ZPA NOVÁ PAKA

PRODUCT MANUAL

Stainless valve

type 967

MANUAL FOR ACCESSORIES, TYPE 981, IS ENCLOSED

APPLICATION

- To close impulse piping when disconnecting a pressure sensor, to close the consumption of the orifice, output of the condensation tank etc.
- To vent the piping and in case of some designs, there is a possibility of connecting another test manometer
- As selected equipment of safety class 2 and 3 pursuant to the Decree No. 132/2008 Coll., on the quality system in realizing and ensuring activities related to the use of nuclear energy and radiation activities and on ensuring quality of the selected equipment with respect to their classification into safety classes
- As selected equipment of safety class 2, 3 and 4 pursuant to Decrees of the Nuclear Regulatory Authority of the Slovak Republic No. 430/2011 Coll., on requirements for nuclear safety, and No. 431/2011 Coll., on the quality management system
- As special design in the grade of purity for oxygen (O_2), this armature is delivered perfectly degreased and provided with suspended blue tag (code P2S)
- As special design with cleanness of internal surfaces of grade I pursuant to TPE 10-40/1926/85 (code PC1)
- For the environment, where mechanical resistance is required pursuant to ČSN EN 60068-2-6 ed. 2 (class AH2 pursuant to ČSN 33 2000-5-51 ed. 3) and seismic capability of the electrical equipment of the safety system of the nuclear power stations pursuant to ČSN IEC 980 (MVZ level SL-2), which is in compliance with the qualification requirements of the nuclear power station Mochovce (MO34), nuclear power station Dukovany and nuclear power station Temelín, refer to the declaration of the manufacturer ZPA Nová Paka No. rem-cec005-11
- For industrial environment with high concentration of SO_2 and the environment with sea climate

The valves are not rated products pursuant to the Act No. 22/1997 Coll.

DESCRIPTION

The basis of valves consists of a body, into which a valve unit is screwed. Its seat is a part of the basic body of the armature. In case of the armature with soft sealing, the seat has a special shape, which contributes to ensuring perfect tightness. Material of the basic body is steel 1.4541.

Valve units have different designs pursuant to the type of used spindle sealing. It can be formed by elastomer o-ring or seal from graphite or from a plastic material.

TECHNICAL DATA

Technical requirements for the valves and dimensions of the connecting terminals are identified in ČSN 13 7501, connecting dimensions of the manometric valve are in compliance with ČSN 13 7517.

Inner bore of the valve: Ø 3 mm
Operating position: discretionary
Weight: approx. 0.4 kg
Type of operation: continuous

OPERATING CONDITIONS

The valves are designed for the environment defined by the group of parameters and their severity grades IE36/3C4 for SO_2 pursuant to ČSN EN 60721-3-3 and the following operation conditions, i.e. in the places with minimum protection against daily fluctuations of the outdoor climate, exposed to sun radiation, with impact of precipitations carried by rain.

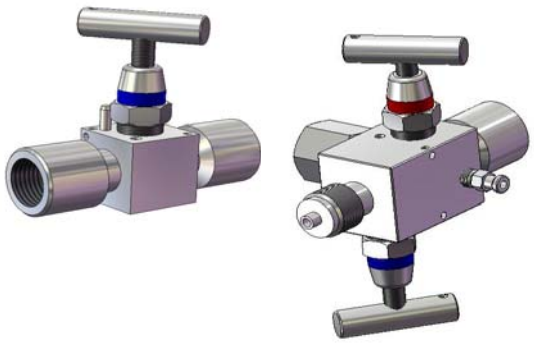
From time to time, the valves may be exposed to the sea climate pursuant to ČSN EN 60068-2-52, severity grade 2.

Relative ambient humidity:
10 to 100 % with condensation, with upper limit of water content 29 g H_2O/kg of dry air

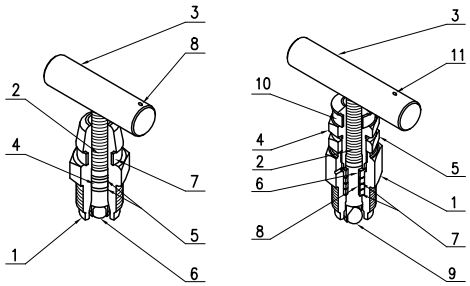
Atmospheric pressure: 70 to 106 kPa

PRESSURE AND TEMPERATURE CHARACTERISTICS

Values of pressure and temperature of operating medium, for which the armature may be used, are determined, in particular, by the selected material of spindle sealing and sealing elements of valve unit seats. The charts provide dependency of pressure on temperature for various materials of such sealing elements. When selecting the material, it is necessary to consider both the chart for the spindle sealing material and the chart for seat sealing material. Operation characteristics of the armature are determined by the material with worse parameters.



Valve unit
with elastomer O-ring **with seal from graphite or PTFE**



By turning the control handle to the right (left) to the stop, the flow of the operating medium through the body of the armature is closed (opened).

Valve unit with elastomer o-ring

Position	Part	Material
1	Valve unit body	1.4541 *)
2	Spindle	1.4541 *)
3	Handle	1.4541 *)
4	O-ring	FPM (code W1) NBR (code W2) EPDM (code W3)
5	Support ring	PTFE
6	Seat sealing	1.4571 *) (code S1) Si_3N_4 (code S2) PVDF (code S3)
7	Differentiating ring	PVC
8	Sealing hole	

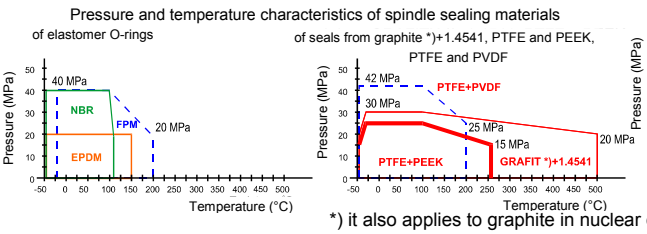
*) For this material, the manufacturer has certificate 3.1 pursuant to ČSN EN 10204

Valve unit with seal from graphite or PTFE

Position	Part		Material
1	Valve unit body		1.4541 **)
2	Spindle		1.4541 **)
3	Handle		1.4541 **)
4	Lid of sealing		1.4541 **)
5	Safety nut		1.4541 **)
6	Ring		1.4541 **)
7	Support ring for spindle seat sealing	(W4, W6)	1.4541 **)
		(W5)	PVDF
		(W7)	PEEK
8	Spindle seal sealing		GRAPHITE (code W4) PTFE (code W5) GRAPHITE *) (code W6) PTFE (code W7)
9	Seat sealing		1.4571 **) (code S1) Si_3N_4 (code S2) PVDF (code S3)
10	Differentiating ring		PVC (NOT for W4, W6)
11	Sealing hole		

*) Graphite in nuclear cleanness
**) For this material, the manufacturer has certificate 3.1 pursuant to ČSN EN 10204

Chart 1



*) it also applies to graphite in nuclear cleanness

Chart 2

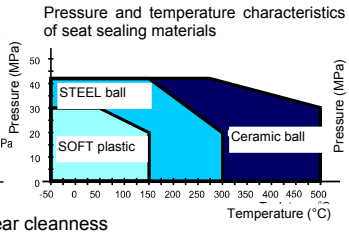


Chart 3

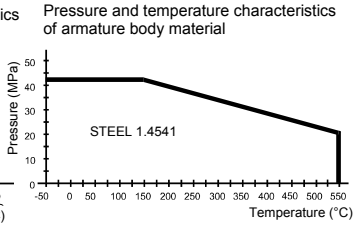


TABLE 1 - RESULTING MAXIMUM VALUES OF OPERATING PRESSURES AND TEMPERATURES (they are marked on the armature body)

CODE	W1 (FPM)	W2 (NBR)	W3 (EPDM)	W4 (GRAPHITE+1.4541)	W5 (PTFE+PVDF)	W6 *) (GRAPHITE+1.4541)	W7 (PTFE+PEEK)
S1 (STEEL)	40 MPa 100°C 20 MPa 200°C	40 MPa 100°C 20 MPa 110°C	20 MPa 150°C	30 MPa 100°C 20 MPa 300°C	42 MPa 100°C 25 MPa 200°C	30 MPa 100°C 20 MPa 300°C	25 MPa 100°C 15 MPa 260°C
S2 (CERAMICS)	40 MPa 100°C 20 MPa 200°C	40 MPa 100°C 20 MPa 110°C	20 MPa 150°C	30 MPa 100°C 20 MPa 500°C	42 MPa 100°C 25 MPa 200°C	30 MPa 100°C 20 MPa 500°C	25 MPa 100°C 15 MPa 260°C
S3 (PLASTIC MATERIAL)	20 MPa 150°C	20 MPa 110°C	20 MPa 150°C	NO	20 MPa 150°C	NO	NO

*) graphite in nuclear cleanness

TABLE 2 - 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	EPDM	GRAPHITE *)	PTFE	PEEK	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
* good or conditional resistance
\- not resistant
vacant no information is available
*) it also applies to graphite in nuclear cleanness

DESIGNATION

(pursuant to ČSN 13 3005-1)

Data on basic body

- Trade mark of the manufacturer
- Maximum operation pressures and temperatures
- Body material
- Casting number of material of basic body
- Valve scheme
- Mark of performed pressure test
- Product ordering number
- Time code
  (manufacturing number for orders pursuant to the Decree 132/2008 Coll.,
  for design for O_2 and for design with code PC1)

Data on valve unit

- Designation of function of the valve unit

TEXT	COLOUR	FUNCTION
BLOCK	blue	closing
VENT	red	closing of control sampling (only for design. 967 52….)

- In case of designs W2, W3, W4, W5, W6, W7, S2 and S3, these codes are marked on the flat area of the hexagon of each valve unit, e.g. W4S2

The armature in purity level for O_2 is marked with a suspended blue tag.

DELIVERY

Unless agreed otherwise with the customer, each delivery includes

- Delivery note
- Products pursuant to the purchase order
- Optional accessories pursuant to manual for accessories, type 981
- Accompanying technical documentation in Czech:
  - Product quality and completeness certificate, which also serves as the warranty certificate
  - Test report and list of used materials
  - Product manual
  - Manual for accessories, type 981
  - Inspection report for design for O_2 (only in case of armature with code P2S)
  - Inspection report about purity of internal surfaces (only in case of armature with code PC1)
  - Declaration of Conformity of the supplier pursuant to ČSN EN ISO/IEC 17050-1 (for orders pursuant to the Decree 132/2008 Coll.)

