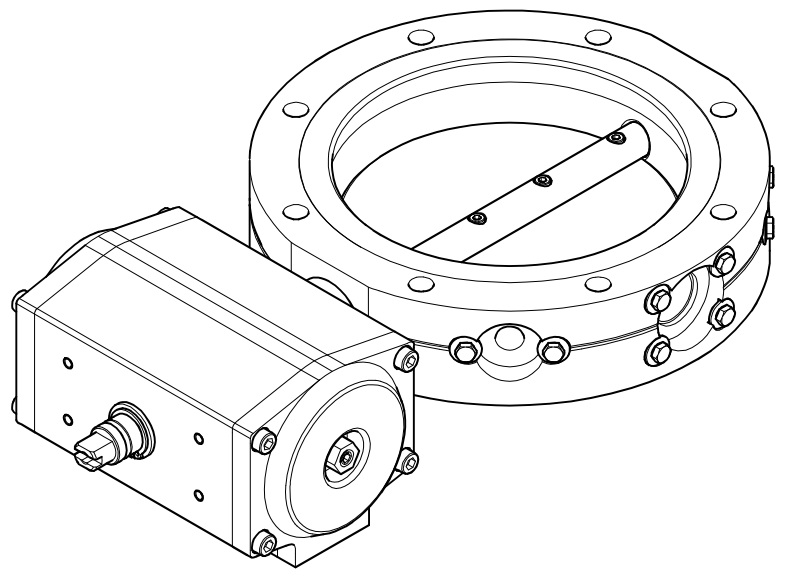


# Butterfly Valve

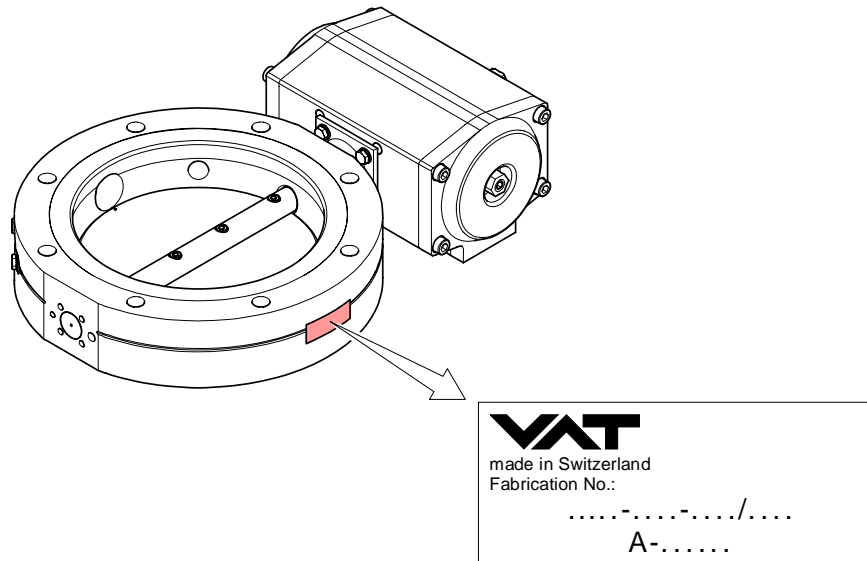
pneumatically actuated

21044-PE.4-.....



## Product Identification

In all communications with VAT, please specify the information on the product nameplate. For convenient reference copy that information into the space provided below:



## Validity

This document applies to products with part numbers  
21044-PE14-....

and the versions

21044-PE24-.... (with position indicator)

21044-PE44-.... (with position indicator and 24 VDC pilot valve)

The part number (PN) can be taken from the product nameplate.

If not indicated otherwise in the legends, the illustrations in this document correspond to the valve 21044-PE.4-....

We reserve the right to make technical changes without prior notice.

All dimensions are indicated in mm.

## Intended Use

The Butterfly Valves 21044-PE.4-.... are pneumatically actuated valves for high vacuum applications.

## Functional Principle

The valve is opened and closed by the rotary motion of the pneumatic actuator.

## Description

The valves have stainless steel housings. The 21044-PE.4-000. has radially arranged small flange connections for the bypass line, gauge and/or vent valve. This type allows for installing the actuator assembly on the opposite side of the valve if required.

A position indicator providing electrical signals for the two final positions of the valve plate as well as a pilot valve for electropneumatic actuation of the valve are available as accessories.

## Scope of Delivery

- 1x Butterfly Valve
- 1x Operating Manual German
- 1x Operating Manual English

## Contents

Product Identification	2
Validity	2
Intended Use	2
Functional Principle	2
Description	2
Scope of Delivery	2
<b>1 Safety</b>	<b>4</b>
1.1 Symbols Used	4
1.2 Personnel Qualifications	4
1.3 General Safety Instructions	4
1.4 Liability and Warranty	4
<b>2 Technical Data</b>	<b>5</b>
2.1 Butterfly Valves	5
2.2 Pilot Valve (Accessory)	6
2.3 Position Indicator (Accessory)	6
2.4 Dimensions [mm]	7
<b>3 Installation</b>	<b>9</b>
3.1 Accessibility of the Actuator	9
3.2 Vacuum Connection of the 21044-PE.4-000.	10
3.3 Vacuum Connections of the 21044-PE.4-....	12
3.4 Compressed Air Connections	13
3.4.1 For Central Compressed Air Control System	14
3.4.2 For Pilot Valve (Accessory)	16
3.4.2.1 Voltage Rating	16
3.4.2.2 Pilot Valve	16
3.4.2.3 Power Connection	19
3.5 Position Indicator (Accessory)	21
<b>4 Operation</b>	<b>24</b>
<b>5 Deinstallation</b>	<b>27</b>
5.1 Power Connections	27
5.2 Compressed Air Connections	28
5.3 Vacuum Connections	29
5.3.1 21044-PE.4-000.	30
5.3.2 21044-PE.4-....	32
<b>6 Maintenance/Repair</b>	<b>33</b>
6.1 Minor Maintenance Work	34
6.2 Major Maintenance Work	35
6.2.1 Disassembling the Valve	35
6.2.2 Cleaning the Valve	39
6.2.3 Reassembling the Valve	39
6.2.4 Adjusting the Actuator (Spare Part)	49
6.2.5 Installing the Position Indicator	57
6.2.6 Valve 21044-PE.4-.....: Placing the O-ring in the Sealing Groove of the Housing	58
<b>7 Accessories</b>	<b>59</b>
<b>8 Spare Parts</b>	<b>60</b>
<b>9 Consumables</b>	<b>60</b>
<b>10 Returning the Product</b>	<b>61</b>
<b>11 Disposal</b>	<b>61</b>

For cross-references within this document, the symbol (→  XY) is used.

# 1 Safety

## 1.1 Symbols Used

**DANGER**

Information on preventing any kind of physical injury.

**WARNING**

Information on preventing extensive equipment and environmental damage.

**Caution**

Information on correct handling or use. Disregard can lead to malfunctions or minor equipment damage.



## 1.2 Personnel Qualifications

**Skilled personnel**

All work described in this document may only be carried out by persons who have suitable technical training and the necessary experience or who have been instructed by the end-user of the product.

## 1.3 General Safety Instructions

- Adhere to the applicable regulations and take the necessary precautions for the process media used.  
Consider possible reactions between the materials (→ 5) and the process media.
  - Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.
  - Before beginning to work, find out whether any vacuum components are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.
- Communicate the safety instructions to all other users.

## 1.4 Liability and Warranty

VAT assumes no liability and the warranty becomes null and void if the end-user or third parties

- disregard the information in this document
- use the product in a non-conforming manner
- make any kind of interventions (modifications, alterations etc.) on the product
- use the product with accessories, spare parts and consumables not listed in the corresponding product documentation.

The end-user assumes the responsibility in conjunction with the process media used.

Failures due to contamination or wear and tear, as well as expendable parts (e.g. seals, actuator), are not covered by the warranty.

## 2 Technical Data

### 2.1 Butterfly Valves

	21044-PE.4-000.	21044-PE.4-.....
Vacuum connections		
Axially arranged vacuum connections		DN 160 ISO-F
Radially arranged vacuum connections	1x DN 25 ISO-KF 2x DN 10 ISO-KF	
Mounting orientation	any	
Cycles to first maintenance	1.5 million <sup>1)</sup>	
Tightness	1x10 <sup>-9</sup> mbar l/s	
Conductance for air		
Molecular flow	3400 l/s	4000 l/s
Pressure range	10 <sup>-8</sup> mbar ... 1.3 bar	
Pressure difference in either direction	1.3 bar	
Actuator		
Functional principle	double action rotary drive	
Initial position	closed	
Compressed air supply		
Compressed air connection (NAMUR)	2x G1/8	
Compressed air pressure	4 ... 6 bar overpressure	
Purity classes	2 4 1 (ISO 8573-1)	
Air cylinder volume	600 cm <sup>3</sup>	
Opening time (at 6 bar overpressure)	550 ms	
Closing time (at 6 bar overpressure)	320 ms	
Ambiance temperature	5 ... 40 °C	
Bakeout temperature		
Housing	150 °C	
Actuator	80 °C	
Materials		
Housing, shaft, valve plate	stainless steel 1.4301	
Seals	FPM	
Weight	≈10 kg	≈8 kg

<sup>1)</sup> Tested at  $\Delta p = 1$  bar under clean conditions.  
If the valve is operated under harsh or dirty conditions, it should be cleaned / maintained before the specified service time to maintenance has been reached.

## 2.2 Pilot Valve (Accessory)

Nominal voltage		230 VAC / 50 Hz
Part number	586579	115 VAC / 60 Hz
	586580	24 VAC / 50 Hz
	586581	24 VDC
	586582	
Valve type		5/2-way pneumatic valve with NAMUR flange connection
Version		normally closed
Power connection		cable socket
Degree of protection		IP65
Pickup power		5.7 VA
Holding power		
DC voltage		2.5 W
AV voltage		2.0 W
Duty cycle		100% (i.e. continuous duty possible)
Compressed air pressure		≤10 bar
Nominal width		4 mm
Compressed air connection		1x G1/4, 2x G1/8
Temperatures		
Ambiance		-25 ... +65 °C
Operation (continuous duty)		+75 °C
Weight (without solenoid coil)		0.25 kg

Accessories →  59.

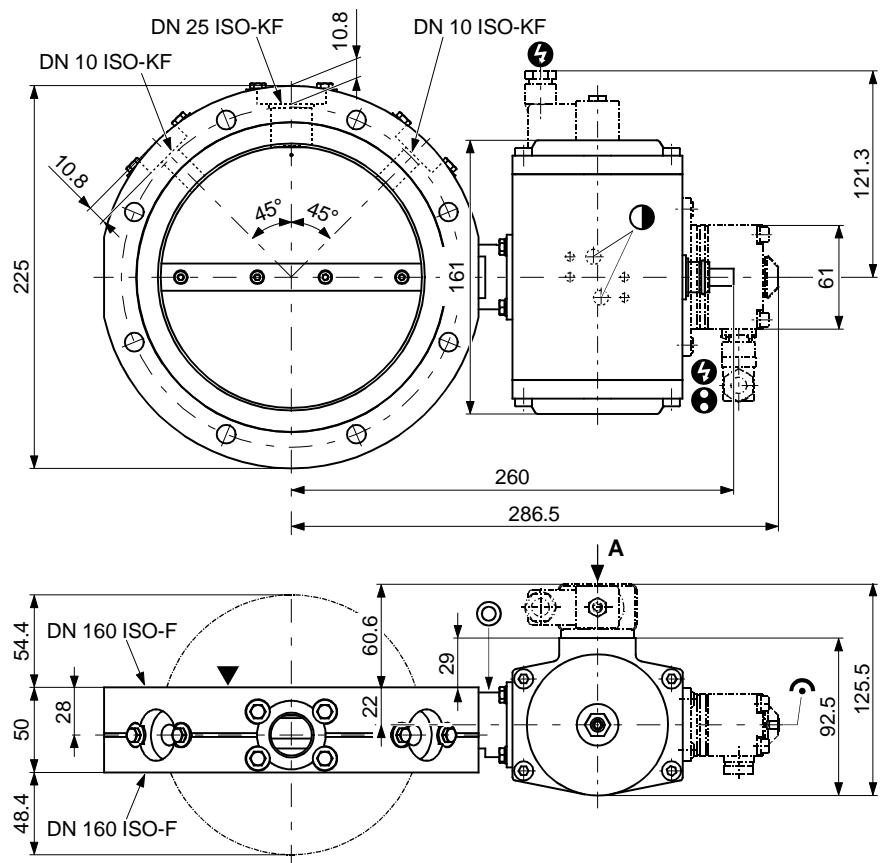
## 2.3 Position Indicator (Accessory)

Supply voltage		250 VAC, 1 A
Mounting orientation		any
Electrical connection		plug M12, 4-pin, DIN EN 61076-2-101
Cable		ø6 ... 8 mm, 0.75 mm <sup>2</sup>
Degree of protection		IP65
Materials		
Housing		PET GF30
Screws		stainless steel A2
Temperatures		
Ambiance		-20 ... +90 °C
Operation		-20 ... +85 °C
Weight		
Without plug		106 g
With plug		130 g

Accessories →  59.

