



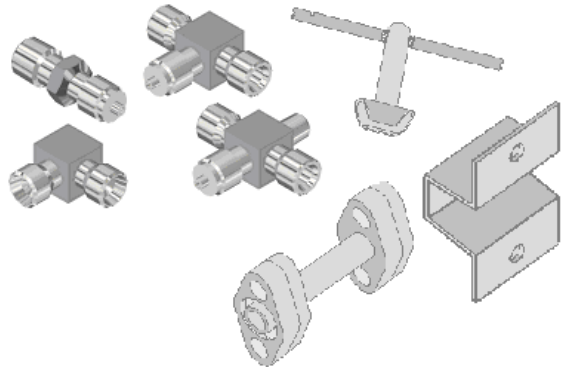
Accessories to pressure sensors, manifolds and valves

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 For the environment, where mechanical resistance is required pursuant to EN 60068-2-6 (class AH2 pursuant to 33 2000-5-51) and seismic capability of the electrical equipment of the safety system of the nuclear power plants pursuant to IEC 980 (MVZ level SL-2).
 - o As special design in the grade of purity for oxygen (O₂), this armature is delivered perfectly degreased and provided with suspended blue tag (code P2S)
 - o For industrial environment with high concentration of SO₂ 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)



OPERATING CONDITIONS

The accessories are designed for the environment defined by the group of parameters and their severity grades IE36/3C4 for SO₂ according to 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 EN 60068-2-52, severity grade 2.

Relative ambient humidity:

10 to 100 % with condensation with upper limit of water content 29 g H₂O/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
- Product ordering number
- (Serial 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 O₂ (only in case of armature with code P2S)

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 according to EN 10204 for the material with the heat number
- Declaration of Conformity with the purchase order 2.1 according to EN 10204
- Test report about the seismic and the vibration qualification
- Copy or the report of the environment resistance test
- Declaration of Conformity of the supplier according to 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 O₂, 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 SO₂ 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).

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
- 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.

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:

Weld-on cone
981 KU3 - 20 pcs

Special request:

Manometric shock absorber
981TL1 – 20 pcs
with threads G1/2 at inlet and outlet

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	Stainless steel	1.4541		
KU3	Heat-resistant steel	15 128		
KU4	Carbon steel	1.0569	7	
KKU4	Carbon steel	1.0569	10	
KU5	Stainless steel	1.4541	7	
KKU5	Stainless steel	1.4541	10	
KU6	Heat-resistant steel	15 128	7	
KKU6	Heat-resistant steel	15 128	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
Stainless 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

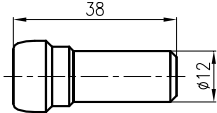
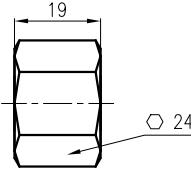
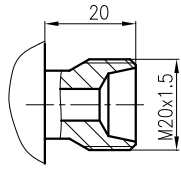
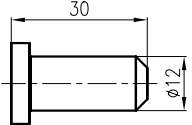
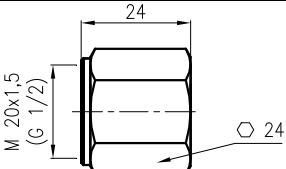
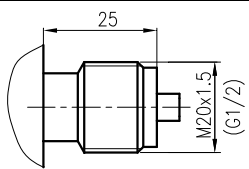
CODE	MATERIAL	DIMENSIONAL DRAWING
ZKU1	Carbon steel 1.0569	
<p>The cone is delivered by 1 pc together with the applicable cap-nut. After putting the cap nut on the cone, the armature provided with the corresponding screw joint for the cone according to the dimensional drawing of the screw joint can be attached to the cone.</p> <p>CAP-NUT FOR BLINDING CONE</p>		
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	Stainless steel 1.4541		
NA2	M20x1.5			
NAG2	G1/2			
NA3	M20x1.5			
NAG3	G1/2			
NA4	M20x1.5			Carbon steel 1.0569
NAG4	G1/2	Stainless steel 1.4541		
NA5	M20x1.5			
NAG5	G1/2			
NA6	M20x1.5			
NAG6	G1/2			
<p>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.</p> <p>CAP-NUT FOR WELD-ON SLEEVE</p>				
MATERIAL OF NUT	DIMENSIONAL DRAWING OF NUT	DIMENSIONAL DRAWING OF SCREW-JOINT		
Stainless 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 codes 32, 33, 36, 39 and 40.