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 the material of the body and other parts pursuant to the table of used materials with the casting number
- Declaration of Conformity with purchase order 2.1 pursuant to ČSN EN 10204
- Declaration of the manufacturer ZPA Nová Paka No. rem-cec005-11
  about seismic qualification of device equipment for the conditions of operation in the nuclear power plant Temelín, nuclear power plant Dukovany and nuclear power plant Mochovce, blocks 3 and 4
- Copy of the resistance test report of the environment
- Declaration of Conformity of the supplier pursuant to ČSN EN ISO/IEC 17050-1

TABLE 3 - DESIGN OF VALVES, TYPE 967

SPECIFICATIONS		ORDERING NUMBER										
		967	x	x	xx	xx	xx	xx	xxx	xxx	xxx	xxx	xxx
DESIGN OF THE VALVE	straight-way		1										
	angle		2										
	straight-way with inner threads		3	1									
	manometric closing		4										
	manometric testing		5										
	manometric testing with closing the control sampling with valve 2)		5	2									
	manometric with inner threads		6	1									
CONNECTING TERMINALS pursuant to manual for accessories type 981	of inlet 1)				xx								
	of outlet 1)					xx							
SEALING OF THE SPIN PURSUANT TO 3)	O-ring from elastomer FPM (max. 200°C)						W1						
	O-ring from elastomer NBR (max. 110°C)						W2						
	O-ring from elastomer EPDM (max. 150°C)						W3						
	seal from graphite + 1.4541 (max. 500°C)						W4						
	seal from PTFE + PVDF (max. 200°C)						W5						
	seal from graphite + 1.4541 (max. 500°C) (graphite in nuclear cleanness)						W6						
	seal from PTFE + PEEK (max. 260°C)						W7						
SEAT SEALING 3)	corrosion-resistant ball from mat. 1.4571 (max. 300°C)							S1					
	ceramic ball Si_3N_4 (max. 500°C) (as a default for W4 and W6)							S2					
	soft sealing from PVDF (max. 150°C) (NOT for W4, W6, W7)							S3					
SPECIAL TREATMENT 4)	purity grade for O_2 (only for W1, W2, W3)								P2S				
	cleanness of internal surfaces of grade I									PC1			
CODES OF ACCESSORIES pursuant to manual for accessories, type 981 4)	of inlet										xxx		
	of outlet											xxx	
	other accessories 5)												xxx

1) For designs of inlet and outlet of the valve, it is possible to select all terminals from the type 981 with the exception of the code 52. For the valve with inner threads (i.e. design 967 31 xx xx and 967 61 xx xx), it is only possible to select the terminals with codes 51 and 52. In this case, the threads shall always be the same (i.e. either both 51 or both 52).
2) For this design, it is possible to select only terminals of inlet s with codes 31 and 35 and terminals of outlet with codes 33 and 39.
3) In case none of the said codes is specified, the set will be delivered with the sealing W1 and S1.
4) If no code is specified, the armature will be delivered without a special treatment and without accessories.
5) It is possible to select the following codes of accessories pursuant to manual for accessories type 981: KL1, TZ1, TZ2, TZ3 and/or TZ4.

ORDERING

The purchase order shall specify:

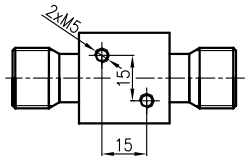
- Name
- Product ordering number
- If the product is ordered as selected equipment of safety class 2 and 3 pursuant to the Decree No. 132/2008 Coll.
- Requirement for other documentation pursuant to Article DELIVERY
- Other (special) requirements
- Number of pieces

PURCHASE ORDER EXAMPLE

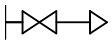
Standard design:

1. Stainless valve
   967 51 31 33
   20 pcs
2. Stainless valve
   967 61 52 W5S1 PS2 TZ4
   20 pcs
3. Stainless valve
   967 11 21 31 W4S2 KU1 NA1 KL1
   20 pcs

1 - STRAIGHT-WAY VALVE 967 11 .., dimensional drawing, scheme, application



Valve scheme:



It is used as closing for the impulse piping
(for pressure sensors, condensation tanks, ...).

Material of spindle sealing	A	B
FPM, NBR, EPDM	80	45
GRAPHITE, PTFE, PEEK	90	60

Dimensions C, D of the weld-on terminals are identified in the manual for accessories - type 981 - Connecting terminals.

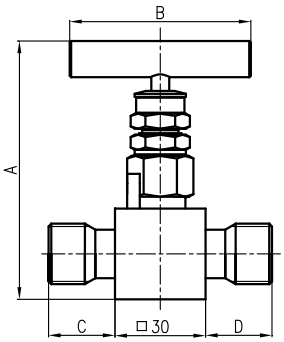


FIGURE 2 - ANGLE VALVE 967 21 .., dimensional drawing, scheme, application

Valve scheme:

It is used as closing for the impulse piping
(for pressure sensors, condensation tanks, ...).

Material of spindle sealing	A	B
FPM, NBR, EPDM	80	45
GRAPHITE, PTFE, PEEK	90	60

Dimensions C, D of the weld-on terminals are identified in the manual for accessories - type 981 - Connecting terminals.

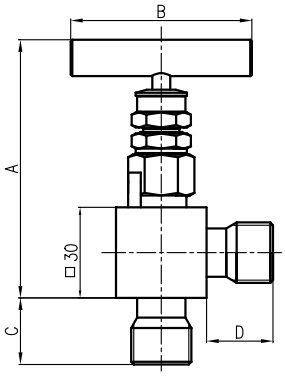
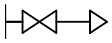


FIGURE 3 - STRAIGHT-WAY VALVE WITH INNER THREADS 967 31 .., dimensional drawing, scheme, application

967 31 51 51 - for C=1/4-18NPT
967 31 52 52 - for C=1/2-14NPT

Valve scheme:



It is used like the previous valves; inner threads enable the installation of various screw-joints.

Material of spindle sealing	A	B
FPM, NBR, EPDM	80	45
GRAPHITE, PTFE, PEEK	90	60

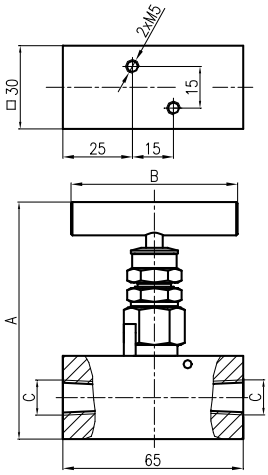
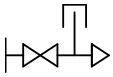


FIGURE 4 - MANOMETRIC CLOSING VALVE 967 41 .., dimensional drawing, scheme, application
In case of valves 967 41 14 33, 967 41 14 39, 967 41 31 33 and 967 41 31 39, there are different dimensions.

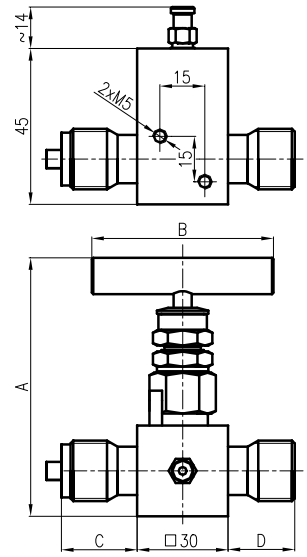
Valve scheme:



It is used as closing for pressure sensor.
It is provided with a venting valve (inner thread M8).

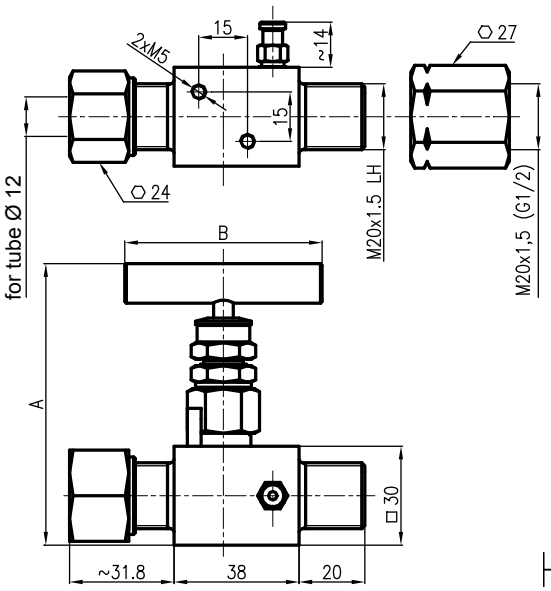
Material of spindle sealing	A	B
FPM, NBR, EPDM	80	45
GRAPHITE, PTFE, PEEK	90	60

Dimensions C, D of the weld-on terminals are identified in the manual for accessories - type 981 - Connecting terminals.



Manometric closing valve **967 41 14 33, 967 41 14 39, 967 41 31 33 and 967 41 31 39**, dimensional drawing

967 41 14 33, 967 41 14 39



967 41 31 33, 967 41 31 39

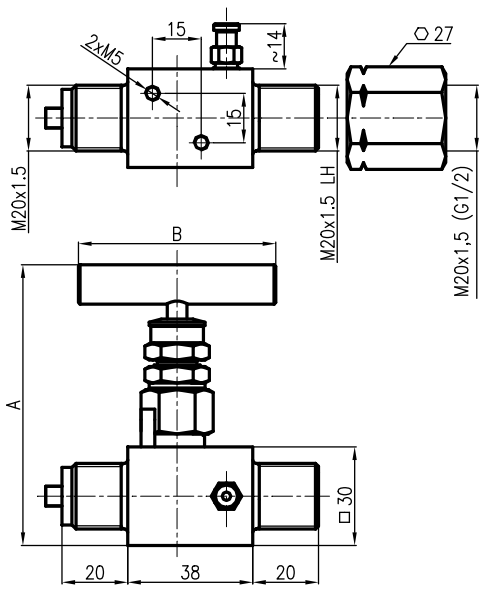
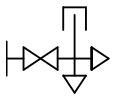


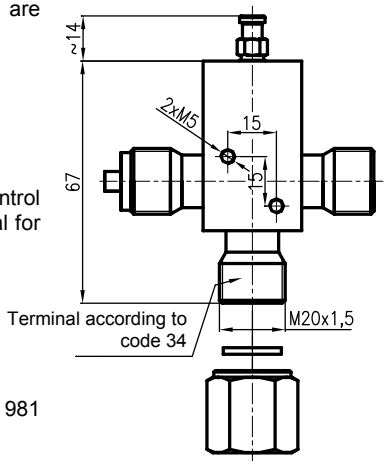
FIGURE 5 - MANOMETRIC TESTING VALVE 967 51 .., dimensional drawing, scheme, application

In case of valves 967 51 14 33, 967 51 14 39, 967 51 31 33 and 967 51 31 39, there are different dimensions.



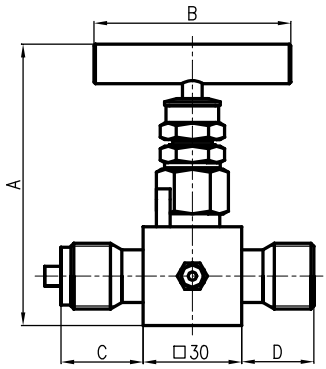
Valve scheme:

It is used like the previous manometric valve.
In addition to the venting valve, it also has a screw-joint M20x1.5 for the connection of the control manometer. It is delivered including the plug with sealing, refer to the code 34 in the manual for accessories – type 981 – Connecting terminals.



Material of spindle sealing	A	B
FPM, NBR, EPDM	80	45
GRAPHITE, PTFE	90	60

Dimensions C, D of the weld-on terminals are identified in the manual for accessories – type 981 – Connecting terminals.