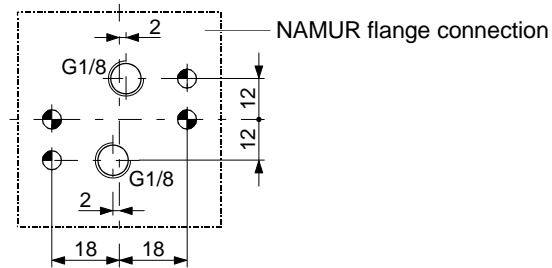
## 2.4 Dimensions [mm]

21044-PE.4-000.



Compressed air connection

**View A**



Threaded tapped hole for code pin (M5x8)

Threaded tapped hole for mounting the pilot valve (M5x8)

Power connection

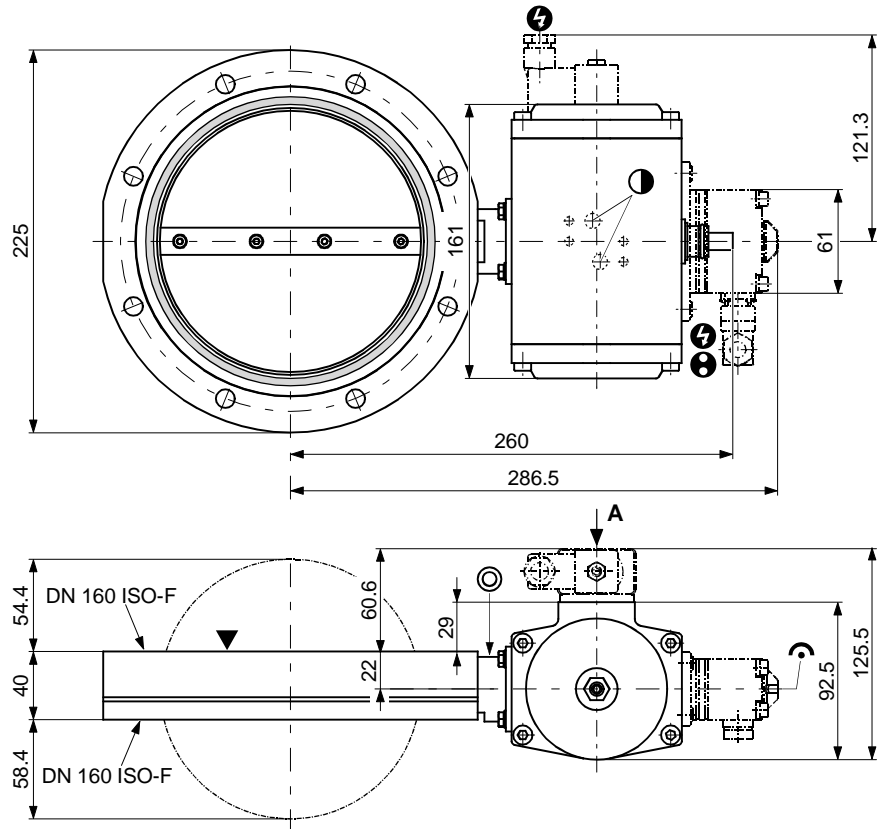
Connection for position indicator

Visual position indicator

Valve seat side

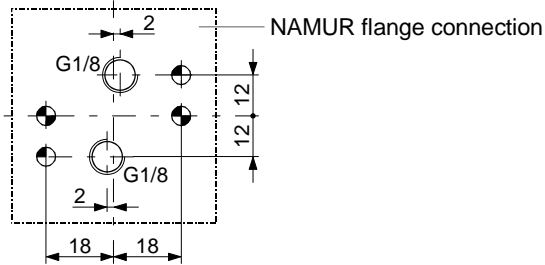
Leak detection opening

21044-PE.4-....



Compressed air connection

**View A**



Threaded tapped hole for code pin (M5x8)

Threaded tapped hole for mounting the pilot valve (M5x8)

Power connection

Connection for position indicator

Visual position indicator

Valve seat side

Leak detection opening



## 3 Installation

**DANGER**

**DANGER:** overpressure in the vacuum system >2.5 bar  
KF flange connections with elastomer seals (e.g. O-rings) cannot withstand such pressures. Process media can thus leak and possibly damage your health.

Use O-rings provided with an outer centering ring.

**Caution**

**Caution:** vacuum component  
Dirt and damages impair the function of the vacuum component.

When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

**Caution**

**Caution:** dirt sensitive area  
Touching the product or parts thereof with bare hands increases the desorption rate.

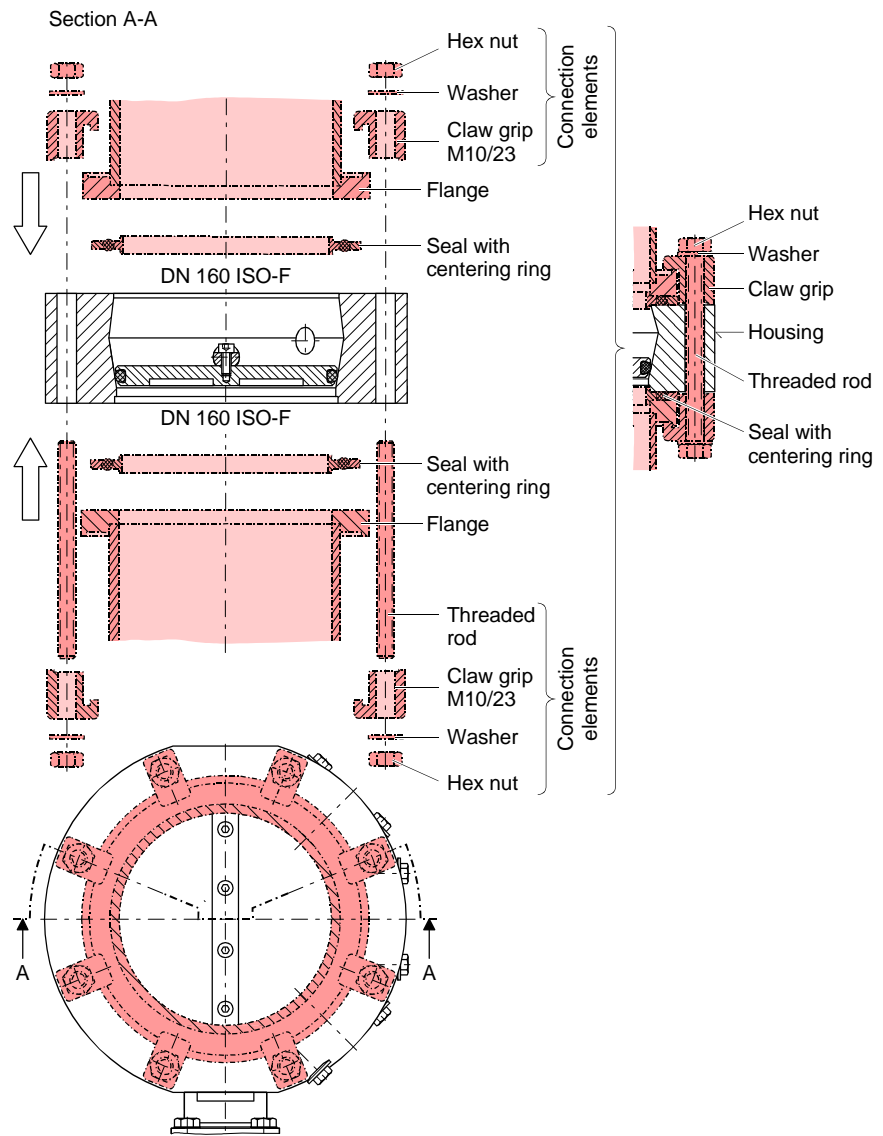
Always wear clean, lint-free gloves and use clean tools when working in this area.

### 3.1 Accessibility of the Actuator

The actuator assembly of the 21044-PE14-000. can be installed on the opposite side of the valve if this improves the accessibility of the actuator (→ 35).

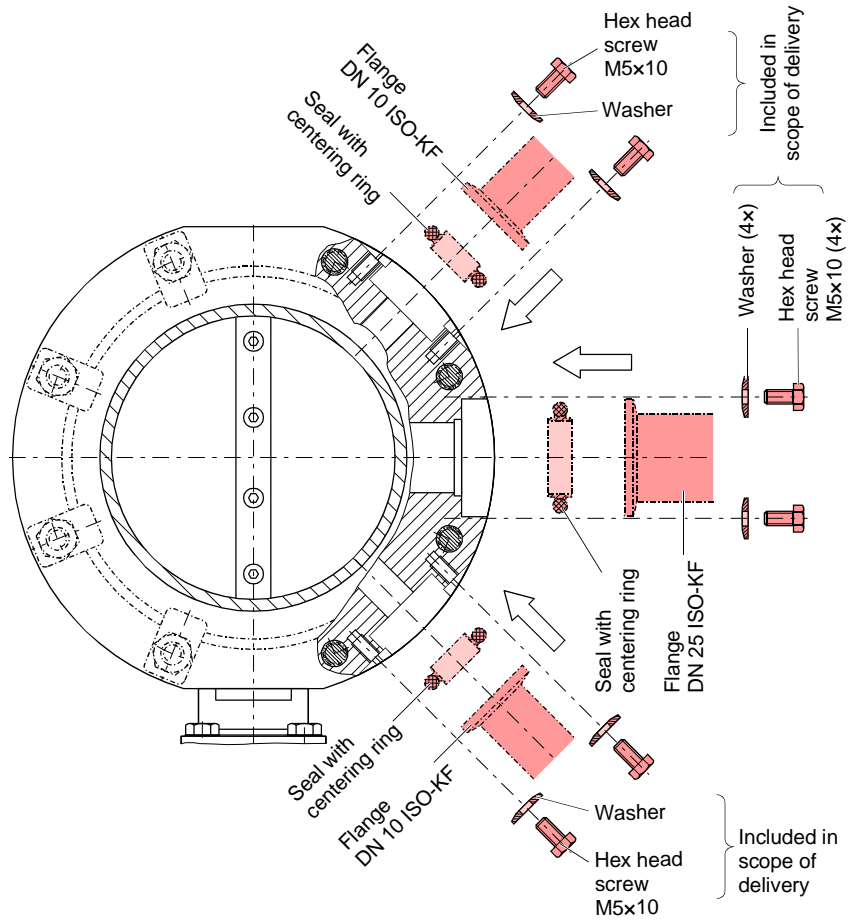
### 3.2 Vacuum Connection of the 21044-PE.4-000.