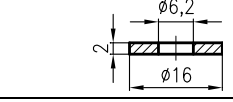
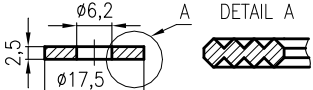
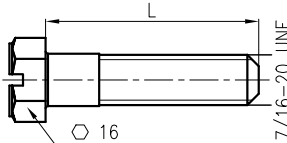
ORDERING NUMBER SEALING	MATERIAL	DIMENSIONAL DRAWING
382 041	Al EN AW-1050A	
276 067	Cu 42 3005	
382 063	Steel 1.4541	
382 096	Steel 1.4404	

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	Stainless 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		<p>Drain piping is designed for the installation for five-way manifold of type 964 and 984.</p> <p>Installation procedure:</p> <ol style="list-style-type: none"> Grease the thread M12 × 1.5 with grease for high temperatures. Insert sealing rings according to the medium temperature into the sealing grooves of the drain piping and slide the piping on the drain screw. 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⁾		<p>Drain piping is designed for the installation for five-way manifold of type 964.</p> <p>Installation procedure:</p> <ol style="list-style-type: none"> 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. Insert the sealing rings pursuant to the medium temperature into the sealing grooves of the drain piping and slide the piping on the reduction. 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	<p>The adjustable angular screw joint enables discretionary rotation of the body with weld-on terminal for threaded rings on a tube with \varnothing 10 mm. After an agreement with the manufacturer, it can be delivered with threaded rings of different dimensions or with a different terminal.</p> <p>Realize the installation of threaded rings according to Figure 18 - TERMINALS WITH THREADED RINGS .</p> <p>Material of screw-joint: stainless steel 1.4541 Material of sealing: aluminium EN AW-1050A</p>	

FIGURE 7 - COUPLING SA5

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

FIGURE 8 - SCREW-JOINT SA6, SA7, SA8

CODE	APPLICATION	DIMENSIONAL DRAWING
SA6	<p>The screw joint enables to connect an armature with internal thread G1/4 and a tube with \varnothing 10 mm, which is welded.</p>	
SA7	<p>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.</p>	
SA8	<p>Material of screw-joint: stainless steel 1.4541 Material of sealing: aluminium EN AW-1050A</p>	

FIGURE 9 - PUT-ON CONTROL HANDLE

CODE	APPLICATION	DRAWING
KL1	<p>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.</p>	

FIGURE 10 - HOLDER FOR INSTALLATION OF MANIFOLDS AND DRAIN TANKS

CODE	APPLICATION	DIMENSIONAL DRAWING																				
B3	<p>The holder is delivered as default together with the manifold of type 964 and 984 in the design for the installation between impulse piping.</p> <p>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.</p>																					
B4	<p>The holder is delivered if it has been required in the purchase order. It is used e.g. when replacing the old Bulgarian manifolds.</p> <p>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.</p>																					
B6	<p>The holder is used for the installation of the drain tank of type 986.</p> <table border="1"> <thead> <tr> <th>POSITIO N</th> <th>PART</th> <th>MATERIAL</th> <th>NUMB ER</th> </tr> </thead> <tbody> <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> </tbody> </table>	POSITIO N	PART	MATERIAL	NUMB ER	1	Holder	11 373	1 pc	2	Yoke	1.4541	1 pc	3	Nut ISO4034-M8-5-A2K		2 pcs	4	Washer 8 ČSN 02 1740.05		2 pcs	
POSITIO N	PART	MATERIAL	NUMB ER																			
1	Holder	11 373	1 pc																			
2	Yoke	1.4541	1 pc																			
3	Nut ISO4034-M8-5-A2K		2 pcs																			
4	Washer 8 ČSN 02 1740.05		2 pcs																			

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 stainless 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.

