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 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 EN 60068-2-6 (class AH2) and seismic capability of the electrical equipment of the safety system of the nuclear power stations pursuant to IEC 980 (MVZ level SL-2).
- For industrial environment with high concentration of SO_2 and the environment with sea climate

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.

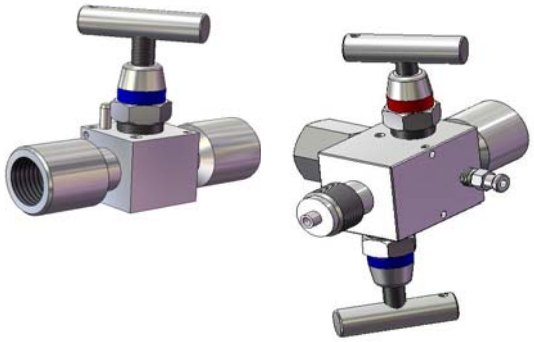
Inner bore of the valve: Ø 3 mm
Operating position: discretionary
Weight: approx. 0.4 kg
Type of operation: continuous

OPERATING CONDITIONS

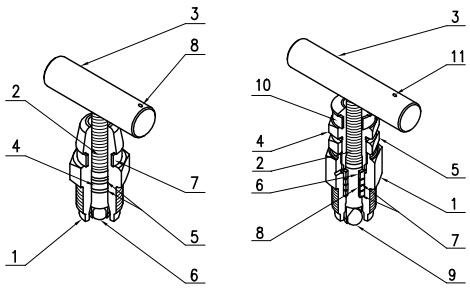
The valves are designed for the environment defined by the group of parameters and their severity grades IE36/3C4 for SO_2 pursuant to EN 60721-3-3 and the following operation conditions, i.e. in the places with minimum protection against daily fluctuations of the outdoor climate, exposed to sun radiation,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

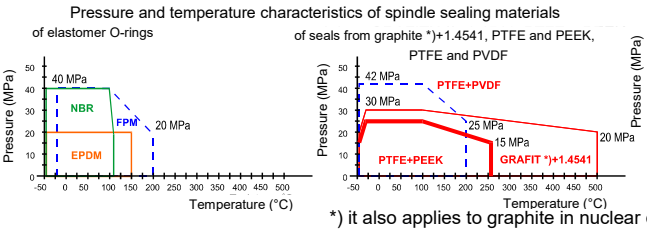
*) For this material, the manufacturer has certificate 3.1 pursuant to EN 10204

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 EN 10204

Chart 1



*) it also applies to graphite in nuclear cleanness

Chart 2

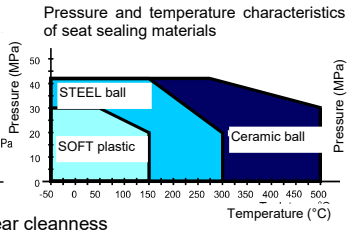


Chart 3

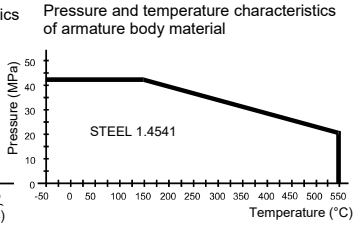


TABLE 1 - RESULTING MAXIMUM VALUES OF OPERATING PRESSURES AND TEMPERATURES (they are marked on the armature body)

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
- Heat number of material of basic body
- Valve scheme
- Mark of performed pressure test
- Product ordering number
- Time code
  (serial number 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)

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

- Copy of inspection certificate 3.1 pursuant to EN 10204 for the material of the body and other parts pursuant to the table of used materials with the heat number
- Declaration of Conformity with purchase order 2.1 pursuant to EN 10204
- Test report about the seismic and the vibration qualification
- Copy of the resistance test report of the environment
- Declaration of Conformity of the supplier pursuant to 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	1									
	angle		2										
	straight-way with inner threads		3										
	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:

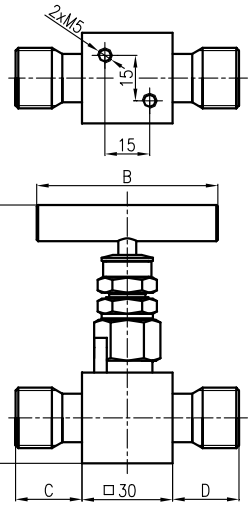
- Name
- Product ordering number
- Requirement for other documentation pursuant to Article DELIVERY
- Other (special) requirements
- Number of pieces