Axially arranged vacuum connections



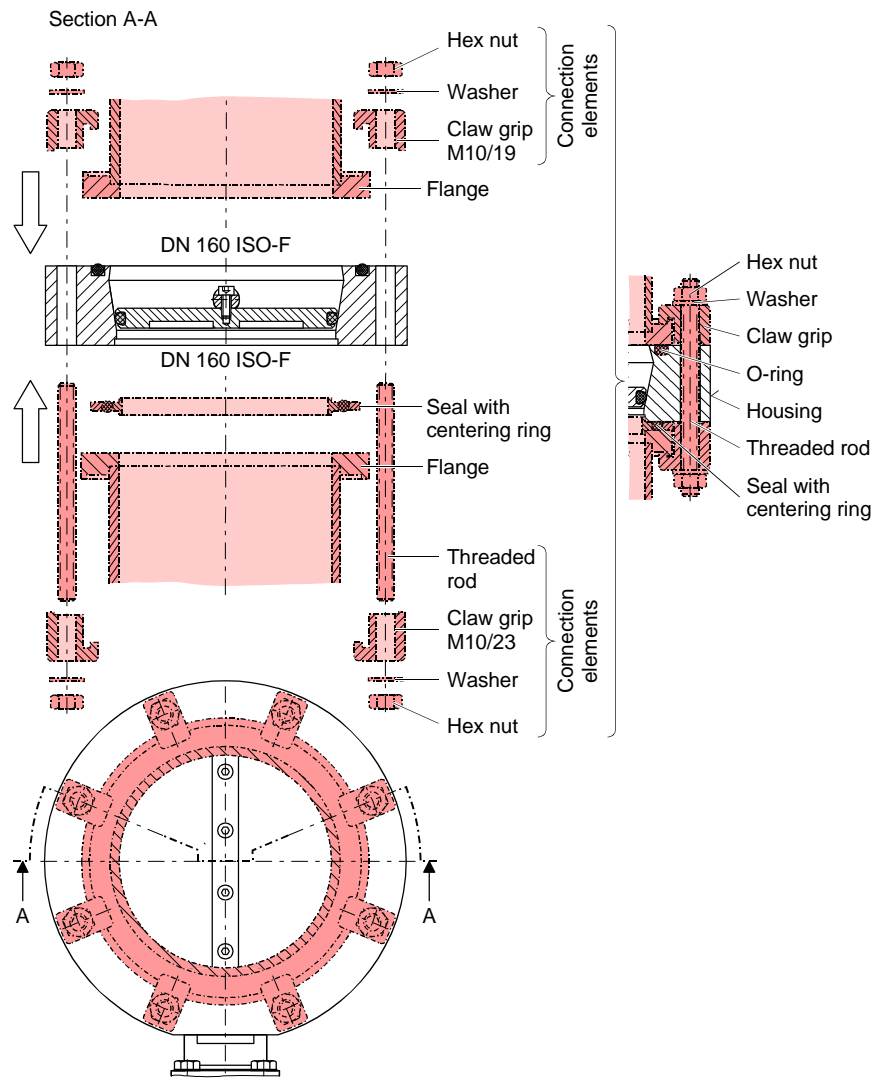
Connection elements → 59.

Radially arranged vacuum connections



Cover the small flange connections that are not used with blanking flanges of the corresponding nominal diameter.

### 3.3 Vacuum Connections of the 21044-PE.4-....



Connection elements → 59.

### 3.4 Compressed Air Connections

**DANGER**

**DANGER: moving parts**  
 When the product is connected to the supply media, parts can start moving. Moving parts can catch parts of the body and cause injuries.

The connection to the compressed air supply may only be established if

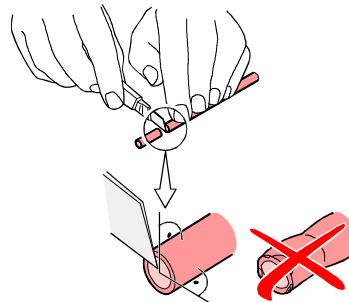
- the compressed air line is not pressurized
- the product is installed in a vacuum system or
- the moving parts are protected to avoid accidental contact.

**DANGER**

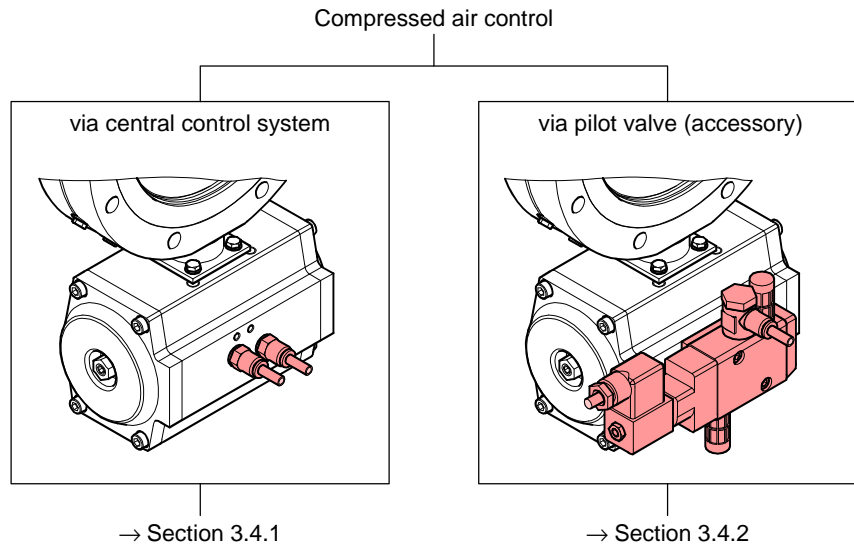
**DANGER: compressed air**  
 Unprofessionally handling compressed air can cause physical injury. Adhere to the relevant regulations and take the necessary precautions when handling compressed air.

- Specifications for the plastic tube:
- OD 6 mm, ID 4 mm
  - bursting pressure  $\geq 10$  bar (overpressure)
  - material: PA soft or PU

- To ensure leak tightness:
- cut the plastic tube orthogonally
  - make sure the outside of the plastic tube is not damaged

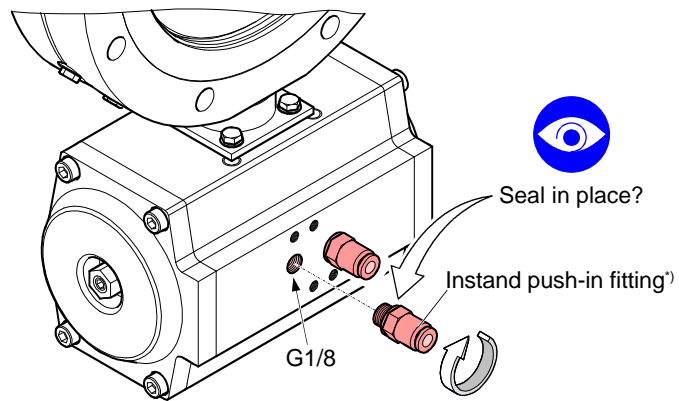


- The compressed air must meet the following specifications:
- Purity classes 2 4 1 (ISO 8573-1)
  - 4 ... 8 bar (overpressure)



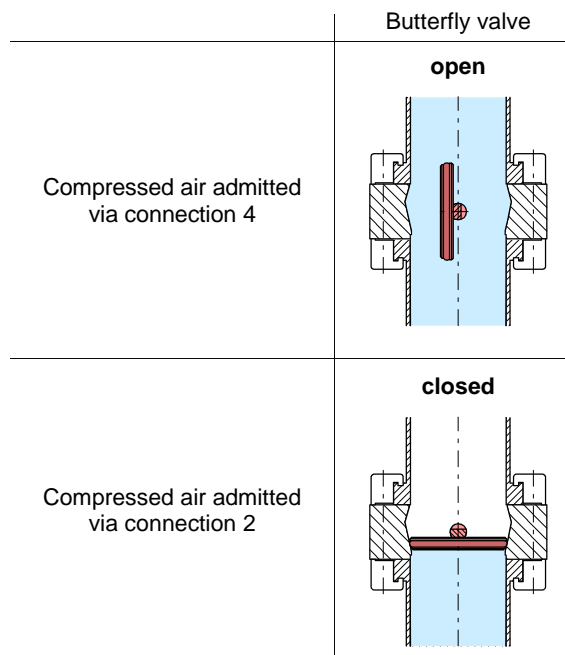
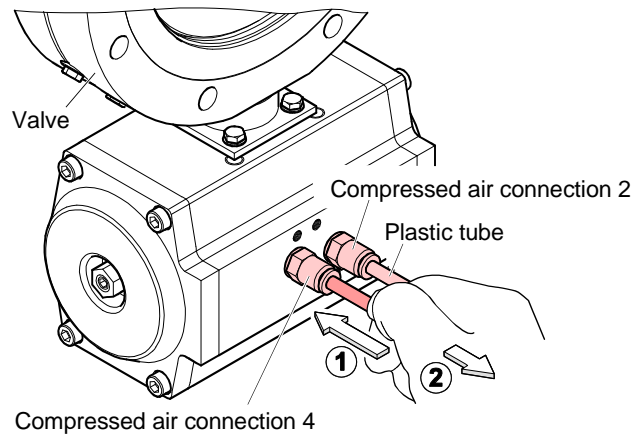
### 3.4.1 For Central Compressed Air Control System

- 1** Screw in the instant push-in fittings.



\*) To be provided by the end-user

- 2** Push the plastic tubes into the instant push-in fittings until the stop position is reached and check for correct mounting by slightly pulling.



### 3.4.2 For Pilot Valve (Accessory)

Accessories → 59.

#### 3.4.2.1 Voltage Rating



#### Caution



Caution: Supply voltage

A wrong supply voltage can destroy the product.

The supply voltage must correspond to the voltage rating of the product (→ solenoid coil). If it does not, please contact your local service center.

#### 3.4.2.2 Pilot Valve

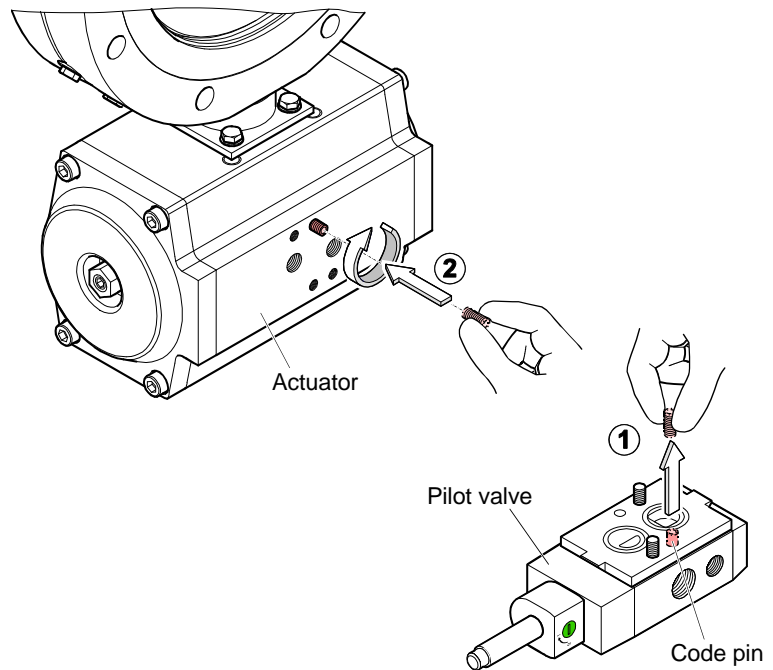
Screwing the pilot valve to the actuator



Pull the code pin out of the pilot valve and manually screw it into the actuator until the stop position is reached.