CODE	MATERIAL OF O-RINGS	DRAWING
H1	FPM (-20 to +250°C)	
H2	NBR (-30 to +125°C)	
H3	EPDM (-45 to +110°C)	

FIGURE 12 - QUICK COUPLING EMA3

CODE	APPLICATION AND INSTALLATION	DRAWING
EMA3	<p>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</p> <p>Installation procedure:</p> <ol style="list-style-type: none"> 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 <p>Thread from the side of the sensor is M16x2. The quick coupling is made of stainless steel 1.4571.</p>	

FIGURE 13 - MANOMETRIC SHOCK ABSORBER

CODE	APPLICATION AND INSTALLATION	DRAWING
TL1	<p>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.</p> <p>Installation:</p> <p>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.</p> <p>During the installation and the operation, it shall be ensured that no mechanical impurities could enter the shock absorber.</p> <p>The manometric shock absorber is made of corrosion resistant steel 1.4541. It is delivered including 2 pcs of the aluminium sealing.</p> <p>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.</p>	

FIGURE 14 - MANOMETRIC PLUG

The plugs are made of stainless steel 1.4541.

CODE	APPLICATION AND INSTALLATION	DIMENSIONAL DRAWING
TZ1	<p>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.</p> <p>Installation procedure:</p> <ol style="list-style-type: none"> 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	<p>The plug with venting can be used in flanges of the pressure and pressure difference sensors, manifolds or valves with a corresponding thread.</p> <p>Installation procedure:</p> <ol style="list-style-type: none"> 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	<p>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.</p> <p>Installation procedure:</p> <ol style="list-style-type: none"> 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	<p>The plug with venting can be used in adapters of the pressure and pressure difference sensors, manifolds or valves with a corresponding thread.</p> <p>Installation procedure:</p> <ol style="list-style-type: none"> 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	SURFACE FINISH	DIMENSIONAL DRAWING
NP1	M20x1.5 / M20x1.5 LH	Stainless steel 1.4541	silver coating	
NP2	M20x1.5 / M20x1.5 LH	Carbon steel 11 109	zinc coating	
NP3	G1/2 / M20x1.5 LH	Stainless steel 1.4541	silver coating	
NP4	G1/2 / G1/2 LH	Stainless steel 1.4541	silver coating	
NP5	M20x1.5 / M20x1.5 LH	Stainless steel 1.4541	-	
NP6	M20x1.5 / M20x1.5 LH	Carbon steel 11 109	oiled	
NP7	G1/2 / M20x1.5 LH	Stainless steel 1.4541	-	
NP8	G1/2 / G1/2 LH	Stainless steel 1.4541	-	

FIGURE 16 - MANOMETRIC REDUCTION

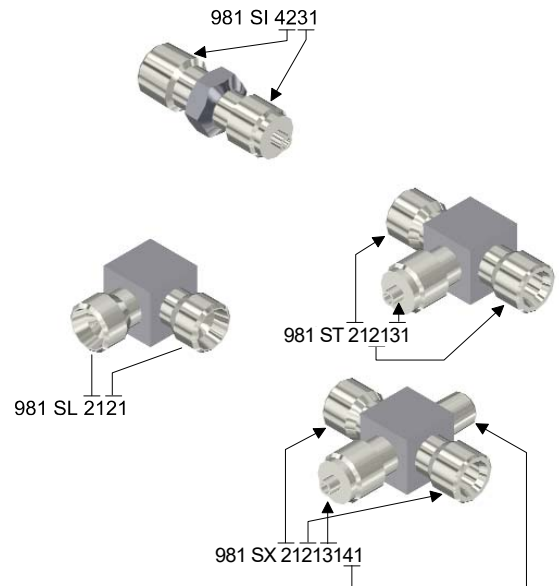
CODE	APPLICATION	DIMENSIONAL DRAWING
TR3	<p>It is mostly used to connect the manometer with the thread 1/2-14 NPT to the sleeve with a nut M20x1.5. The sleeve with cap-nut and sealing can be ordered according to Figure 3.</p> <p>Material of the manometric reduction: stainless steel 1.4541</p>	