PURCHASE ORDER EXAMPLE

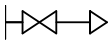
Standard design:

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:

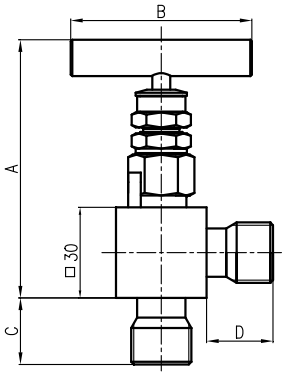


It is used as closing for the impulse piping
(for pressure sensors, condensation tanks, ...).

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:

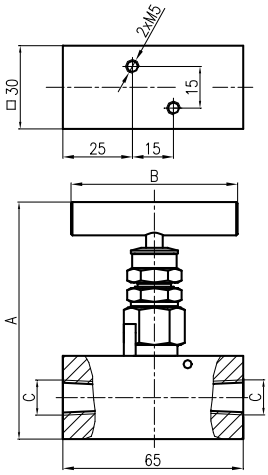
It is used as closing for the impulse piping
(for pressure sensors, condensation tanks, ...).

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

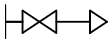
Dimensions C, D of the weld-on terminals are identified in the manual for accessories - type 981 - Connecting terminals.

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:

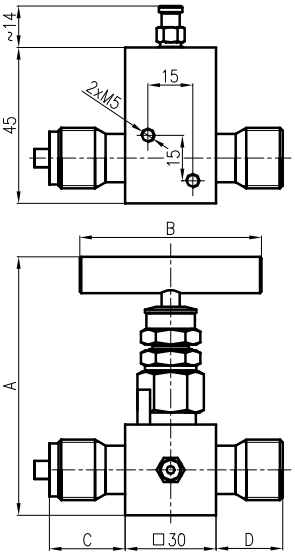


It is used like the previous valves; inner threads enable the installation of various screw-joints.

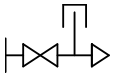
Material of spindle sealing	A	B
FPM, NBR, EPDM	80	45
GRAPHITE, PTFE, PEEK	90	60

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:



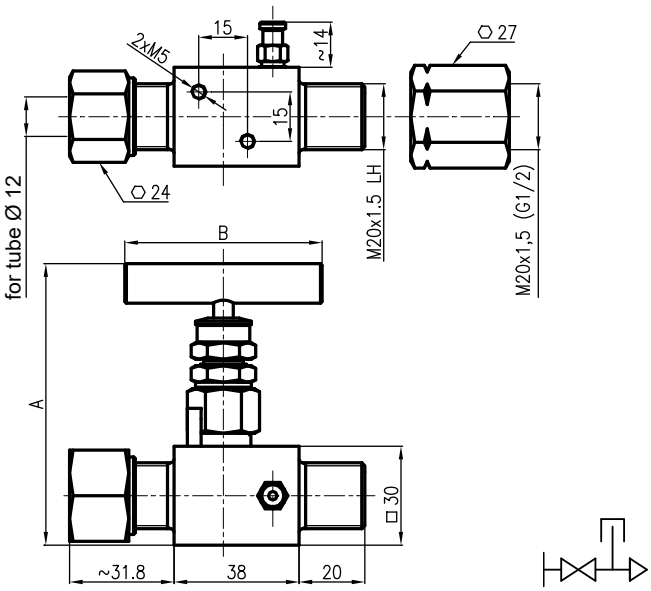
It is used as closing for pressure sensor.
It is provided with a venting valve (inner thread M8).