Manometric testing valve **967 51 14 33, 967 51 14 39, 967 51 31 33 and 967 51 31 39**, dimensional drawing

967 51 14 33, 967 51 14 39 967 51 31 33, 967 51 31 39

FOR TUBE TERMINAL ACCORDING TO CODE 34 TERMINAL ACCORDING TO CODE 34

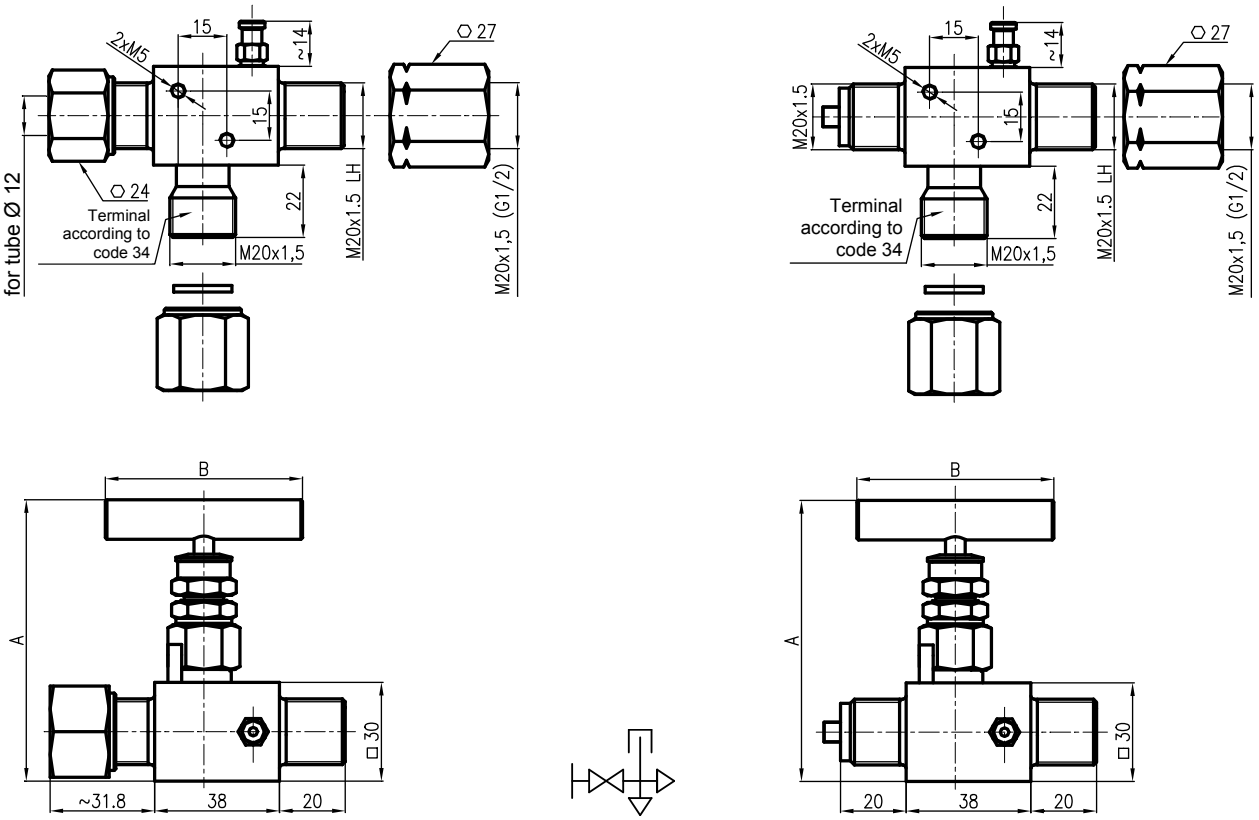
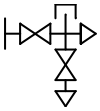


FIGURE 6 - MANOMETRIC TESTING VALVE WITH CLOSING THE CONTROL SAMPLING WITH VALVE 967 52 31 33, 967 52 31 39, 967 52 35 33 AND 967 52 35 39,
Dimensional drawing, scheme, application

Valve scheme:



It is used like the previous manometric valve.
In addition to the venting valve, it also has a screw-joint M20x1.5 for the connection of the control manometer that can be closed with a valve.

Material of spindle sealing	A	B
FPM, NBR, EPDM	85	45
GRAPHITE, PTFE	95	60

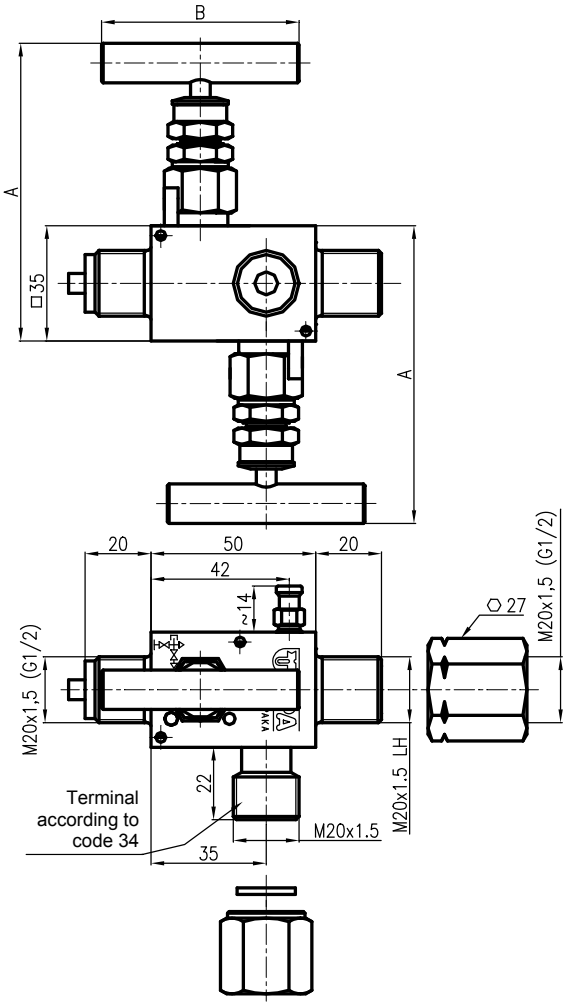
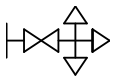
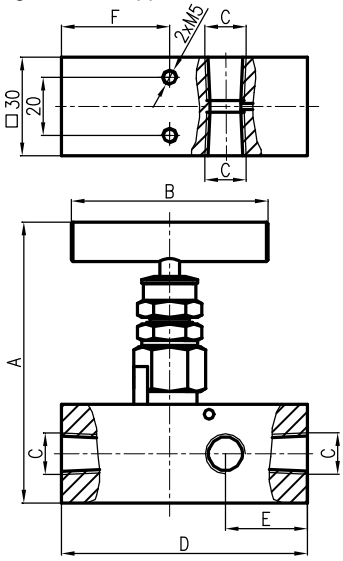


FIGURE 7 - MANOMETRIC VALVE WITH INNER THREADS 967 61 .., dimensional drawing, scheme, application

967 61 51 51 - for C=1/4-18NPT
967 61 52 52 - for C=1/2-14NPT)





Valve scheme:

It is used as a manometric or distribution valve.
It has one inlet and three outlets, into which various types of screw-joints can be screwed thanks to the inner threads.
Dimensions of the valve also depend on the size of the selected thread.

Material of spindle sealing	A	B
FPM, NBR, EPDM	80	45
GRAPHITE, PTFE	90	60

Thread C	D	E	F
1/4-18 NPT	75	25	33
1/2-14 NPT	85	33	32.5

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.
When removing the product from the packing, no special measures are necessary with the exception of design for O_2, when perfect degreasing of the product shall be maintained.

TRANSPORT

The products may be transported on conditions corresponding to the set of combinations of classes IE 23 according to ČSN EN 60721-3-2, (i.e. by airplanes and trucks, semi-trailers and trailers, railway wagons with specially designed shock absorbers and ships, in premises that are neither ventilated, nor protected against atmospheric conditions).

STORAGE

The products may be stored on conditions corresponding to the set of combinations of classes IE 13/1C3 for SO_2 pursuant to ČSN EN 60721-3-1, with ambient temperature from -30 to + 55 °C (i.e. in places providing minimum protection against daily fluctuations of outdoor climate, exposed to sun radiation, impact of precipitations carried by wind, with danger of growth of fungi and attacks by animals, with the exceptions of termites, in close vicinity of sources of dust and sand, with vibrations of low importance).

INSTALLATION AND CONNECTION

The valve installation may be realized by a worker of the installation or service organization.
The installation and commissioning for design for O_2 may only be performed by the organization, which has the authorization for installation and repair of gas equipment, issued by the organization Technická inspekce České republiky /"Technical inspection of the Czech Republic"/ (originally ITI Praha).
Installation and uninstallation of screw-joints of the type series 981 for the selected equipment pursuant to the Decree 132/2008 Coll. for the connection of valves of the type 967 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 passed training.

PIPING CLEANNESS

Before the valve is connected, the impulse piping shall be perfectly cleaned. To avoid any deposit of impurities in the valve, cleanness of the medium in the piping shall be ensured in a suitable way (drain tanks, etc.).

OPERATING POSITION AND INSTALLATION OF THE VALVE

The operating position of the valve is discretionary. On the bottom side of the body of the valve there are two holes with threads M5 for the connection of the valve on the wall or, as the case may be, on the holder. These connecting holes are not present in case of the design with closing the control sampling with valve 967 52xxxx.

CONNECTION OF THE PIPING

The armature is connected to the piping either by means of inner threads or by means of weld-on terminals. All types of the connection, together with the dimensional drawings and with the described type of the installation, are identified in the manual for accessories type 981.

COMMISSIONING

After the installation of the valve and venting of the piping, the equipment is prepared for operation.
To vent, you should use either condensate (cold, if possible) or fill the whole system, including the sensor, with clean service water.
In case of the valve in design with a venting valve, such valves can be used for venting. Venting shall be realized in the shortest possible time to avoid excessive warming of the armature. By knocking on the piping, air blisters are released, which could stick on the piping wall when it is flooded.
Therewith the venting is completed.
If required, an appointed worker of the installation and service organization may provide the valve with a seal with the mark of the installation and service organization.

OPERATION AND MAINTENANCE

TORQUE OF THE SPINDLE

The following table provides informative values of torques of spindle and moments required to close the valve for various types of sealing subjected to different medium pressures. The values are only for information purposes because actual values may differ depending on the tightening of the seal cover.

Pressure of medium [MPa]	Torque [Nm]	Closing moment [Nm]
0	0.1 to 1.0	2.5 to 4.0
40	2.0 to 3.0	4.0 to 6.0

WARNING:
To avoid any damage to the seat sealing of the valve unit with soft sealing (code S3), smaller closing moment (max. 4 Nm) shall be used when closing the valve.

VENTING

During the operation of the armature, air may leak into the piping. Therefore, it is necessary to vent the piping by means of venting valves, which form a part of the armature. The venting interval shall be selected according to the local conditions.

VALVE CLEANING

This activity may only be performed by service workers of the valve manufacturer.

ELIMINATION OF LEAKAGE OF SPINDLE SEAL

In case of an armature with a valve unit with seal from expanded graphite, PTFE or PEEK, possible leakage around the spindle can be eliminated by tightening the lid of the seal after previous releasing of the nut. Tighten the lid of sealing as required with torque max. 10 – 12 Nm. After the seal has been tightened, the safety nut shall be tightened, too.