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 aabccc		1 pc coupling 981 ST 212131
SX aabccddd		1 pc coupling 981 SX 21213141



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

Material of coupling: stainless 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		<p align="center">TERMINALS WITH THREADED RINGS</p> <p>By means of a cap nut and two rings, a drawn, seamless tube made of plain carbon steel, alloy steel or stainless steel with the diameter 6, 8, 10, 12, 14, 16, 18, 20 and 22 mm with tolerance of the outer diameter and ovality of ± 0.3 mm can be connected in a way that enables further uninstallation.</p> <p>FIRST INSTALLATION:</p> <ol style="list-style-type: none"> 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!! Insert the end of the tube with rings up to the bottom of the connecting sleeve and tighten the cap nut by hand. By means of the torque wrench tighten the cap nut with the torque according to the following table: <table border="1"> <tr> <td>Tube diameter [mm]</td> <td>6</td> <td>8</td> <td>10</td> <td>12</td> <td>14</td> <td>16</td> <td>18</td> <td>20</td> <td>22</td> </tr> <tr> <td>Torque [Nm]</td> <td>30</td> <td>40</td> <td>50</td> <td>55</td> <td>65</td> <td>75</td> <td>85</td> <td>90</td> <td>100</td> </tr> </table> <ol style="list-style-type: none"> 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. <p>UNINSTALLATION + REPEATED INSTALLATION:</p> <ol style="list-style-type: none"> The uninstallation shall be realized by complete unscrewing of the cap nut after pressure has been completely discharged from the system. Before repeated installation, check cleanness of the tube, threads and all sealing surfaces and pay attention to any possible damage. Rotation of the front threaded ring on the tube is not a defect! To ensure correct function, it is 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. 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. By means of a torque wrench, tighten the cap nut by torque pursuant to the following table: <table border="1"> <tr> <td>Tube diameter [mm]</td> <td>6</td> <td>8</td> <td>10</td> <td>12</td> <td>14</td> <td>16</td> <td>18</td> <td>20</td> <td>22</td> </tr> <tr> <td>Torque [Nm]</td> <td>25</td> <td>35</td> <td>40</td> <td>50</td> <td>55</td> <td>65</td> <td>70</td> <td>80</td> <td>85</td> </tr> </table> <p>WARNING: <u>THE CAP NUT MAY NEVER BE TIGHTENED (RELEASED) UNDER PRESSURE – it can cause lethal injury!!!</u> 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.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> <p>The tube to be connected shall be fully inserted up to the bottom of the sleeve</p> <p>Minimum length of direct part of tube</p> </div> </div>	Tube diameter [mm]	6	8	10	12	14	16	18	20	22	Torque [Nm]	30	40	50	55	65	75	85	90	100	Tube diameter [mm]	6	8	10	12	14	16	18	20	22	Torque [Nm]	25	35	40	50	55	65	70	80	85
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FIGURE 18 - CONNECTING TERMINALS, continuation from the previous page

CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
21		<p align="center">SCREW-JOINT FOR A CONE</p> <ol style="list-style-type: none"> Put a cap nut on the cone Weld the cone on the end of tube Screw the tube to the sleeve with a nut and tighten with torque of max. 120 Nm <p>Cone with cap-nut can be ordered according to Figure 1.</p>
22		<p align="center">WELD-ON CONE WITH CAP-NUT M20x1.5</p> <p>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.</p>
23		<p align="center">WELD-ON CONE WITH CAP-NUT M22x1.5</p> <p>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.</p>
31		<p align="center">MANOMETRIC SCREW-JOINT M20x1.5</p> <ol style="list-style-type: none"> Put a cap nut on the sleeve Weld the sleeve on the end of tube Put a metal sealing on the screw joint Screw the piping to the screw joint by means of a nut and tighten with torque of max. 120 Nm <p>The sleeve with cap-nut and sealing can be ordered according to Figure 3.</p>
32		<p align="center">WELD-ON SLEEVE WITH CAP-NUT M20x1.5</p> <p>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.</p>
33		<p align="center">SCREW-JOINT WITH MANOMETRIC COUPLING M20x1.5 LH / M20x1.5</p> <p>The screw joint is used to connect the manometer or valve with manometric screw joint M20x1.5</p> <ol style="list-style-type: none"> 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. 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		<p align="center">TEST SCREW-JOINT M20x1.5</p> <p>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.</p>
35		<p align="center">MANOMETRIC SCREW-JOINT G1/2</p> <ol style="list-style-type: none"> Put a cap nut on the sleeve Weld the sleeve on the end of tube Put a metal sealing on the screw joint Screw the piping to the screw joint by means of a nut and tighten with torque of max. 120 Nm <p>The sleeve with cap-nut and sealing can be ordered according to Figure 3.</p>
36		<p align="center">WELD-ON SLEEVE WITH CAP-NUT G1/2</p> <p>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.</p>
37		<p align="center">WELD-ON SLEEVE WITH CAP-NUT M20x1.5 WITH SEALING ACCORDING TO THE STANDARD SHELL</p> <p>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.</p>
38		<p align="center">MANOMETRIC SCREW-JOINT G1/4</p> <ol style="list-style-type: none"> Put a cap nut on the sleeve Weld the sleeve on the end of tube Put a metal sealing on the screw joint (not a part of the delivery) Screw the piping to the screw-joint with the use of a nut and tighten with torque of max. 120 Nm <p>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.</p>

FIGURE 18 - CONNECTING TERMINALS, continuation from the previous page

CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
39		<p>SCREW-JOINT WITH MANOMETRIC CONNECTION M20x1.5 LH / G1/2</p> <p>The screw-joint is used for the connection of the manometer or valve with the manometric screw-joint G1/2</p> <ol style="list-style-type: none"> 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		<p>SCREW-JOINT WITH MANOMETRIC CONNECTION G1/2 LH / G1/2</p> <p>The screw-joint is used for the connection of the manometer or valve with the manometric screw-joint G1/2</p> <ol style="list-style-type: none"> 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		<p>EXTERNAL THREAD 1/4 - 18 NPT</p> <ol style="list-style-type: none"> 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		<p>EXTERNAL THREAD 1/2 - 14 NPT</p> <ol style="list-style-type: none"> 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		<p>EXTERNAL THREAD 3/8 - 18 NPT</p> <ol style="list-style-type: none"> 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		<p>INTERNAL THREAD 1/4 - 18 NPT</p> <p>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.</p> <ol style="list-style-type: none"> 1. Wind up sealing tape from PTFE on a corresponding external thread 2. Screw-joint tighten with torque of max. 28 Nm
52		<p>INTERNAL THREAD 1/2 - 14 NPT</p> <p>The thread is cut out directly in the basic body.</p> <ol style="list-style-type: none"> 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		<p>INTERNAL THREAD 1/2 - 14 NPT</p> <p>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.</p> <ol style="list-style-type: none"> 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		<p>INTERNAL THREAD 1/2 - 14 NPT</p> <p>The thread is cut out in the weld-on terminal.</p> <ol style="list-style-type: none"> 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		<p>EXTERNAL THREAD G1/4</p> <ol style="list-style-type: none"> 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		<p>EXTERNAL THREAD G1/2</p> <ol style="list-style-type: none"> 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		<p>EXTERNAL THREAD G3/8</p> <ol style="list-style-type: none"> 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		<p>INTERNAL THREAD G1/2</p> <p>The thread is cut out in the weld-on terminal.</p> <ol style="list-style-type: none"> 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

The installation and commissioning for design for O₂ 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"/

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

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

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.



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