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

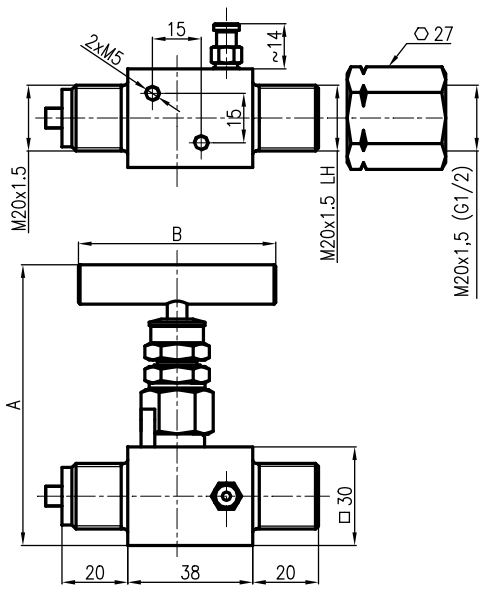
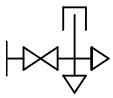


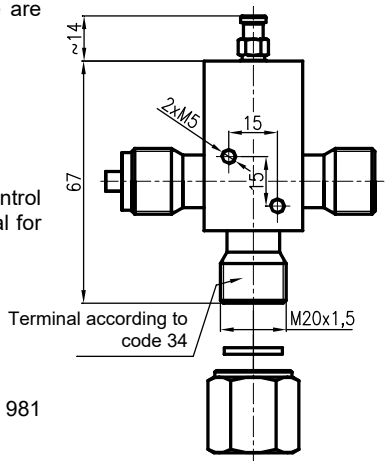
FIGURE 5 - MANOMETRIC TESTING VALVE 967 51 .., dimensional drawing, scheme, application

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.



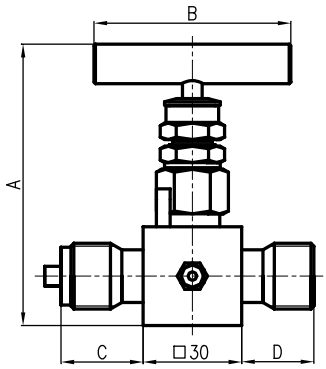
Valve scheme:

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

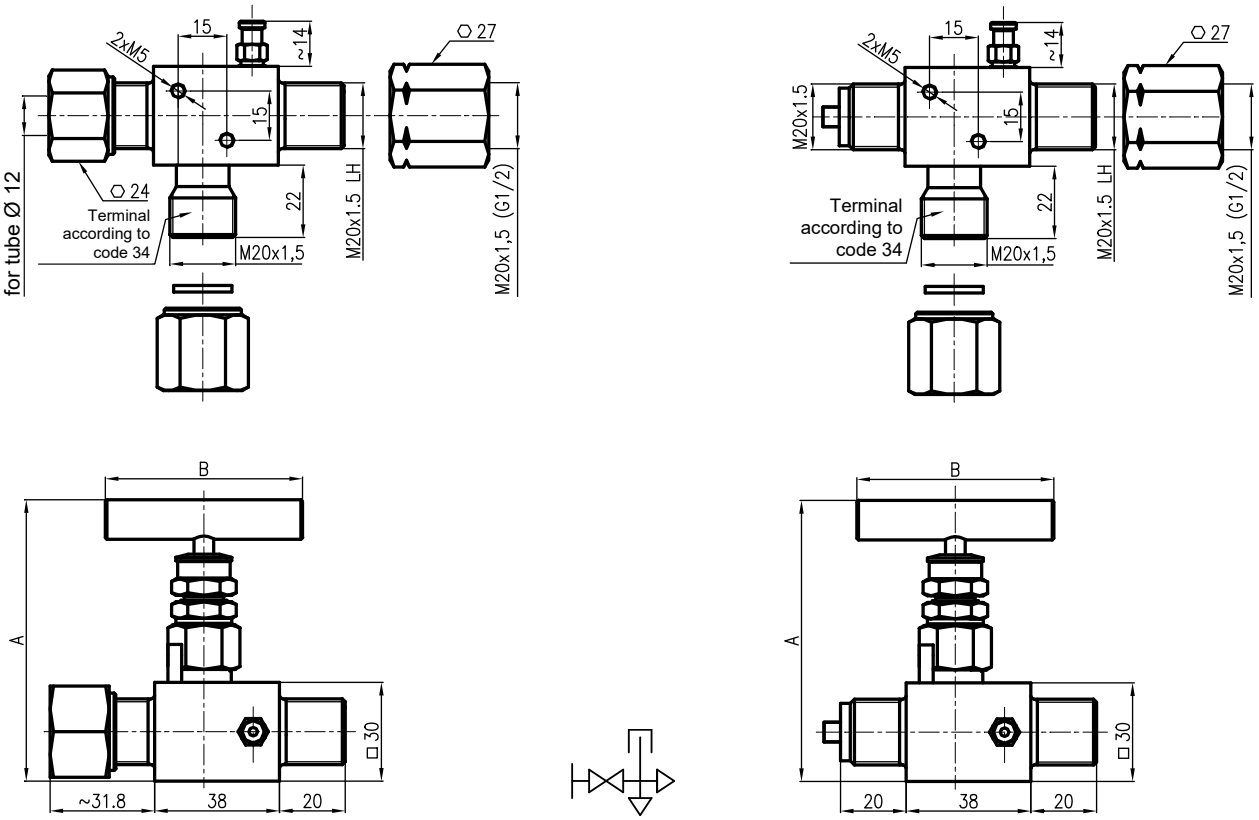
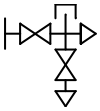