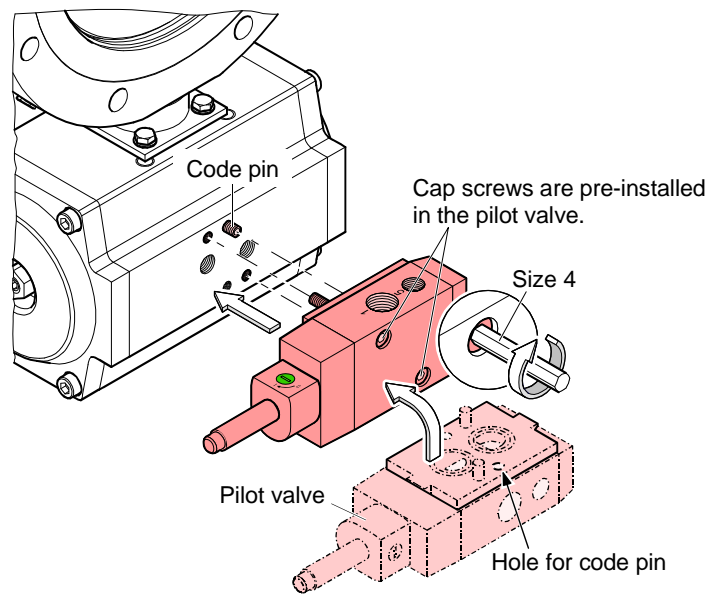


The code pin is now positioned in such a way that the de-energized state of the pilot valve corresponds with the initial position of the actuator (= Butterfly valve "closed").



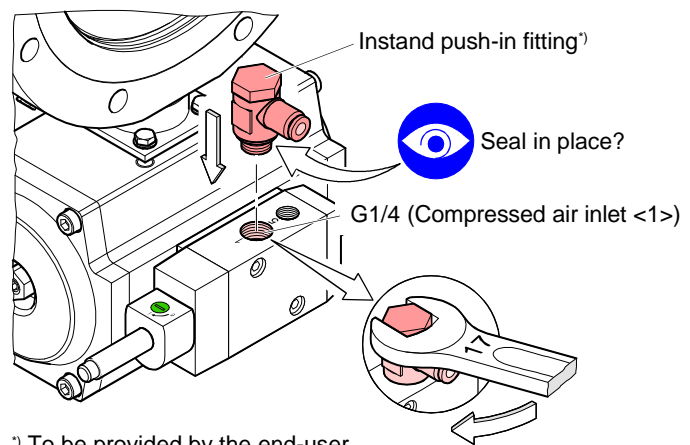


- 2** Place the pilot valve on the actuator and tighten the screws.

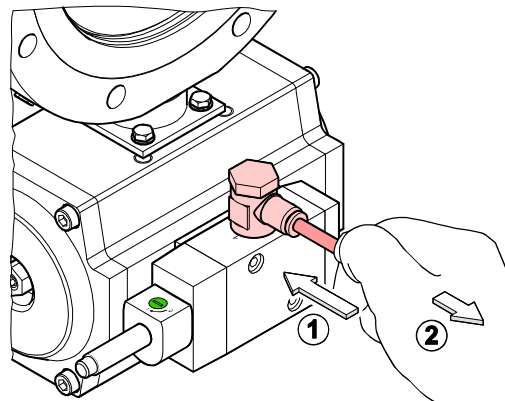


Connecting the compressed air inlet

- 3** Screw the instant push-in fitting into compressed air inlet <1>.



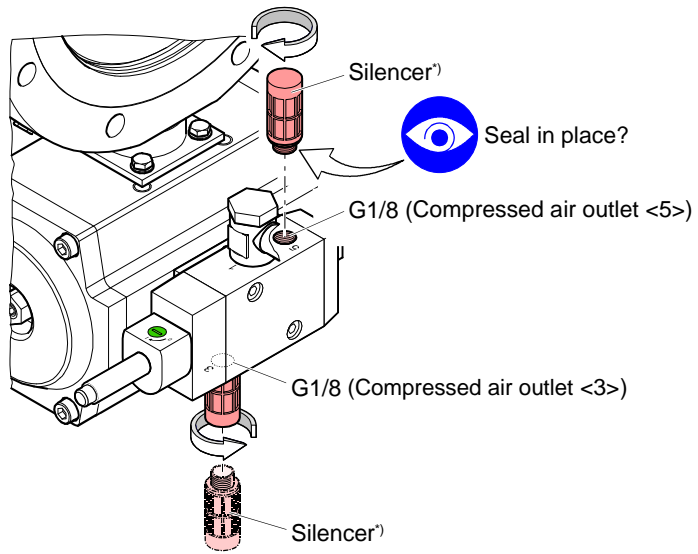
- 4** Push the plastic tube into the instant push-in fitting until the stop position is reached and check for correct mounting by slightly pulling.



Connecting the compressed air outlets

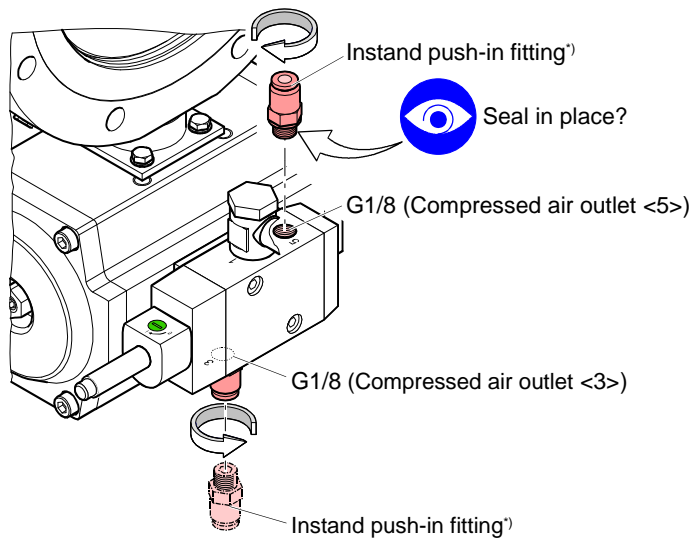
If required ...

- 5** ... close compressed air outlets <3> and <5> with silencers, ...



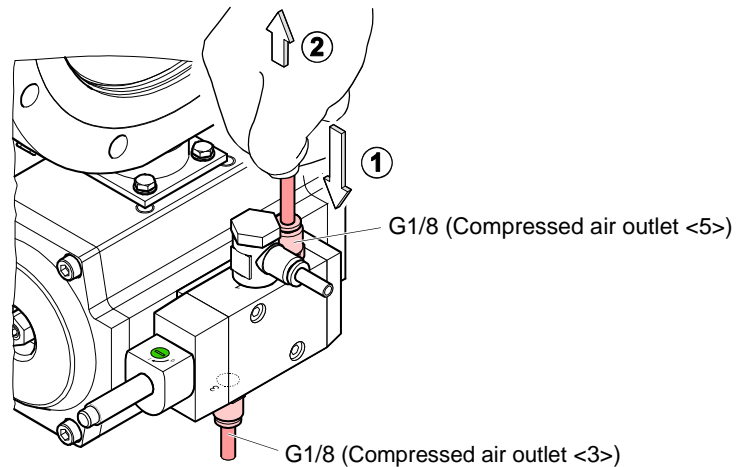
¹) To be provided by the end-user

... or screw in instant push-in fittings for the return lines of the compressed air ...



¹) To be provided by the end-user

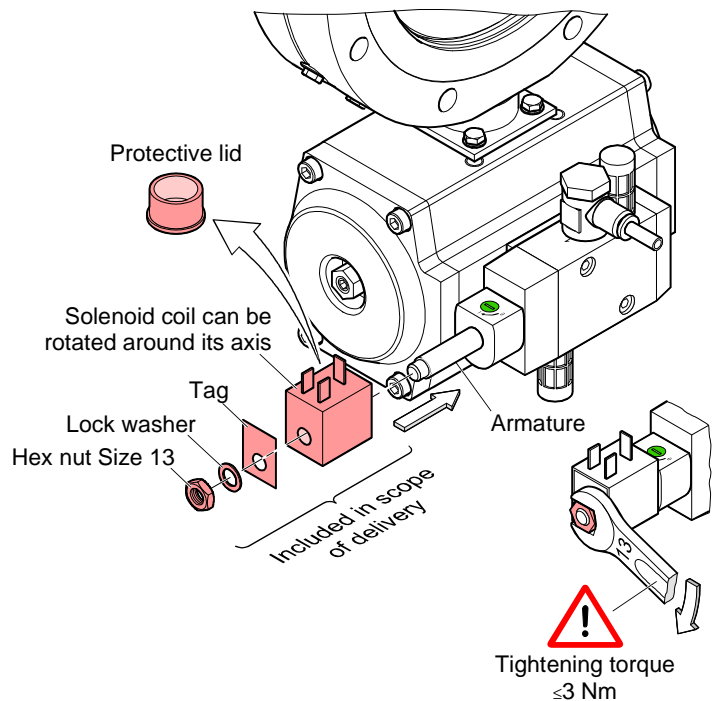
... and push the plastic tubes into the instant push-in fittings until the mechanical stop is reached and check for correct mounting by slightly pulling.



### 3.4.2.3 Power Connection

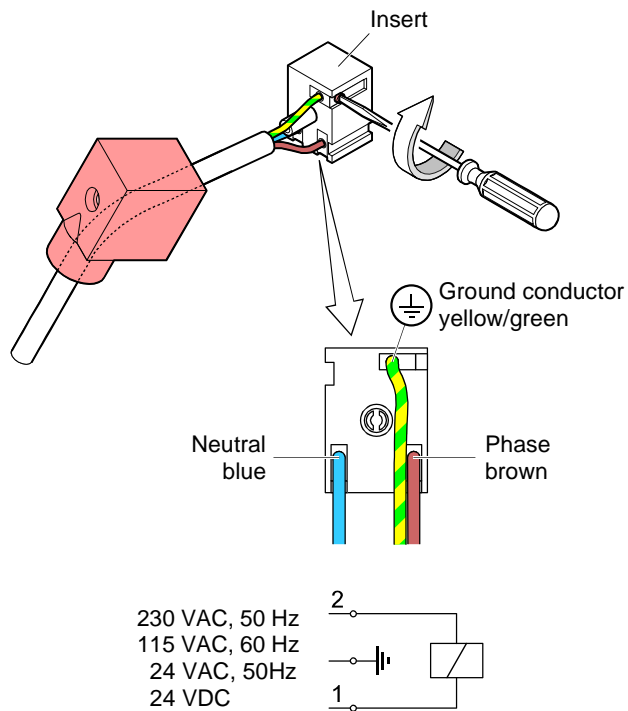
#### Mounting the solenoid coil

- 1 Remove the protective lid.  
Slide the solenoid coil, tag and lock washer on the armature and fix them with the hex nut.



Preparing the cable socket

**2** Prepare the cable socket.



The polarity need not be taken into consideration in the 24 VDC version.  
 For safety reasons, we recommend connecting the ground conductor also in the 24 VDC version.

Connecting the cable socket to the solenoid coil

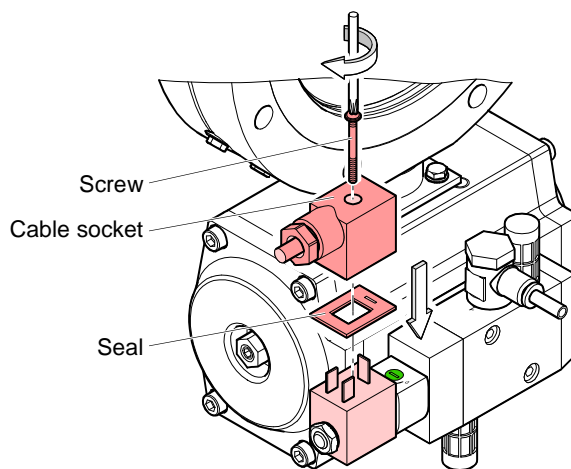
- 3** Mount the seal, plug in the cable socket, and secure it with the screw.

