may only be performed by a bearer of the authorization, which is issued by the manufacturer of the armatures on the basis of taken training.

The operation liquid may flow through the ball cock 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 cock shall be realized directly on the piping by means of inlet and outlet connecting terminals.

The procedure of correct connection of the terminals with threaded rings is specified on the instruction label, which forms a part of the delivery of the cock.

COMMISSIONING

After the installation (connection of the piping) and inspection of the correct position of the control handle, the ball cock is prepared for operation.

OPERATION AND MAINTENANCE

The cock 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 cock. The positions of the cock “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 cock may only be cleaned by service workers of the manufacturer.

PROCEDURE IN CASE OF FINDING LEAKAGE OF THE CONNECTION WITH THREADED RINGS
Possible leakage of the connection can be caused by unauthorized installation, e.g. by failure to comply with required torque (i.e. excessive or insufficient tightening of the cap nut), failure to comply with the minimum direct part of the tube from its end or application of this connection in conditions with increased level of vibrations without any fixation of the armature and connecting tubes, especially of those of bigger lengths.

WARNING

The cap nut may never be tightened (released) under pressure – it could cause lethal injury !!!

Uninstallation and repeated installation of the connection shall be realized pursuant to table 2 - INSTALLATION PROCEDURE FOR CONNECTING TERMINALS WITH THREADED RINGS.

SPARE PARTS

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

WARRANTY

Pursuant to § 429 of the Commercial Code and the provisions of § 620 (2) of the Civil Code, 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 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 cocks shall be repaired by the manufacturer. They shall be sent for repair in the original or equal package without accessories.

DISABLING AND LIQUIDATION

They shall be realized in compliance with the Waste Act No. 106/2005 Coll.
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 by recycled completely. Metal parts of the product are recycled, non-recyclable plastic materials shall be disposed of in compliance with the aforesaid Act.

November 2006