PROCEDURE WHEN FINDING LEAKAGE OF CONNECTION WITH THREADED RINGS
Possible leakage of the connection can be caused by unprofessional installation, e.g. by failure to comply with specified torque (i.e. insufficient or excessive tightening of the cap nut), with minimum straight part of the tube from its end or by using this connection in the environment with increased level of vibrations without any fixation of armature and connecting tubes, in particular those of longer lengths.

WARNING:
Never tighten (release) the cap nut under pressure – danger of lethal injury!!!
Uninstallation and repeated installation of the connection shall be realized according to manual for accessories, type 981 – Connecting terminals.

RELIABILITY

Reliability indicators in operation conditions and ambient conditions specified herein
- Mean time of operation between failures 96 000 hours (inf. value)
- Expected service life 10 years

SPARE PARTS

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

WARNING
Never tighten (release) the lid of the seal or safety nut under pressure – danger of lethal injury!!!

WARRANTY

Pursuant to Section 2113 of the Civil Code (Act No. 89/2012 Coll.), the manufacturer warrants for technical and operating parameters of the product specified in the manual. The warranty period shall be 36 months from the receiving of the product by the customer, unless established otherwise in the purchase contract or another document. The warranty of the manufacturer for the parts that are exposed to natural wear and are replaceable during normal maintenance of the product (seal sealing, sealing O-rings etc.) shall be 24 months.
The 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 valves shall be repaired by the manufacturer. They shall be sent for repair in the original or equal packing without accessories.

DISABLING AND LIQUIDATION

They shall be realized in compliance with the Waste Act No. 106/2005 Coll.
Both the product and its package do not include any parts that could impact the environment.
The products that are withdrawn from operation, including their packages, may be disposed of to the sorted or unsorted waste pursuant to the type of waste.
The package of the product is fully recyclable. Metal parts of the product are recycled, non-recyclable plastic materials shall be disposed of in compliance with the aforesaid Act.

Magyarországon:
Tartarini Hungary Kft.
8600 SIÓFOK, Fő utca 177.
tel:+36-84-310-503, tel/fax:+36-84-317-984
GSM.:+36-30-9720-800
e-mail : office@tartarini.hu

ZPA NOVÁ PAKA

Accessories to pressure sensors, manifolds and valves

PRODUCT MANUAL type 981

APPLICATION

- It is specified at individual accessories, figures 1 to 18
- The accessories may be used in a set with another armature
  - o As selected equipment of the safety class 2 and 3 pursuant to the Directive No.132/2008 Coll. about the Quality System during the realization and assurance of the activities related to the use of nuclear energy and radiation activities and on ensuring quality of selected equipment with respect to their inclusion into the safety classes
  - o As selected equipment of the safety class 2, 3 and 4 pursuant to the Directive of the Nuclear regulatory Authority of the Slovak Republic No. 430/2011 Coll. on requirements for nuclear safety and No. 431/2011 Coll. on quality management system
  - o For the environment, where mechanical resistance is required pursuant to ČSN EN 60068-2-6 ed. 2 (class AH2 pursuant to ČSN 33 2000-5-51 ed. 3) and seismic capability of the electrical equipment of the safety system of the nuclear power plants pursuant to ČSN IEC 980 (MVZ level SL-2), which is in compliance with the qualification requirements of the nuclear power plant Mochovce (MO34), nuclear power plant Dukovany and nuclear power plant Temelín, refer to the declaration of the manufacturer ZPA Nová Paka No. rem-cec005-11
  - o As special design in the grade of purity for oxygen (O_2), this armature is delivered perfectly degreased and provided with suspended blue tag (code P2S)
  - o For industrial environment with high concentration of SO_2 and the environment with sea climate
- Furthermore, the couplings may be also used as special design with cleanness of internal surfaces of grade I according to TPE 10-40/1926/85 (code PC1)

Accessories are not rated products pursuant to the Act No. 22/1997 Coll.

OPERATING CONDITIONS

The accessories are designed for the environment defined by the group of parameters and their severity grades IE36/3C4 for SO_2 according to ČSN EN 60721-3-3 and the following operating conditions, i.e. in the places with minimum protection against daily fluctuations of the outdoor climate, exposed to sun radiation, with impact of precipitations carried by wind.

From time to time, the accessories may be exposed to the sea climate according to ČSN EN 60068-2-52, severity grade 2.

Relative ambient humidity:
10 to 100 % with condensation with upper limit of water content 29 g H_2O/kg of dry air

Atmospheric pressure: 70 to 106 kPa

Other operating conditions are identified at the individual accessories, figures 1 to 18.

DESIGNATION

Data on identification label
- Trademark of the manufacturer
- Product ordering number

Data on weld-on and blinding cone and weld-on sleeve
- Material

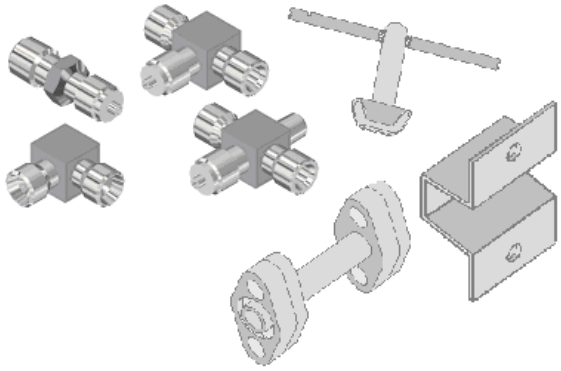
Data on coupling body
- Mark of realized pressure test (for couplings that have weld-on terminals)

Data on certificate of quality and completeness of the product
- Trademark of the manufacturer
- Name of the product
- Manufacturing number (for orders according to the Decree 132/2008 Coll.)
- Product ordering number

RELIABILITY

Reliability indicators in operation conditions and ambient conditions specified herein

- Mean time of operation between failures 96 000 hours (inf. value)
- Expected service life 10 years



DELIVERY

Unless agreed otherwise with the customer, each delivery includes
- Delivery note
- Products pursuant to purchase order
- Accompanying technical documentation in Czech:
  - o Product quality and completeness certificate, which also serves as the warranty certificate (for the whole order)
  - o Identification label
  - o Product manual
  - o Inspection report about cleanness of inner surfaces (only couplings with code PC1)
  - o Inspection report of the design for O_2 (only in case of armature with code P2S)
  - o Declaration of conformity by the supplier according to ČSN EN ISO/IEC 17050-1 (for purchase orders according to the Directive 132/2008 Coll.)

If it is established in the purchase contract or agreed otherwise, the following documentation can be also delivered with the product:
- Copy of inspection certificate3.1 according to ČSN EN 10204 for the material with the casting number
- Declaration of Conformity with the purchase order 2.1 according to ČSN EN 10204
- Declaration of the manufacturer ZPA Nová Paka No. rem-cec005-11
  on seismic qualification of the device equipment for conditions of operation in the nuclear power plant Temelín, nuclear power plant Dukovany and nuclear power plant Mochovce, block 3 and 4
- Copy or the report of the environment resistance test
- Declaration of Conformity of the supplier according to ČSN EN ISO/IEC 17050-1

PACKING

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

When removing the product from the packing, no special measures are necessary with the exception of design for O_2, when perfect degreasing of the product shall be maintained.

TRANSPORT

The products may be transported on conditions corresponding to the set of combinations of classes IE 23 according to ČSN EN 60721-3-2, (i.e. by airplanes and trucks, semi-trailers and trailers, railway wagons with specially designed shock absorbers and ships, in premises that are neither ventilated, nor protected against atmospheric conditions).

STORAGE

The products may be stored on conditions corresponding to the set of combinations of classes IE 13/1C3 for SO2 pursuant to ČSN EN 60721-3-1, with ambient temperature from -30 to + 55 °C (i.e. in places providing minimum protection against daily fluctuations of outdoor climate, exposed to sun radiation, impact of precipitations carried by wind, with danger of growth of fungi and attacks by animals, with the exceptions of termites, in close vicinity of sources of dust and sand, with vibrations of low importance).

ORDERING

The accessories can be ordered in two ways, either directly (as type 981) or by means of the ordering number of another product.

Ordering directly as type 981:

The purchase order shall specify

- Name
- Type number 981 + relevant code or ordering number
- If it is ordered for assembly with another armature, which is the selected equipment of the safety class 2 and 3 pursuant to the Directive No. 132/2008 Coll.
- Requirement for further documentation according to the Article DELIVERY
- Other (special) requirements
- Number of pieces

In this way, only one type of the accessories can be ordered; behind the number 981 there may be only one code or one ordering number.

PURCHASE ORDER EXAMPLE

Standard design:

Weld-on cone
981 KU3 - 20 pcs

Special request:

Manometric shock absorber
981TL1 – 20 pcs

with threads G1/2 at inlet and outlet

Ordering by means of the ordering number of another product:

The purchase order shall specify

- Name of the product including the name of accessories
- Ordering number including the code(s) of accessories
- Number of pieces

In this way it is possible to order more types of accessories, which can be considered for a particular product. The number of pieces of individual parts of the accessories is based on the need of such parts with respect to the product, the type number of which is identified in the purchase order.

PURCHASE ORDER EXAMPLE

Standard design:

1. Manifold + weld-on cone
   9644521 W1 S1 KU3
   10 pcs
2. Manifold + weld-on sleeve + holder
   9642531 W2 S1 NA5 B3
   10 pcs

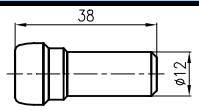
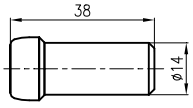
TABLE 1

The table specifies the accessories, which are delivered with the armature as a default, and also the accessories that can be delivered together with the armature after they have been ordered by means of the code behind the ordering number.

TYPE OF ARMATURE	ACCESSORIES DELIVERED AS A DEFAULT WITH THE ARMATURE	CODES OF ACCESSORIES THAT CAN BE SPECIFIED BEHIND THE ORDERING NUMBER
964 2... **(on sensor flange - pitch 54 mm)**	Sealing ring PTFE 24x18x3	- SR2, SR3, SR4, SR5 - B3 - ODP2, ODP1 *) - KL1 - KU1, KU2, KU3, KU4, KU5, KU6 - NA1, NA2, NA3, NA4, NA5, NA6 - NAG1, NAG2, NAG3, NAG4, NAG5, NAG6 - EMA3, TZ1
964 3... *) **(on sensor flange - pitch 57 mm)**		
964 4... **(between the piping)**	Holder B3	- ODP2, ODP1 *) - KL1 - KU1, KU2, KU3, KU4, KU5, KU6 - NA1, NA2, NA3, NA4, NA5, NA6 - NAG1, NAG2, NAG3, NAG4, NAG5, NAG6 - EMA3, TZ1
967 ...		- KL1 - KU1, KU2, KU3, KU4, KU5, KU6 - NA1, NA2, NA3, NA4, NA5, NA6 - NAG1, NAG2, NAG3, NAG4, NAG5, NAG6 - TZ1, TZ2, TZ3, TZ4
984 2..... **(on sensor flange - pitch 54 mm)**	Sealing ring PTFE 24x18x3	- SR2, SR3, SR4, SR5 - B3 - ODP2 - KU1, KU2, KU4, KU5 - NA1, NA2, NA4, NA5
984 4..... **(between the piping)**	Holder B3	- ODP2 - KU1, KU2, KU4, KU5 - NA1, NA2, NA4, NA5

*) Only after an agreement with the manufacturer as a special request

FIGURE 1 - WELD-ON CONE WITH CAP-NUT

CODE	MATERIAL		INNER Ø [mm]	DIMENSIONAL DRAWING
KU1	Carbon steel	1.0569	7	
KU2	Corrosion resistant steel	1.4541		
KU3	Creep-resisting steel	15 128		
KU4	Carbon steel	1.0569	7	
KKU4			10	
KU5	Corrosion resistant steel	1.4541	7	
KKU5			10	
KU6	Creep-resisting steel	15 128	7	
KKU6			10	

The cone is delivered by 1 pc together with the applicable cap-nut.
After putting the cap nut on the cone and welding the cone on the piping, the armature provided with the corresponding screw joint for the cone according to the dimensional drawing of the screw joint can be attached to the cone.