STOP
DANGER

**DANGER: mains voltage (supply voltage)**  
 Incorrectly grounded products can be extremely hazardous in the event of a fault.

Use only a 3-conductor power cable (supply cable) with protective ground. The power connector may only be plugged into a socket with a protective ground. The protection must not be nullified by an extension cable without protective ground.

Before connecting or disconnecting the product, turn off the control system.



### 3.5 Position Indicator (Accessory)

Accessories → 59.

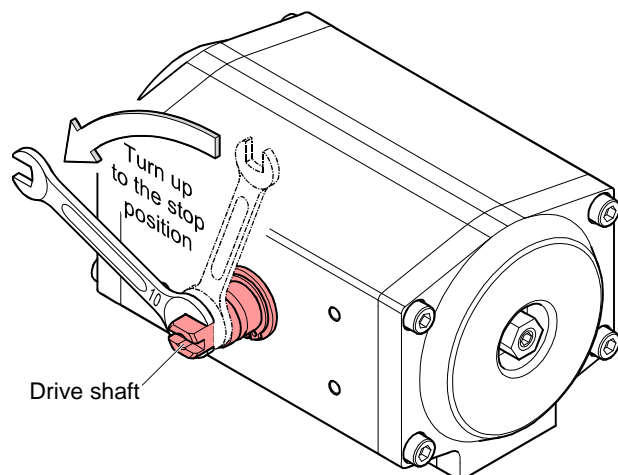
The position indicator signals that the valve plate has reached one of its final positions (open or closed).

Precondition

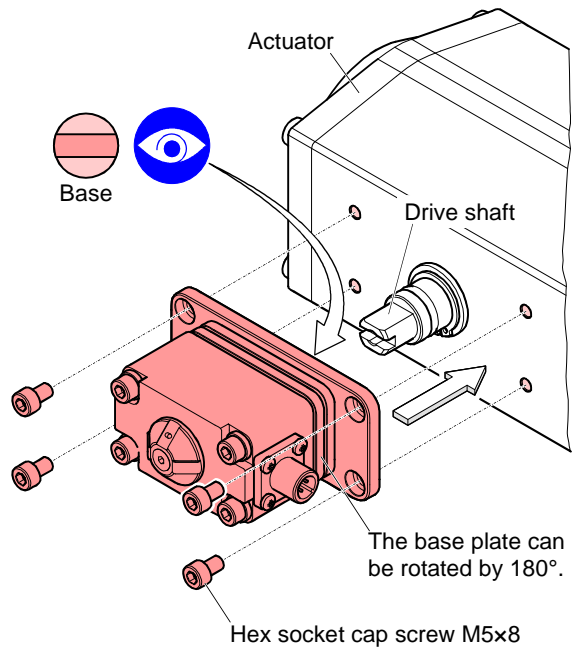
Butterfly valve closed.

This is achieved by

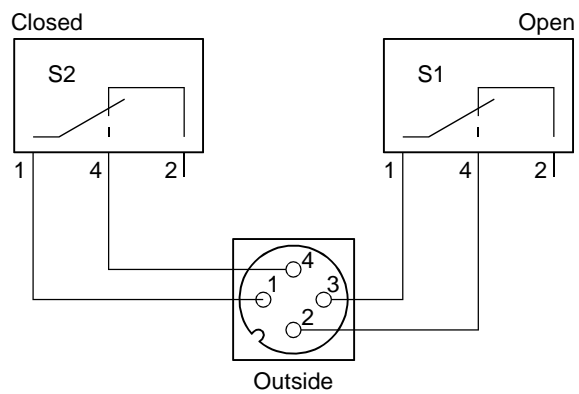
- admitting compressed air to the actuator (→ 24) or ...
- ... turning the drive shaft counter-clockwise until the stop position is reached.



- Slide the base plate of the position indicator on the drive shaft and mount it to the actuator with four hex head screws.



- Make a cable according to the following diagram.



- 3** Plug in the cable socket and secure it with the coupling ring.

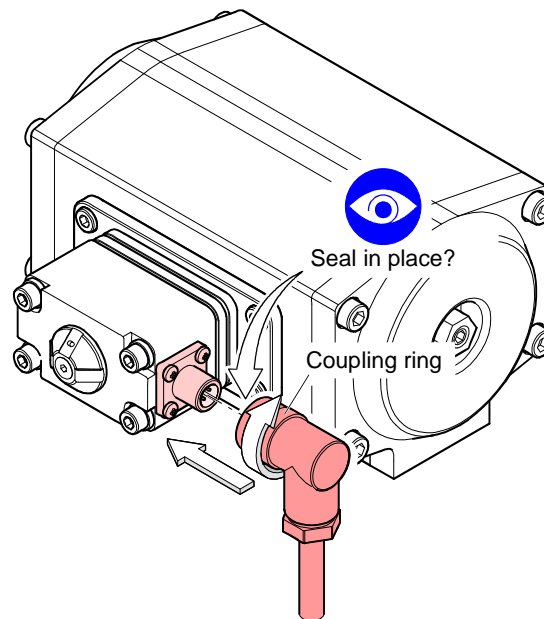
**DANGER**

**DANGER: mains voltage (supply voltage)**  
 Incorrectly grounded products can be extremely hazardous in the event of a fault.

Use only a 5-conductor power cable (supply cable) with protective ground. The power connector may only be plugged into a socket with a protective ground. The protection must not be nullified by an extension cable without protective ground.



Before connecting or disconnecting the product, turn off the control system.



## 4 Operation

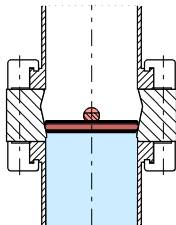
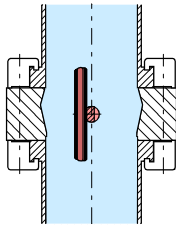


Periodically check that the sealing surface of the valve housing and the O-ring of the valve plate are clean and uniformly lubricated. Otherwise, clean and lubricate the sealing surface and O-ring (→ "Minor Maintenance Work", § 34).



If the valve is operated under harsh or dirty conditions, it should be cleaned / maintained before the specified service time to maintenance (→ "Technical Data") has been reached.

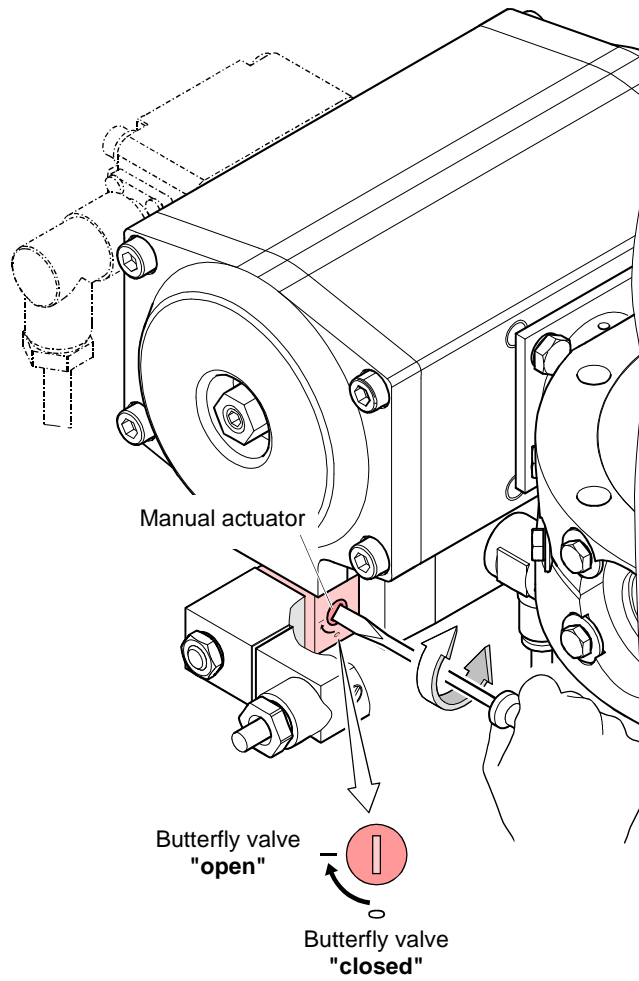
Normal operation

Butterfly valve	Compressed air control by control system		Compressed air control by pilot valve	
	Compressed air connection 4	Compressed air connection 2	Compressed air connection	Nominal voltage
<p><b>closed</b></p> 	no compressed air admitted	compressed air admitted	compressed air admitted	no voltage supplied
<p><b>open</b></p> 	compressed air admitted	no compressed air admitted	compressed air admitted	voltage supplied



Power failure

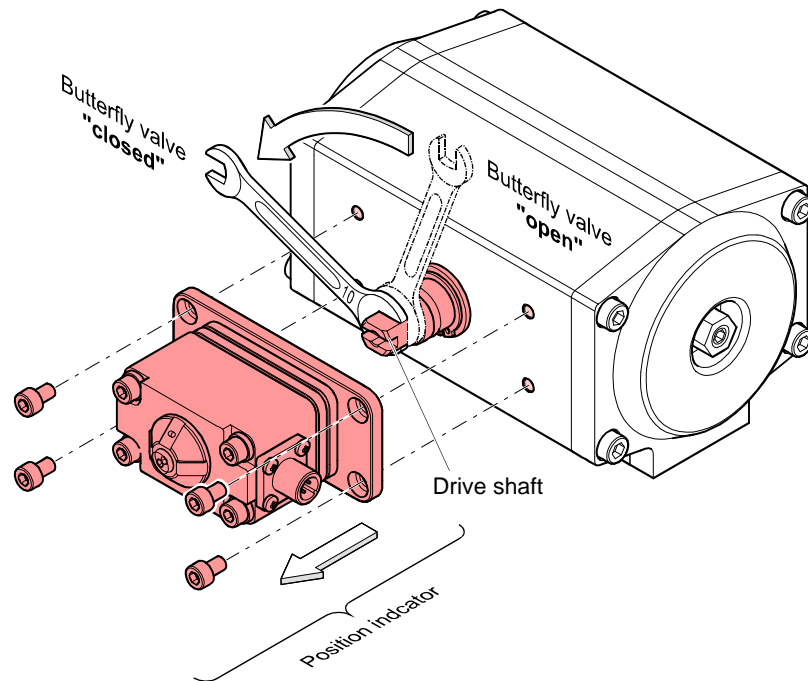
Butterfly valves controlled by the standard pilot valve (→ Accessories) close in the event of a power failure. If such failure occurs and compressed air is admitted, they can be opened and closed via the manual actuator.



### Compressed air failure

In the event of a compressed air failure, the valve plate remains in an undefined position if it was moving. If such failure occurs, manually turn the drive shaft to open or close the Butterfly valve.

Precondition: Position indicator removed.



### Power and compressed air failure

In the event of a power and compressed air failure, the valve plate remains in an undefined position if it was moving. If such failure occurs, manually turn the drive shaft to open or close the Butterfly valve (→ illustration above).

## 5 Deinstallation

**Preconditions**

- Butterfly valve closed
- Vacuum system vented

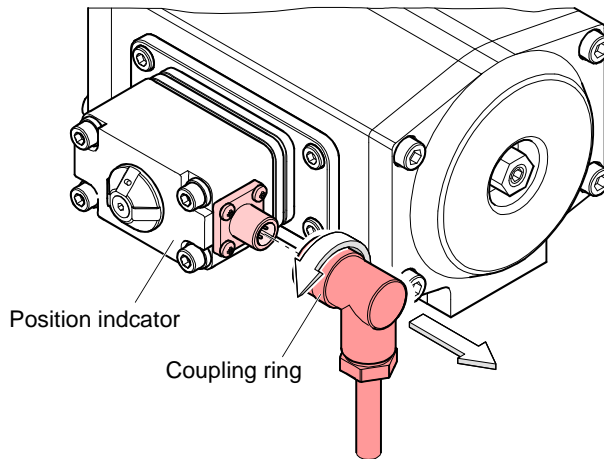
### 5.1 Power Connections



Before connecting or disconnecting the product, turn off the control system.