FIGURE 6 - MANOMETRIC TESTING VALVE WITH CLOSING THE CONTROL SAMPLING WITH VALVE 967 52 31 33, 967 52 31 39, 967 52 35 33 AND 967 52 35 39,

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

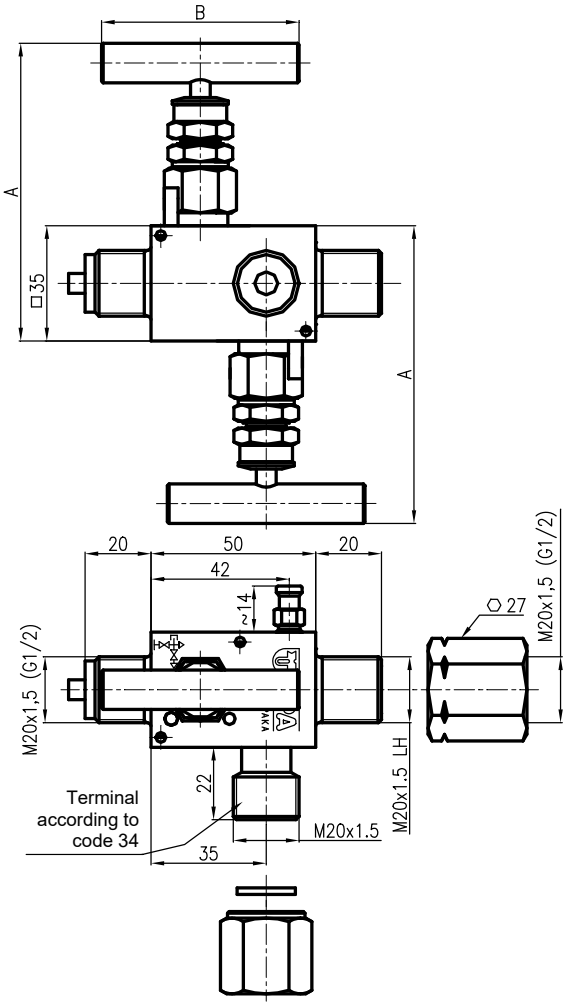
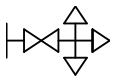
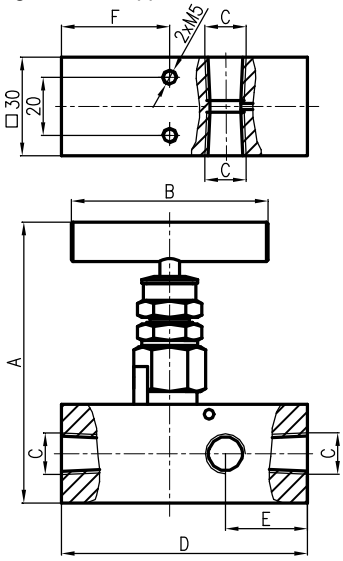


FIGURE 7 - MANOMETRIC VALVE WITH INNER THREADS 967 61 .., dimensional drawing, scheme, application

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 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 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.

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.

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

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.

WARRANTY

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

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 accordance with applicable legislation.

October 2017

ZPA Nová Paka, a.s.
Pražská 470
509 39 Nová Paka
tel.: spojovatel: 493 761 111
fax: 493 721 194
e-mail: obchod@zpanp.cz
www.zpanp.cz
bankovní spojení: ČSOB HK
číslo účtu: 271 992 523/300
IČO: 46 50 48 26
DIČ: CZ46504826