CAP-NUT FOR WELD-ON CONE

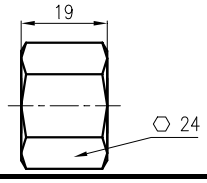
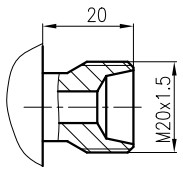
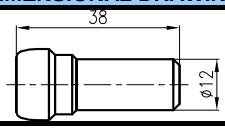
MATERIAL OF NUT	DIMENSIONAL DRAWING OF NUT	DIMENSIONAL DRAWING OF SCREW-JOINT
Corrosion resistant steel 1.4541 (only for KU2, KU3, KU5 and KU6)		
Carbon steel 11 109.0 (only for KU1 and KU4)		

FIGURE 2 - BLINDING CONE WITH CAP-NUT WITH FUNCTION OF PLUG

CODE	MATERIAL	DIMENSIONAL DRAWING
ZKU1	Carbon steel 1.0569	

The cone is delivered by 1 pc together with the applicable cap-nut.
After putting the cap nut on the cone, the armature provided with the corresponding screw joint for the cone according to the dimensional drawing of the screw joint can be attached to the cone.

CAP-NUT FOR BLINDING CONE

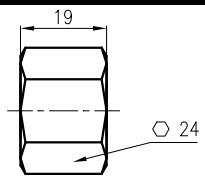
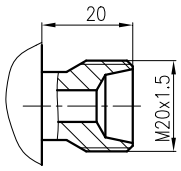
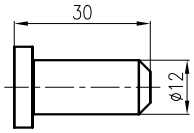
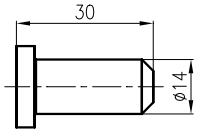
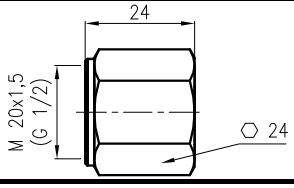
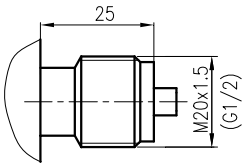
MATERIAL OF NUT	DIMENSIONAL DRAWING OF NUT	DIMENSIONAL DRAWING OF SCREW-JOINT
Carbon steel 11 109.0		

FIGURE 3 - WELD-ON SLEEVE WITH CAP-NUT AND SEALING

CODE	THREAD OF CAP-NUT	MATERIAL	INNER Ø OF THE SLEEVE [mm]	DIMENSIONAL DRAWING
NA1	M20x1.5	Carbon steel 1.0569	6.5	
NAG1	G1/2			
NA2	M20x1.5	Corrosion resistant steel 1.4541		
NAG2	G1/2			
NA3	M20x1.5	Creep-resisting steel 15 128		
NAG3	G1/2			
NA4	M20x1.5	Carbon steel 1.0569		
NAG4	G1/2			
NA5	M20x1.5	Corrosion resistant steel 1.4541		
NAG5	G1/2			
NA6	M20x1.5	Creep-resisting steel 15 128		
NAG6	G1/2			

The sleeve is delivered by 1 piece together with the relevant cap nut and with aluminium sealing.
After putting the cap nut on the sleeve and welding the sleeve on the piping, the armature provided with the corresponding screw joint for the sleeve according to the dimensional drawing of the screw joint can be attached to the piping.

CAP-NUT FOR WELD-ON SLEEVE

MATERIAL OF NUT	DIMENSIONAL DRAWING OF NUT	DIMENSIONAL DRAWING OF SCREW-JOINT
Corrosion resistant steel 1.4541 (only for NA2, NAG2, NA3, NAG3, NA5, NAG5, NA6 and NAG6		
Carbon steel 11 109.0 (only for NA1, NAG1, NA4 and NAG4)		

SEALING RINGS FOR WELD-ON SLEEVE
They can also be ordered independently from other materials pursuant to the ordering numbers specified below:
The sealing rings can also be used for sealing of the connecting terminals with codes32, 33, 36, 39 and 40.

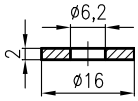
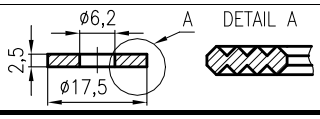
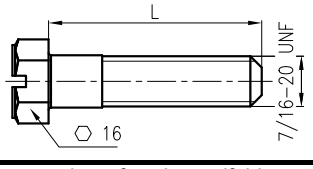
ORDERING NUMBER SEALING	MATERIAL		DIMENSIONAL DRAWING
382 041	Al	EN AW-1050A	
276 067	Cu	42 3005	
382 063	Steel	1.4541	
382 096	Steel	1.4404	

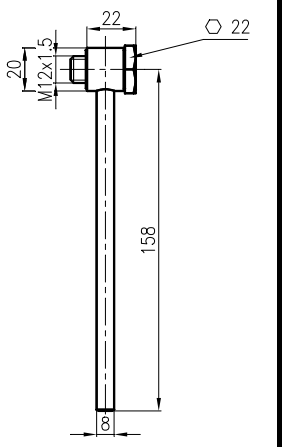
FIGURE 4 - SCREW WITH HEXAGONAL HEAD 7/16-20 UNF

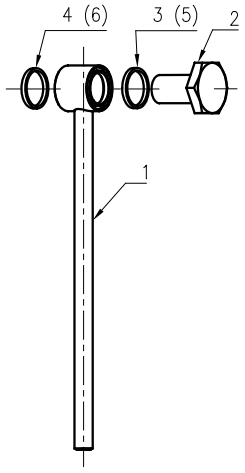
for the connection of the manifold on the flange of the pressure difference sensor

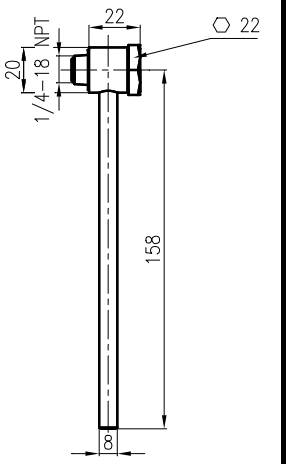
CODE	MATERIAL	LENGTH "L"	FLANGE	DIMENSIONAL DRAWING
SR2	Alloyed steel 15 230	45 mm	Conventional	
SR3		75 mm	Coplanar	
SR4	Corrosion resistant steel A2 (AISI 304)	45 mm	Conventional	
SR5		75 mm	Coplanar	

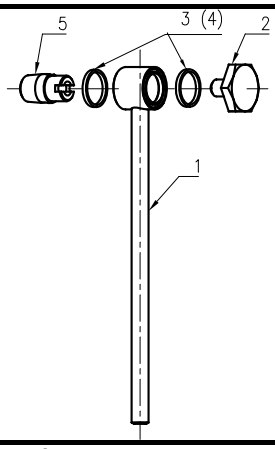
Delivery: 4 pcs or 2 pcs according to the design of the manifold when ordering by means of the ordering number of such manifold
1 pc when ordering directly as type 981

FIGURE 5 - DRAIN PIPING FOR MANIFOLD

CODE	APPLICATION AND INSTALLATION	DIMENSIONAL DRAWING
ODP2	Drain piping is designed for the installation for five-way manifold of type 964 and 984. Installation procedure: 1. Grease the thread M12 × 1.5 with grease for high temperatures. 2. Insert sealing rings according to the medium temperature into the sealing grooves of the drain piping and slide the piping on the drain screw. 3. Screw the drain screw into the manifold and tighten with torque of max. 9 Nm.	

Position	Part	Material	Dimension of ring	Number of pcs in packing	Ordering number of replacement rings	
1	Drain piping	Steel 1.4541		1		
2	Drain screw	Steel 1.4541		1		
3	Sealing ring for temperatures up to 200°C	PTFE	18x14x2	1	479820	
4			18x12x2	1	479842	
5	Sealing ring for temperatures up to 450°C	Fibrous-rubber board TEMAPLUS	18x14x2	1	495297	
6			18x12x2	1	495308	

ODP1 [1)]	Drain piping is designed for the installation for five-way manifold of type 964. Installation procedure: 1. Screw the drain reduction into the drain hole of the manifold (it is necessary to wind up sealing tape PTFE on the thread 1/4-18 NPT before screwing or, in case of temperatures exceeding 200°C, apply grease for high temperatures). Torque is max. 28 Nm. 2. Insert the sealing rings pursuant to the medium temperature into the sealing grooves of the drain piping and slide the piping on the reduction. 3. Screw the drain screw into the reduction and tighten with torque of 9 Nm.	

Position	Part	Material	Number of pcs in packing	Ordering number of replacement rings	
1	Drain piping	Steel 1.4541	1		
2	Drain screw	Steel 1.4541	1		
3	Sealing ring 18x14x2 for temperatures up to 200°C	PTFE	2	479820	
4	Sealing ring 18x14x2 for temperatures up to 450°C	Board HD-U	2	495297	
5	Drain reduction	Steel 1.4541	1		

[1)] **Do not use for new structures (only upon a special request after an agreement with the manufacturer).**
The complete drain piping is delivered with the parts specified in the Table. Sealing rings can also be delivered as spare parts under the specified ordering numbers. In such a case you need to specify the required number of pieces of rings.