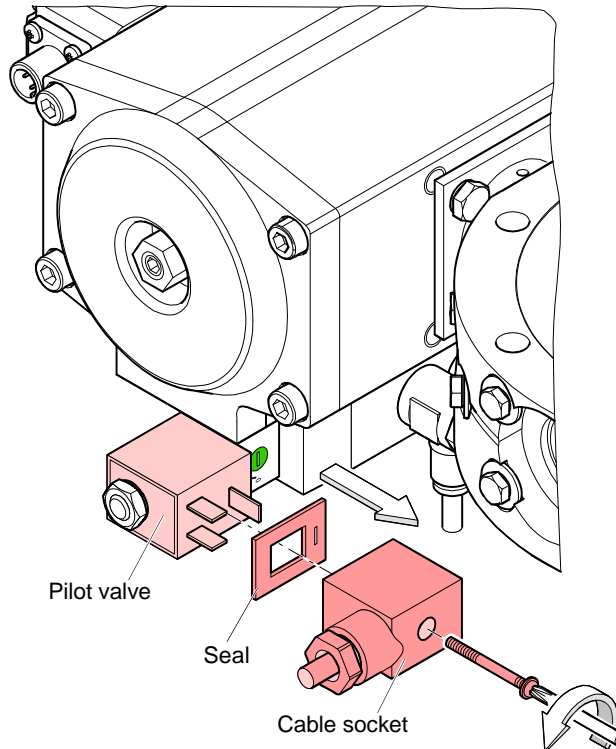
**Position indicator**

Unfasten the coupling ring and pull out the cable socket.



**Pilot valve**

Unlock the cable socket and pull it out.



## 5.2 Compressed Air Connections



**DANGER**



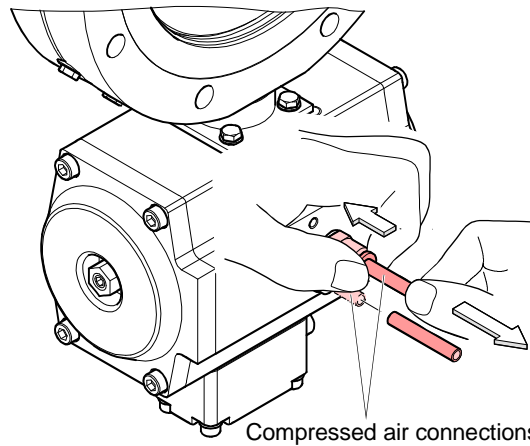
**DANGER: compressed air**

Physical injury can result if a pressurized compressed air line is disconnected.

Before doing any work, turn off the compressed air supply and relieve the compressed air lines.

Central compressed air system

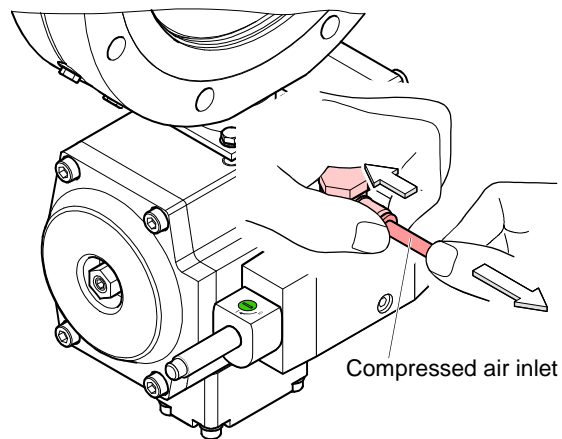
Press the ring towards the valve and pull out the plastic tube.



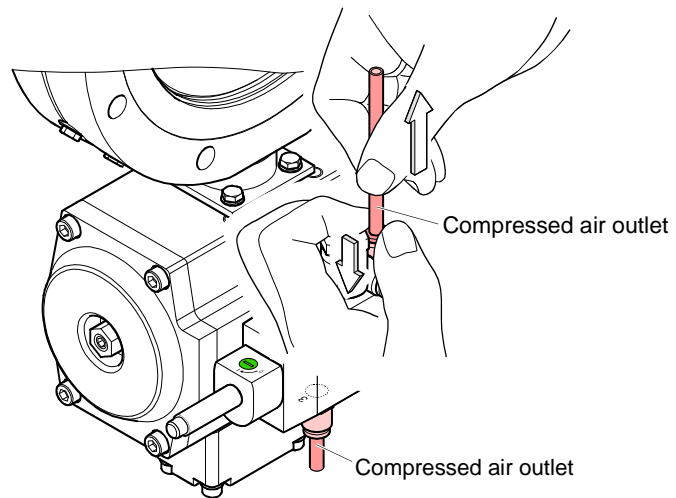
Pilot valve

**1**

Press the ring towards the valve and pull out the plastic tube.



- 2 Press the rings of the compressed air outlets towards the valve and pull out the plastic tubes.



Silencers that have been installed instead of instant push-in fittings need not be removed.

### 5.3 Vacuum Connections

**DANGER**



**DANGER: contaminated parts**

Contaminated parts can be detrimental to health and environment. Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

**Caution**



**Caution: vacuum component**

Dirt and damages impair the function of the vacuum component. When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

**Caution**

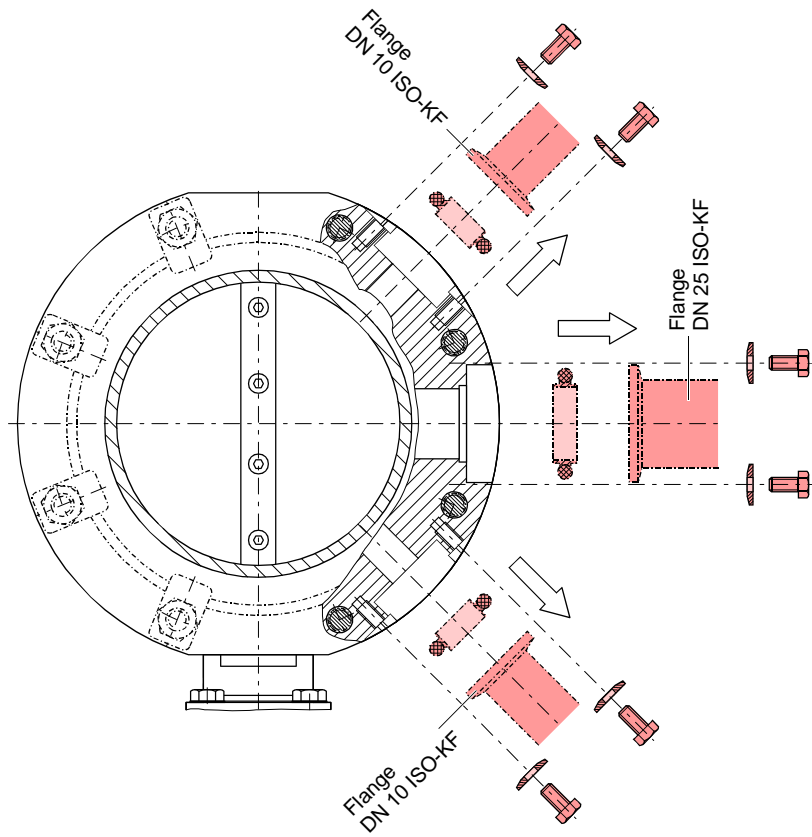


**Caution: dirt sensitive area**

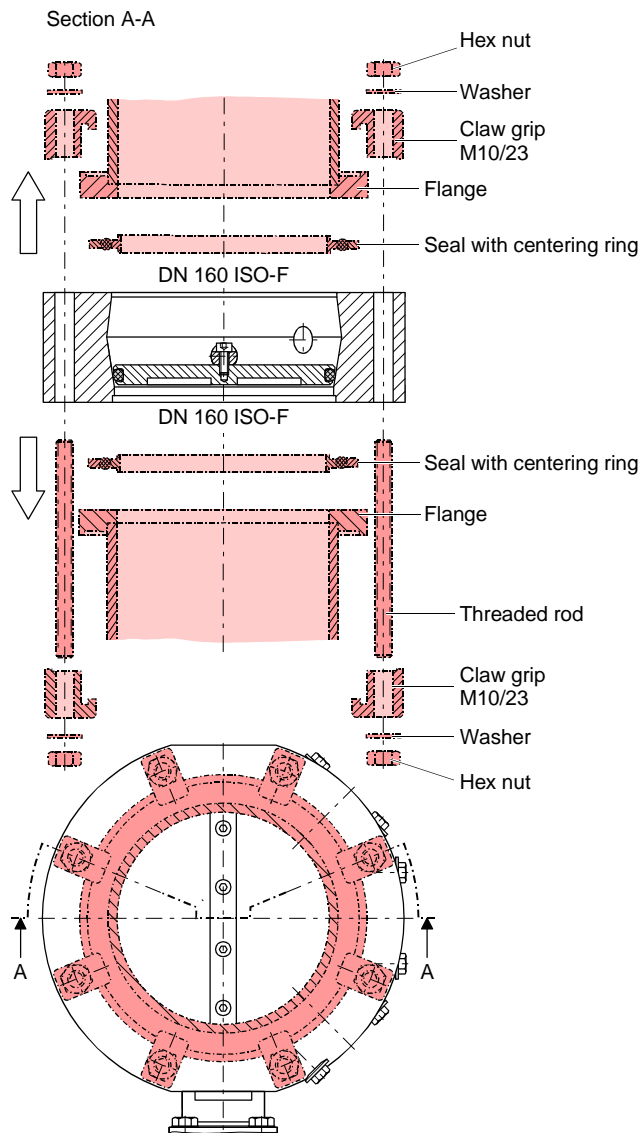
Touching the product or parts thereof with bare hands increases the desorption rate. Always wear clean, lint-free gloves and use clean tools when working in this area.

### 5.3.1 21044-PE.4-000.

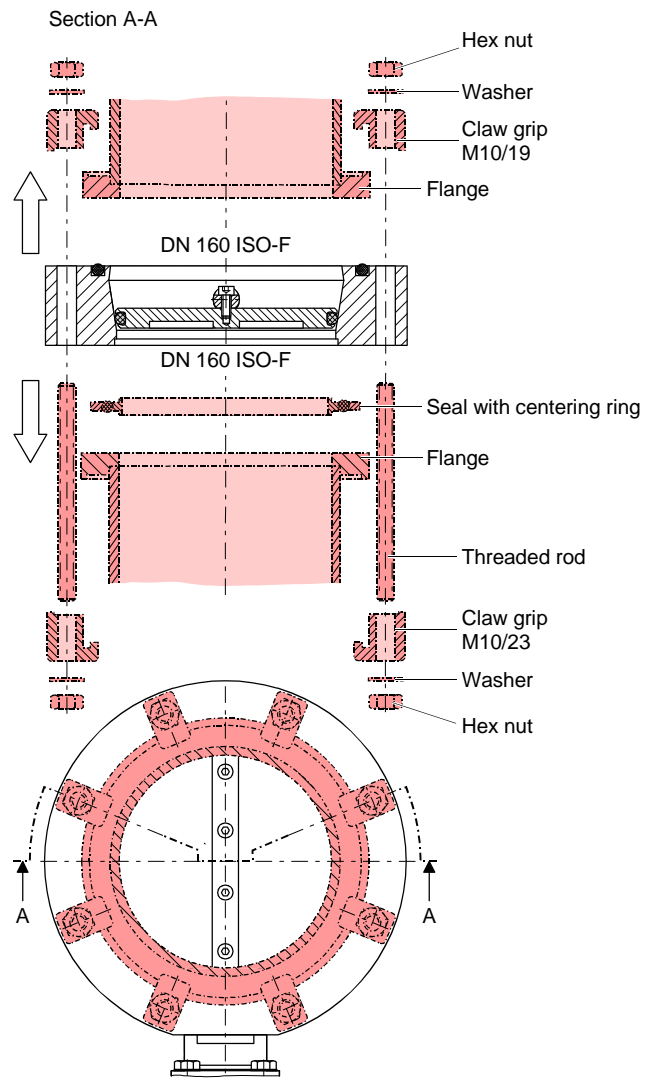
Radially arranged vacuum connections



Axially arranged vacuum connections



5.3.2 21044-PE.4-....