FIGURE 6 - ANGULAR SCREW-JOINT SA4

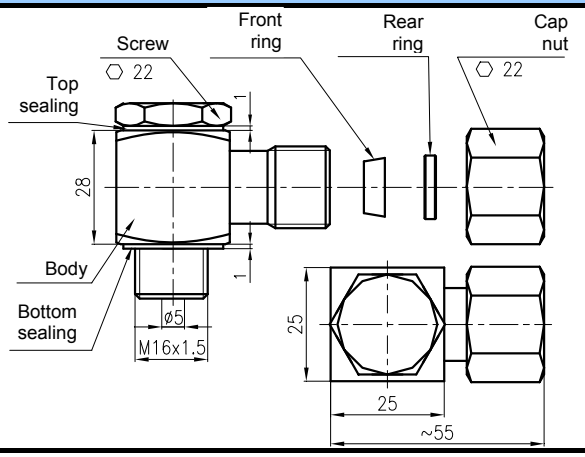
CODE	APPLICATION AND INSTALLATION	DIMENSIONAL DRAWING
SA4	The adjustable angular screw joint enables discretional rotation of the body with weld-on terminal for threaded rings on a tube with ∅ 10 mm. After an agreement with the manufacturer, it can be delivered with threaded rings of different dimensions or with a different terminal. Realize the installation of threaded rings according to Figure 18 - TERMINALS WITH THREADED RINGS . Material of screw-joint: corrosion resistant steel 1.4541 Material of sealing: aluminium EN AW-1050A	

FIGURE 7 - COUPLING SA5

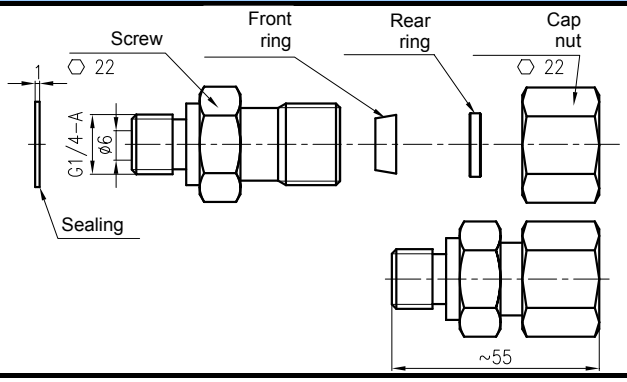
CODE	APPLICATION AND INSTALLATION	DIMENSIONAL DRAWING
SA5	The coupling enables to connect the armature with internal thread G1/4 and a tube with ∅ 10 mm by means of threaded rings Realize the installation of threaded rings according to Figure 18 - TERMINALS WITH THREADED RINGS . Material of coupling: corrosion resistant steel 1.4541 Material of sealing: aluminium EN AW-1050A	

FIGURE 8 - SCREW-JOINT SA6, SA7, SA8

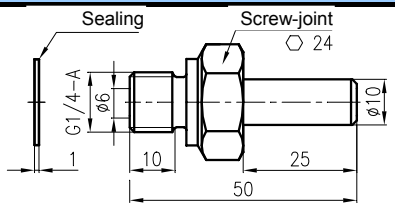
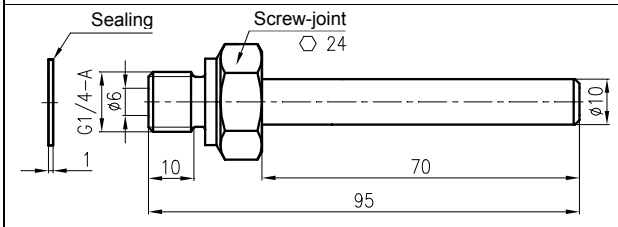
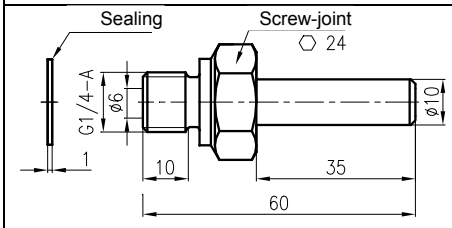
CODE	APPLICATION	DIMENSIONAL DRAWING
SA6	The screw joint enables to connect an armature with internal thread G1/4 and a tube with ∅ 10 mm, which is welded. Installation: Wind up the sealing tape from PTFE on the thread. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 35 Nm. Material of screw-joint: corrosion resistant steel 1.4541 Material of sealing: aluminium EN AW-1050A	
SA7		
SA8		

FIGURE 9 - PUT-ON CONTROL HANDLE

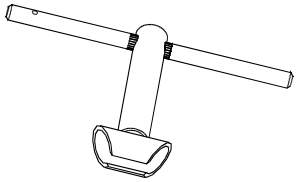
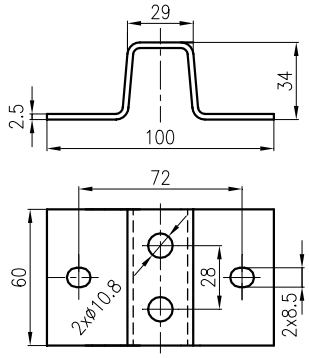
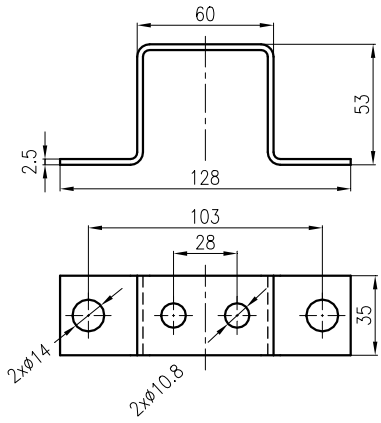
CODE	APPLICATION	DRAWING
KL1	The handle is used to control valve units of armatures (964, 967) in case of application for high temperatures of the medium (over 200 °C). It is inserted on the standard handle of the manifold. It is delivered in a PE bag and is packed by 1 pc.	

FIGURE 10 - HOLDER FOR INSTALLATION OF MANIFOLDS AND DRAIN TANKS

<table>
<tr><th>CODE</th><th>APPLICATION</th><th>DIMENSIONAL DRAWING</th></tr>
<tr><td>B3</td><td>The holder is delivered as default together with the manifold of type 964 and 984 in the design for the installation between impulse piping.

The holder is made of galvanized carbon steel 11 320 and is delivered together with two screws ISO4762-M10x12-8.8-A3K, which are used for screwing the holder to the body of the manifold.</td><td> 
</td></tr>
<tr><td>B4</td><td>The holder is delivered if it has been required in the purchase order. It is used e.g. when replacing the old Bulgarian manifolds.

The holder is made of galvanized carbon steel 11 320 and is delivered together with two screws ISO4762-M10x12-8.8-A3K, which are used for screwing the holder to the body of the manifold.</td><td> 
</td></tr>
<tr><td>B6</td><td>The holder is used for the installation of the drain tank of type 986.

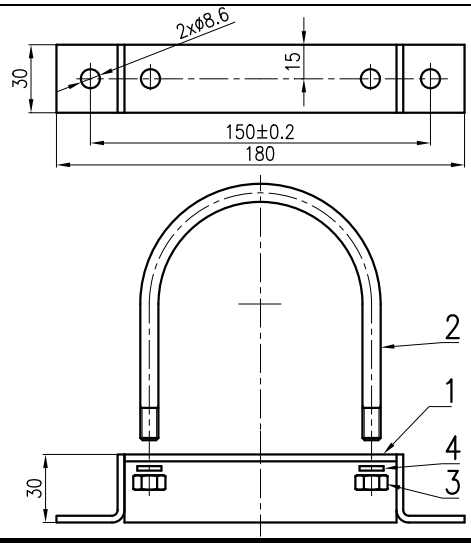
<table>
<tr><th>POSITION</th><th>PART</th><th>MATERIAL</th><th>NUMBER</th></tr>
<tr><td>1</td><td>Holder</td><td>11 373</td><td>1 pc</td></tr>
<tr><td>2</td><td>Yoke</td><td>1.4541</td><td>1 pc</td></tr>
<tr><td>3</td><td>Nut ISO4034-M8-5-A2K</td><td></td><td>2 pcs</td></tr>
<tr><td>4</td><td>Washer 8 ČSN 02 1740.05</td><td></td><td>2 pcs</td></tr>
</table></td><td> 
</td></tr>
</table>

FIGURE 11 - INTERCONNECTING PIECE FOR CASCADE CONNECTION OF PRESSURE DIFFERENCE SENSORS

The interconnecting piece is used to interconnect two pressure difference sensors with a conventional flange. It is made of corrosion resistant steel.

It is delivered in a box, packed by 2 pieces, together with 4 sealing O-rings, the material of which can be selected, and eight screws, 7/16-20UNF from galvanized steel 15 230 of length 37, which are used to screw both elements to the sensor flanges.

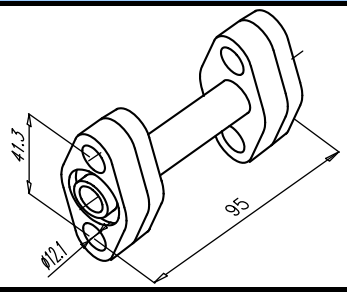
<table>
<tr><th>CODE</th><th>MATERIAL OF O-RINGS</th><th>DRAWING</th></tr>
<tr><td>H1</td><td>FPM (-20 to +250°C)</td><td rowspan="3"> 
</td></tr>
<tr><td>H2</td><td>NBR (-30 to +125°C)</td></tr>
<tr><td>H3</td><td>EPDM (-45 to +110°C)</td></tr>
</table>

FIGURE 12 - QUICK COUPLING EMA3

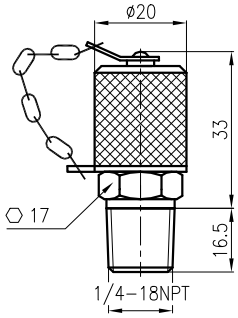
CODE	APPLICATION AND INSTALLATION	DRAWING
EMA3	The quick-coupling is used to connect and disconnect measurement and extraction places with the internal thread 1/4 - 18NPT in a fast and simple way. Maximum operation pressure is 63 MPa Installation procedure: 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 28 Nm Thread from the side of the sensor is M16x2. The quick coupling is made of corrosion resistant steel 1.4571.	

FIGURE 13 - MANOMETRIC SHOCK ABSORBER

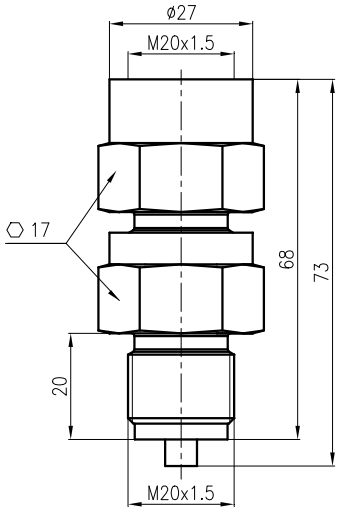
CODE	APPLICATION AND INSTALLATION	DRAWING
TL1	The shock absorber is used to decrease pressure surges in the impulse piping. It is made of stainless steel 1.4541 before the pressure sensors with tensometric sensors. Maximum operation pressure is 70 MPa at temperature +95 °C. With normal overload capability of the pressure sensor, the shock absorber can protect the pressure sensor against pressure surges for the period of 0.1 s. The internal thread is used to connect a pressure sensor or a manometric valve. The impulse piping is connected to the external thread by means of sealing and a sleeve with a cap nut. It is only designed for clean media. Installation: During the installation and uninstallation of the shock absorber to the sensor (to the piping), the shock absorber shall be kept with a wrench in the area of the hexagon that is closer to the sensor (to the piping). Recommended torque is max. 120 Nm. During the installation and the operation, it shall be ensured that no mechanical impurities could enter the shock absorber. The manometric shock absorber is made of corrosion resistant steel 1.4541. It is delivered including 2 pcs of the aluminium sealing. The sleeve with cap-nut and sealing can be ordered according to Figure 3. Sealing can be also ordered separately or, as the case may be, also from other materials according to the table at Figure 3 – Sealing rings for weld-on sleeve.	

FIGURE 14 - MANOMETRIC PLUG

The plugs are made of corrosion resistant steel 1.4541.