## 6 Maintenance/Repair



Failures due to contamination or wear and tear, as well as expendable parts (e.g. seals, actuator), are not covered by the warranty.

VAT assumes no liability and the warranty becomes null and void if the end-user or third parties use the product with accessories, spare parts and consumables not listed in the corresponding product documentation.



### DANGER



**DANGER: contaminated parts**

Contaminated parts can be detrimental to health and environment. Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.



### Caution



**Caution: vacuum component**

Dirt and damages impair the function of the vacuum component.

When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

**6.1 Minor maintenance work**  
(periodically during normal operation, → 34)

- Cleaning and lubricating the sealing surface on the valve housing and the O-ring of the valve plate

**6.2 Major maintenance work**  
(specified service time to maintenance has been reached, → 35)


- Disassembling the valve
- Replacing of O-rings and actuator
- Cleaning and assembling the valve
- Adjusting the actuator

## 6.1 Minor Maintenance Work

Precondition

- Butterfly valve opened

STOP
**DANGER**




**DANGER: moving parts**  
Parts brought into motion by electrical power or compressed air can catch parts of the body and cause injuries.

Disconnect the supply media (→ "Deinstallation", 27) and make sure the valve is not inadvertently put into operation.

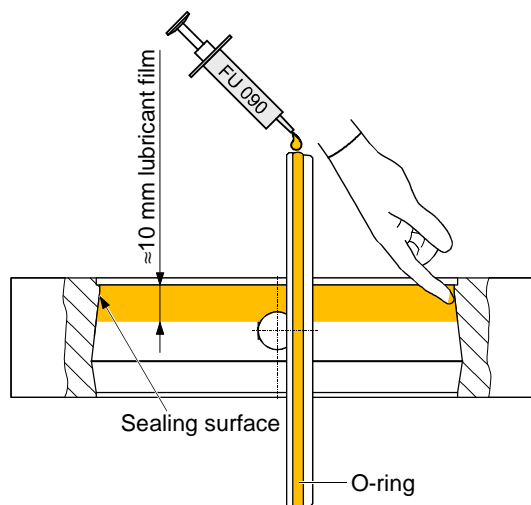
Cleaning and lubricating the sealing surface and O-ring

STOP
**DANGER**



**DANGER: cleaning agents**  
Cleaning agents can be detrimental to health and environment. Adhere to the relevant regulations and take the necessary precautions when handling cleaning agents and disposing of them. Consider possible reactions with the product materials (→ 5).

- Carefully clean the sealing surface and the O-ring with a lint-free cloth moistened with alcohol. Allow them to dry.
- Uniformly lubricate the sealing surface and the O-ring with FU 090 (→ "Consumables", 60).



## 6.2 Major Maintenance Work



In the following illustrations, the valve is shown without accessories.

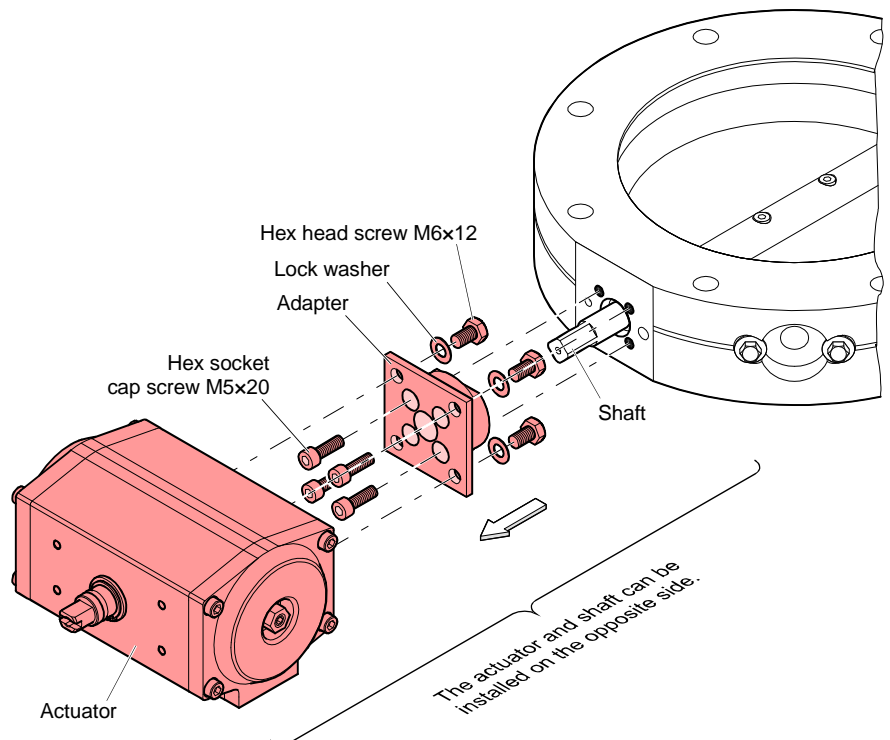
Precondition

- Valve deinstalled (→ 27)
- Valve positioned as shown in the illustration

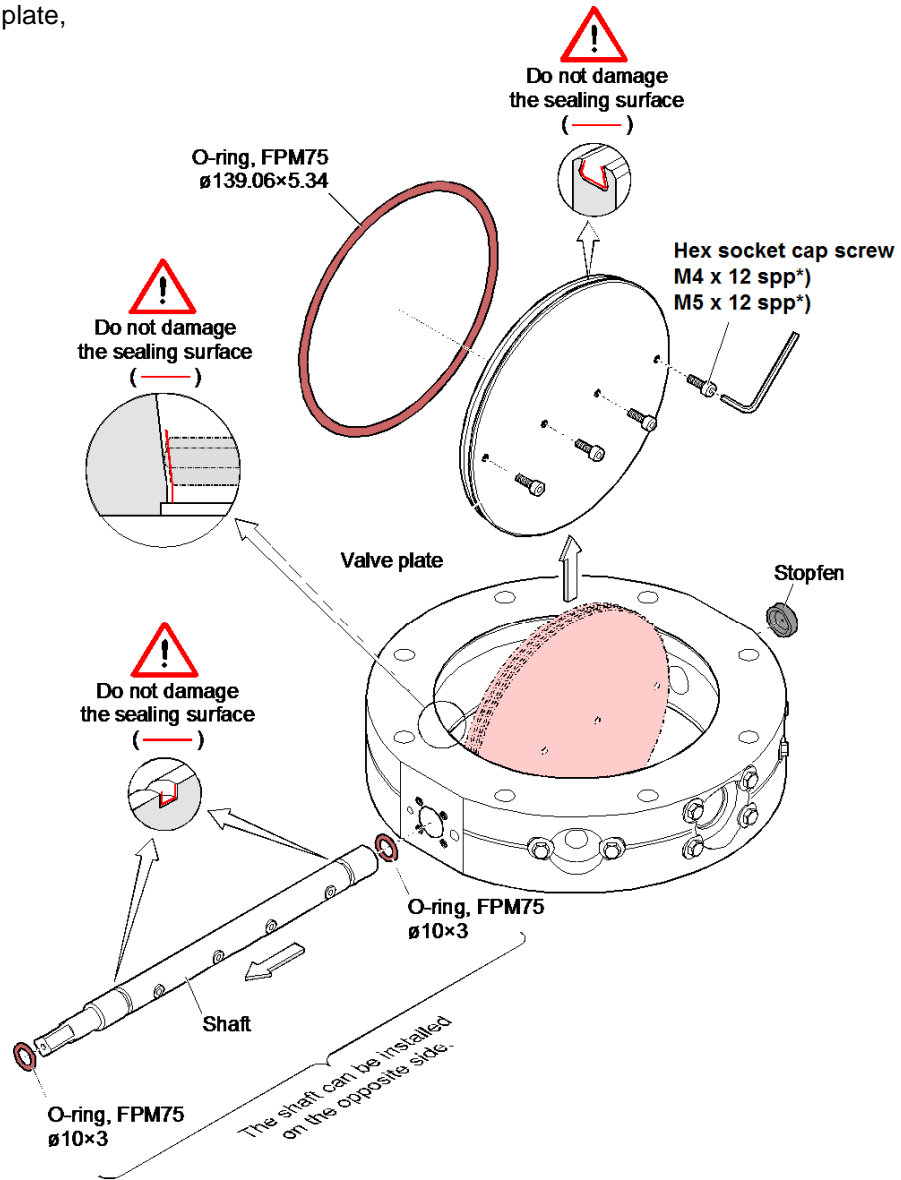
### 6.2.1 Disassembling the Valve

Valve 21044-PE14-000.

Deinstalling the actuator and adapter



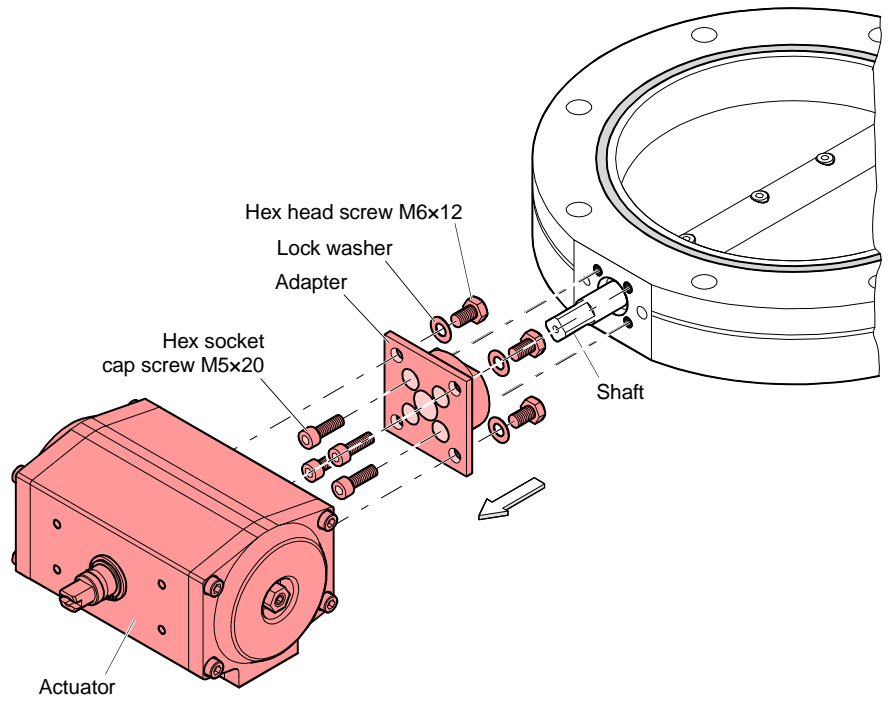
Deinstalling the valve plate,  
shaft and O-rings