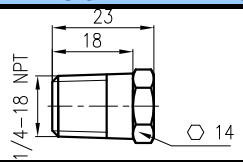
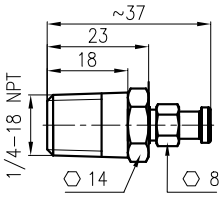
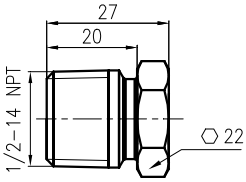
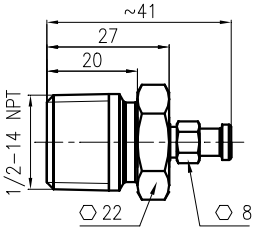
CODE	APPLICATION AND INSTALLATION	DIMENSIONAL DRAWING
TZ1	The plug can be used to blind the holes in the flanges of the pressure and pressure difference sensors, manifolds or valves with a corresponding thread. Installation procedure: 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 28 Nm	
TZ2	The plug with venting can be used in flanges of the pressure and pressure difference sensors, manifolds or valves with a corresponding thread. Installation procedure: 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 28 Nm	
TZ3	The plug can be used to blind the holes in the adapters of the pressure and pressure difference sensors, manifolds or valves with a corresponding thread. Installation procedure: 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 60 Nm	
TZ4	The plug with venting can be used in adapters of the pressure and pressure difference sensors, manifolds or valves with a corresponding thread. Installation procedure: 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 60 Nm	

FIGURE 15 - MANOMETRIC CONNECTION

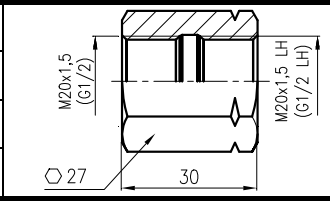
CODE	DESIGN	MATERIAL	DIMENSIONAL DRAWING
NP1	M20x1.5 / M20x1.5 LH	Corrosion resistant steel 1.4541	
NP2	M20x1.5 / M20x1.5 LH	Galvanized carbon steel 11 109	
NP3	G1/2 / M20x1.5 LH	Corrosion resistant steel 1.4541	
NP4	G1/2 / G1/2 LH	Corrosion resistant steel 1.4541	

FIGURE 16 - MANOMETRIC REDUCTION

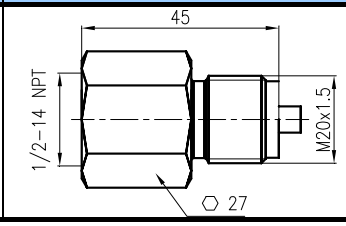
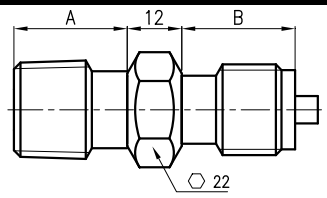
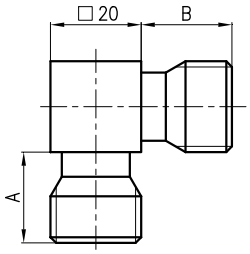
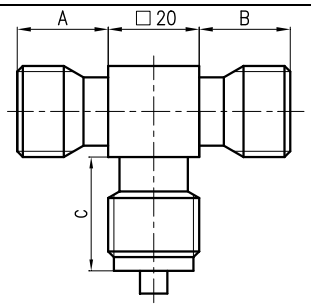
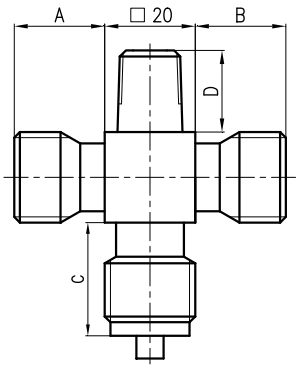
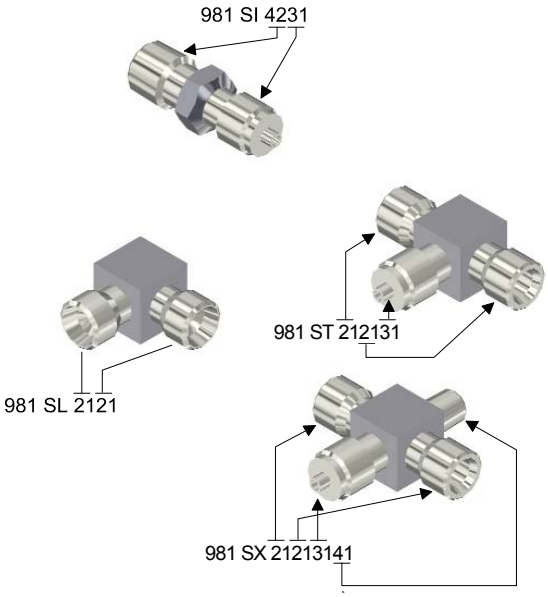
CODE	APPLICATION	DIMENSIONAL DRAWING
TR3	It is mostly used to connect the manometer with the thread 1/2-14 NPT to the sleeve with a nut M20x1.5. The sleeve with cap-nut and sealing can be ordered according to Figure 3. Material of the manometric reduction: corrosion resistant steel 1.4541	

FIGURE 17 - COUPLINGS

The couplings are designed for the interconnection of the impulse piping or for the connection of the impulse piping to other armatures and devices (valve, pressure sensor, etc.) and for other applications.

Examples of coupling designs and their specification:

CODE	DIMENSIONAL DRAWING	PURCHASE ORDER EXAMPLE
SI aabb		1 pc coupling 981 SI 4231
SL aabb		1 pc coupling 981 SL 2121
ST aabbcc		1 pc coupling 981 ST 212131
SX aabbccdd		1 pc coupling 981 SX 21213141



The coupling consists of the coupling body and terminals pursuant to Figure 18.

Material of coupling: corrosion resistant steel 1.4541

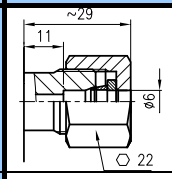
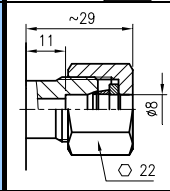
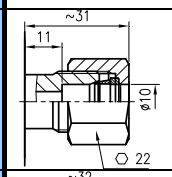
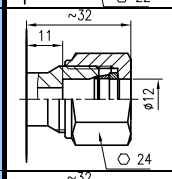
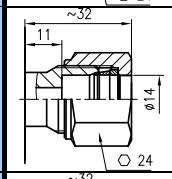
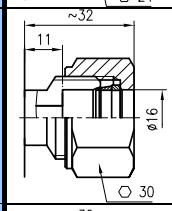
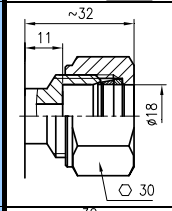
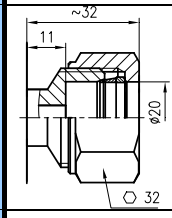
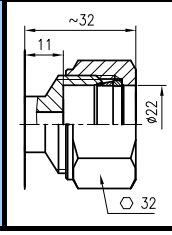
In case of a requirement for the special design with purity of internal surfaces of grade I according to TPE 10-40/1926/85, specify the code PC1 behind the ordering number of the coupling.

Operation conditions:
Maximum operation pressure of medium 40 MPa
Maximum operation temperature 500 °C
The combination of both maximum values is not permissible.

Note:
Characters aa, bb, cc, dd represent codes of weld-on terminals, the dimensions of which (A, B, C, D) are specified in Figure 18-Connecting terminals. For couplings, all terminals may be selected, just the code 52 can be only selected after an agreement with the manufacturer.

FIGURE 18 - CONNECTING TERMINALS

The tables specify various types of connecting terminals, which can be chosen for valves, manifolds, couplings and other armatures. 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 cap nuts, sealing, plugs, threaded rings, which are illustrated in the dimensional drawing, will be delivered according to its type for the armature. All terminals are made of steel 1.4541.

CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
11		**TERMINALS WITH THREADED RINGS** By means of a cap nut and two rings, a non-alloyed, alloyed or corrosion resistant tube (pursuant to ČSN EN 10216-2+A2 and ČSN EN 10216-5) with the diameter 6, 8, 10, 12, 14, 16, 18, 20 and 22 mm with tolerance of the outer diameter of ± 0.3 mm can be connected in a way that enables further dismantling. **FIRST INSTALLATION:** 1. Put a cap nut, rear (cylindrical) ring and front (conical) ring – ensure correct orientation! – on the straight-cut end of the tube that is free of burrs. 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 up to the bottom of the connecting sleeve and tighten the cap nut by hand. 3. By means of the torque wrench tighten the cap nut with the torque according to the following table:
12		
13		
14		
15		
16		
17		
18		
19		

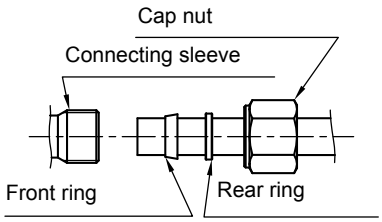
Tube diameter [mm]	6	8	10	12	14	16	18	20	22
Torque [Nm]	30	40	50	55	65	75	85	90	100

4. If the medium pressure exceeds 20 MPa, the nut shall be tightened again after the first trial pressurisation after pressure has been discharged from the system.

UNINSTALLATION + REPEATED INSTALLATION:
1. The 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 necessary to maintain the layer of grease applied by the manufacturer on the conical sealing surface, rear ring and threads; otherwise, they shall be greased again. If required, this original grease can be ordered at the manufacturer of the armatures.
4. Realize the installation 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 cap nut by torque pursuant to the following table:

Tube diameter [mm]	6	8	10	12	14	16	18	20	22
Torque [Nm]	25	35	40	50	55	65	70	80	85

WARNING:
THE CAP NUT MAY NEVER BE TIGHTENED (RELEASED) UNDER PRESSURE – it can cause lethal injury!!!
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 finally result in 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 with the use of tube fittings.



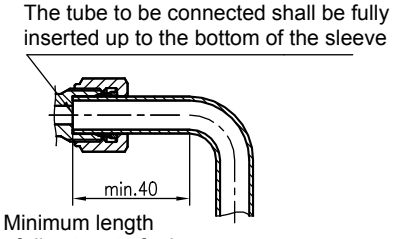


FIGURE 18 - CONNECTING TERMINALS, continuation from the previous page

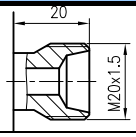
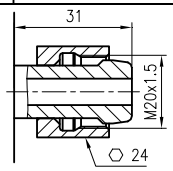
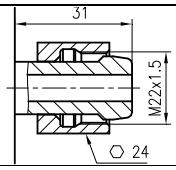
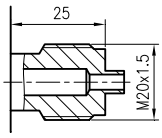
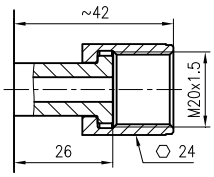
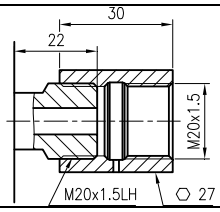
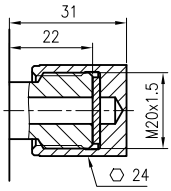
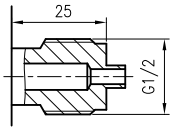
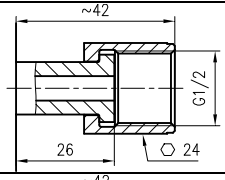
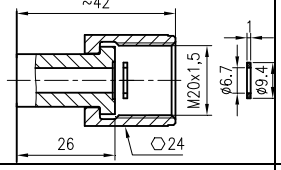
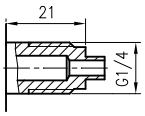
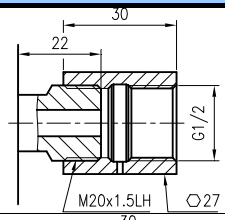
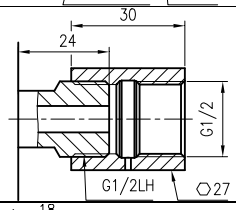
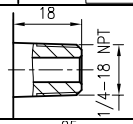
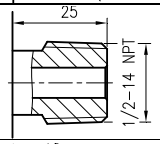
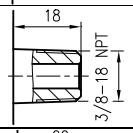
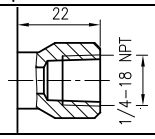
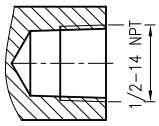
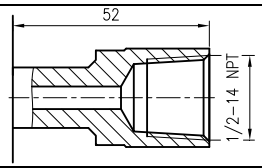
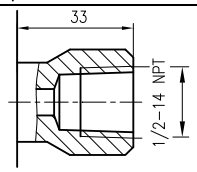
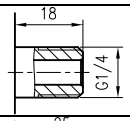
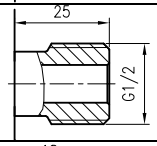
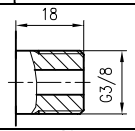
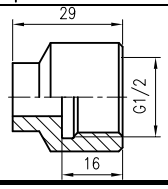
CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
21		**SCREW-JOINT FOR A CONE** 1. Put a cap nut on the cone 2. Weld the cone on the end of tube 3. Screw the tube to the sleeve with a nut and tighten with torque of max. 120 Nm Cone with cap-nut can be ordered according to Figure 1.
22		**WELD-ON CONE WITH CAP-NUT M20x1.5** By means of a nut, screw the armature to the screw-joint for a cone, which forms a part of e.g. a condensation tank, another valve etc., and tighten with torque of max. 120 Nm.
23		**WELD-ON CONE WITH CAP-NUT M22x1.5** By means of a nut, screw the armature to the screw-joint for a cone with the relevant thread, which forms a part of e.g. the piping, and tighten with torque of max. 150 Nm.
31		**MANOMETRIC SCREW-JOINT M20x1.5** 1. Put a cap nut on the sleeve 2. Weld the sleeve on the end of tube 3. Put a metal sealing on the screw joint 4. Screw the piping to the screw joint by means of a nut and tighten with torque of max. 120 Nm The sleeve with cap-nut and sealing can be ordered according to Figure 3.
32		**WELD-ON SLEEVE WITH CAP-NUT M20x1.5** By means of a nut, screw the armature to the manometric screw-joint with the relevant thread and tighten with torque of max. 120 Nm. Metal sealing (not a part of the delivery) can be ordered according to Table at Figure 3 – Sealing rings for weld-on sleeve.
33		**SCREW-JOINT WITH MANOMETRIC COUPLING M20x1.5 LH / M20x1.5** The screw joint is used to connect the manometer or valve with manometric screw joint M20x1.5 1. Put a metal sealing (not a part of the delivery, it can be ordered according to Table at Figure 3 – Sealing rings for weld-on sleeve) on the screw-joint of the manometer. 2. Screw the manometer and the armature together with the manometric coupling (delivered with the armature), which is tightened by torque of max. 120 Nm
34		**TEST SCREW-JOINT M20x1.5** The screw joint is used to connect the control manometer. It is delivered including the plug with sealing. Aluminium sealing is made of material EN AW-1050A. Recommended torque max. 120 Nm The sealing can be ordered also separately under the ordering number 221386.
35		**MANOMETRIC SCREW-JOINT G1/2** 1. Put a cap nut on the sleeve 2. Weld the sleeve on the end of tube 3. Put a metal sealing on the screw joint 4. Screw the piping to the screw joint by means of a nut and tighten with torque of max. 120 Nm The sleeve with cap-nut and sealing can be ordered according to Figure 3.
36		**WELD-ON SLEEVE WITH CAP-NUT G1/2** By means of a nut, screw the armature to the manometric screw-joint with the relevant thread and tighten with torque of max. 120 Nm. Metal sealing (not a part of the delivery), can be ordered according to Table at Figure 3 – Sealing rings for weld-on sleeve.
37		**WELD-ON SLEEVE WITH CAP-NUT M20x1.5** **WITH SEALING ACCORDING TO THE STANDARD SHELL** By means of a nut, screw the armature to the manometric screw-joint and tighten with torque of max. 120 Nm. The sealing is secured with stainless sealing ring from material 1.4404. The sealing can be ordered also separately under the ordering number 120208.
38		**MANOMETRIC SCREW-JOINT G1/4** 1. Put a cap nut on the sleeve 2. Weld the sleeve on the end of tube 3. Put a metal sealing on the screw joint (not a part of the delivery) 4. Screw the piping to the screw-joint with the use of a nut and tighten with torque of max. 120 Nm The sleeve with cap-nut can be ordered as special request after an agreement with the manufacturer, aluminium sealing from material EN AW-1050A can be ordered under the ordering number 382041/ZP2699.

FIGURE 18 - CONNECTING TERMINALS, continuation from the previous page

CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
39		**SCREW-JOINT WITH MANOMETRIC CONNECTION M20x1.5 LH / G1/2** The screw-joint is used for the connection of the manometer or valve with the manometric screw-joint G1/2 1. On the screw-joint of the manometer, put on a metal sealing (not a part of the delivery, it can be ordered according to Table at Figure 3 – Sealing rings for weld-on sleeve) **2.** Screw the manometer and the armature together with the manometric coupling (delivered with the armature); tighten it with torque of max. 120 Nm
40		**SCREW-JOINT WITH MANOMETRIC CONNECTION G1/2 LH / G1/2** The screw-joint is used for the connection of the manometer or valve with the manometric screw-joint G1/2 1. On the screw-joint of the manometer, put on a metal sealing (not a part of the delivery, it can be ordered according to Table at Figure 3 – Sealing rings for weld-on sleeve) **2.** Screw the manometer and the armature together with the manometric coupling (delivered with the armature); tighten it with torque of max. 120 Nm
41		**EXTERNAL THREAD 1/4 - 18 NPT** 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 28 Nm
42		**EXTERNAL THREAD 1/2 - 14 NPT** 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 60 Nm
43		**EXTERNAL THREAD 3/8 - 18 NPT** 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 45 Nm
51		**INTERNAL THREAD 1/4 - 18 NPT** The thread is cut out in the weld-on terminal, only for valve 967 with inner threads the thread is cut out directly in the basic body. 1. Wind up sealing tape from PTFE on a corresponding external thread 2. Screw-joint tighten with torque of max. 28 Nm
52		**INTERNAL THREAD 1/2 - 14 NPT** The thread is cut out directly in the basic body. 1. Wind up sealing tape from PTFE on a corresponding external thread 2. Screw the screw-joint or, as the case may be, tube into the hole in the armature and tighten with torque of max. 60 Nm
53		**INTERNAL THREAD 1/2 - 14 NPT** The thread is cut out in the weld-on terminal. This terminal is suitable especially for the manifolds 964 25 53 AS2 or 964 25 53 AS21. 1. Wind up sealing tape from PTFE on a corresponding external thread **2.** Screw the screw-joint or, as the case may be, tube into the hole in the armature and tighten with torque of max. 60 Nm
54		**INTERNAL THREAD 1/2 - 14 NPT** The thread is cut out in the weld-on terminal. 1. Wind up sealing tape from PTFE on a corresponding external thread 2. Screw the screw-joint or, as the case may be, tube into the hole in the armature and tighten with torque of max. 60 Nm
61		**EXTERNAL THREAD G1/4** 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 35 Nm
62		**EXTERNAL THREAD G1/2** 1. Wind up a sealing tape from PTFE on the thread **2.** Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 120 Nm
63		**EXTERNAL THREAD G3/8** 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 80 Nm
72		**INTERNAL THREAD G1/2** The thread is cut out in the weld-on terminal. 1. Wind up sealing tape from PTFE on a corresponding external thread 2. Screw the screw-joint or, as the case may be, tube into the hole in the weld-on terminal 3. With the side wrench 32, hold the flange of the cock and tighten the nut with torque of max. 120 Nm

INSTALLATION, CONNECTION AND COMMISSIONING

Installation and uninstallation of the screw joint, type of line 981, for selected equipment pursuant to the Decree No. 132/2008 Coll., their operation and maintenance may only be realized by a bearer of the AUTHORIZATION, which is issued by the manufacturer of the armatures on the basis of a completed training.

The installation and commissioning for design for O_2 may only be performed by the organization, which has the authorization for installation and repair of gas equipment, issued by the organization Technická inspekce České republiky /"Technical inspection of the Czech Republic"/ (originally ITI Praha).

PIPING CLEANNESS
Before the armature is connected, the impulse piping shall be perfectly cleaned. To avoid any deposit of impurities in the manifold, cleanness of the medium in the piping shall be ensured in a suitable way (drain tanks, etc.).

OPERATION POSITION
The operation position of the armature is discretionary. It shall be situated in the piping system so that no bigger forces and torque can be applied on it insofar it is possible.
In case of vibrations of the piping system, it is necessary to attach the armature by means of a suitable holder and fix the connecting piping at certain distances with tube fittings.

INSTALLATION AND CONNECTION OF COUPLINGS
The couplings are connected to the piping by means of the weld-on terminals with inner threads or by means of terminals with threaded rings.

INSTALLATION AND CONNECTION OF OTHER ACCESSORIES
The installation and connection of the accessories are provided at the relevant Figures 1 to 16.

OPERATION AND MAINTENANCE

The accessories to manifolds and valves do not require any operation and maintenance.

PROCEDURE WHEN FINDING LEAKAGE OF CONNECTION WITH THREADED RINGS
Possible leakage of the connection can be caused by unprofessional installation, e.g. by failure to comply with specified torque (i.e. insufficient or excessive tightening of the cap nut), with minimum straight part of the tube from its end or by using this connection in the environment with increased level of vibrations without any fixation of the armature and the connecting tubes, in particular those of bigger lengths.

WARNING
Never tighten (release) the cap nut under pressure – danger of lethal injury!!!

Uninstallation and repeated installation of the connection shall be realized pursuant to Figure 18.

SPARE PARTS

Accessories can be delivered as spare parts.

WARRANTY

Pursuant to Section 2113 of the Civil Code (Act No. 89/2012 Coll.), the manufacturer warrants for technical and operating parameters of the product specified in the manual. The warranty period shall be 36 months from the receiving of the product by the customer, unless established otherwise in the purchase contract or another document.
The 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 accessories are not repaired.

DISABLING AND LIQUIDATION

They shall be realized in compliance with the Waste Act No. 106/2005 Coll.
Both the product and its package do not include any parts that could impact the environment.
The products that are withdrawn from operation, including their packages, may be disposed of to the sorted or unsorted waste pursuant to the type of waste.
The package of the product is fully recyclable. Metal parts of the product are recycled, non-recyclable plastic materials shall be disposed of in compliance with the aforesaid Act.

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