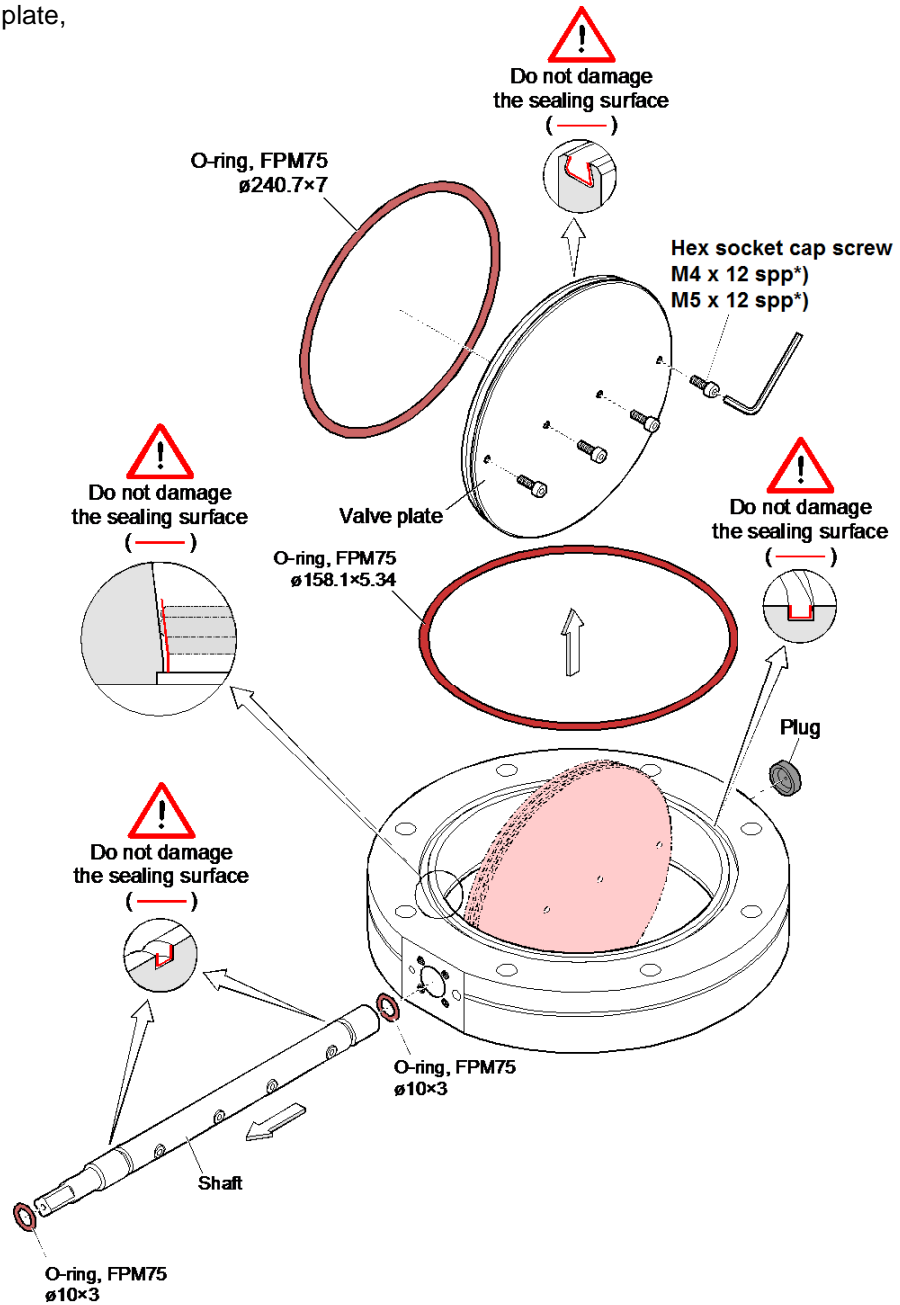
\*) The cap screw are secured with spp (stepstop®) and thus difficult to loosen.

Valve 21044-PE.4-.....

Deinstalling the actuator and adapter



Deinstalling the valve plate,  
shaft and O-rings



\*) The cap screw are secured with spp (stepstop®) and thus difficult to loosen.

## 6.2.2 Cleaning the Valve



**STOP DANGER**

**DANGER: cleaning agents**

Cleaning agents can be detrimental to health and environment. Adhere to the relevant regulations and take the necessary precautions when handling cleaning agents and disposing of them. Consider possible reactions with the product materials (→ 5).

### Procedure

- Carefully clean the parts with a grease solving, non-scouring cleaner.
- After cleaning, the parts should preferably be rinsed with alcohol and subsequently heated to  $\approx 50$  °C in an oven or with an industrial blower.
- Carefully clean the sealing surfaces with a lint-free cloth moistened with alcohol. Allow them to dry.

## 6.2.3 Reassembling the Valve



**Caution**



**Caution: vacuum component**

Dirt and damages impair the function of the vacuum component.

When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.



**Caution**



**Caution: dirt sensitive area**

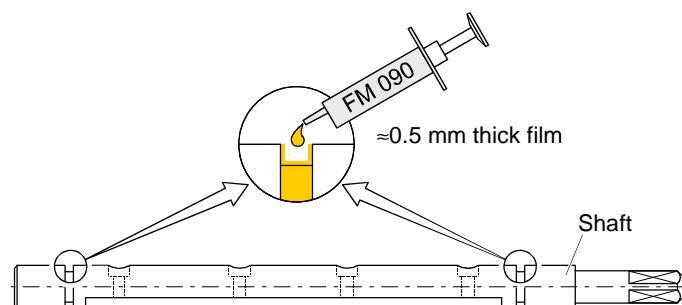
Touching the product or parts thereof with bare hands increases the desorption rate.

Always wear clean, lint-free gloves and use clean tools when working in this area.

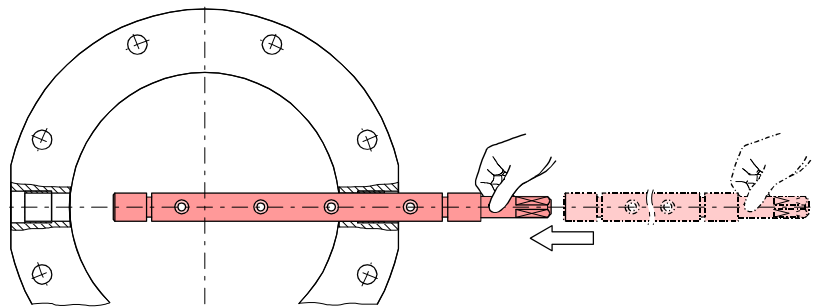
### Mounting the O-ring and installing the shaft



Lubricate the sealing groove with high vacuum lubricant FM 090 (→ "Consumables", 59).



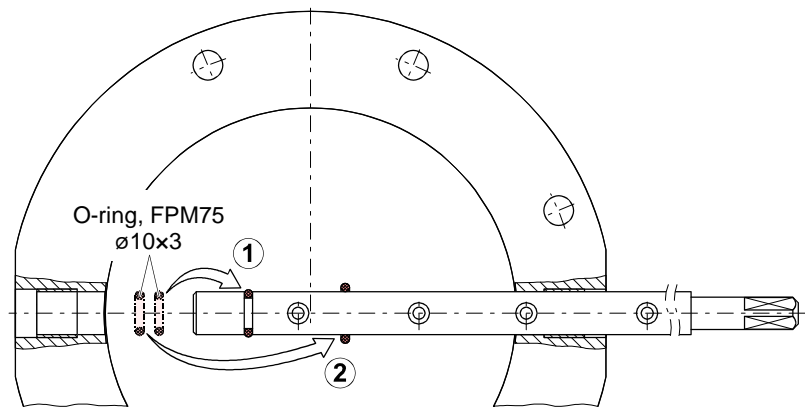
- 2** Carefully insert the shaft into the housing.



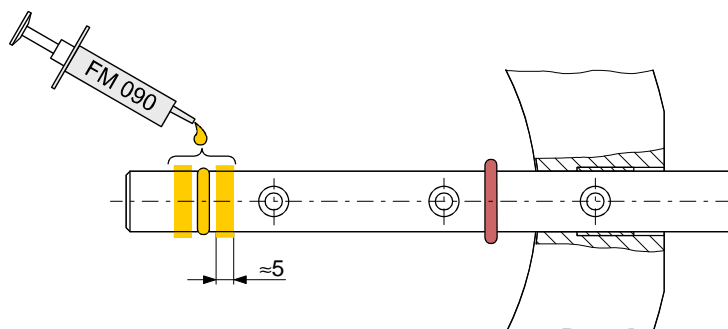
- 3** Slide one O-ring from the inside of the housing onto the shaft and insert it level into the groove without twisting it.  
Slide the second O-ring over the first one.



Use new O-rings (Spare parts → 60).

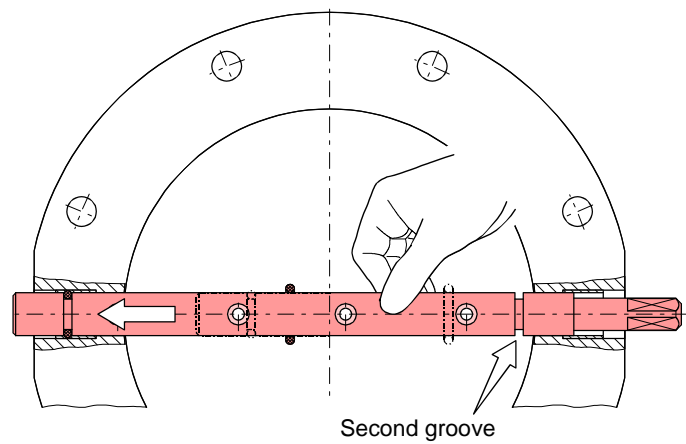


- 4** Lubricate the contact surfaces of the shaft and the visible surface of the O-ring that has been inserted into the groove with high vacuum lubricant FM 090.

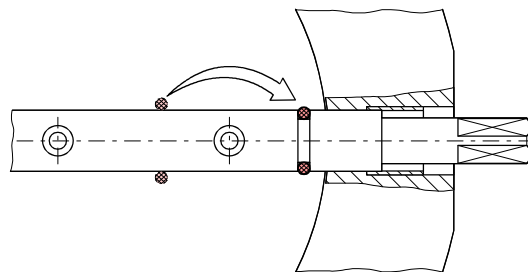




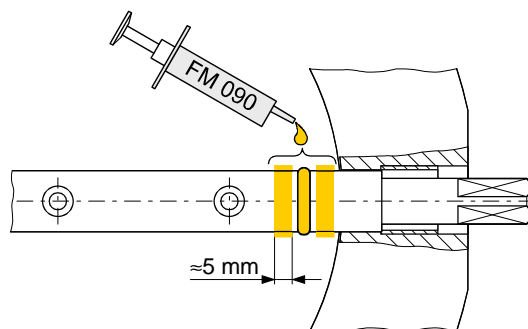
- 5** Push the shaft in further until the second groove is visible.



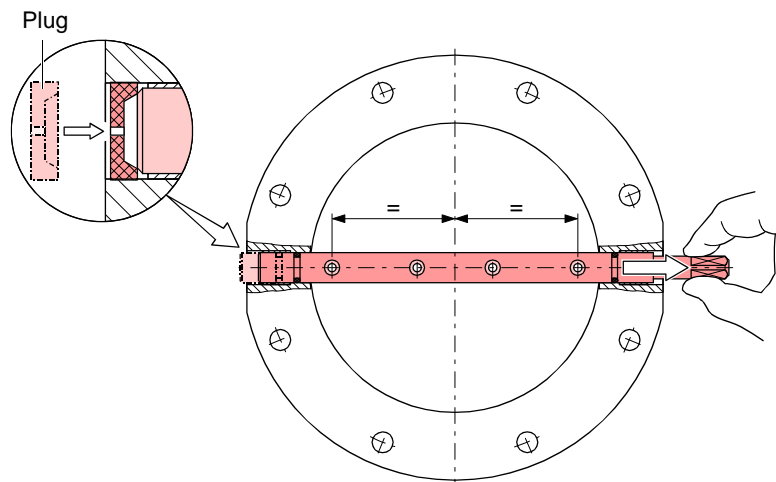
- 6** Insert the second O-ring level into the groove without twisting it.



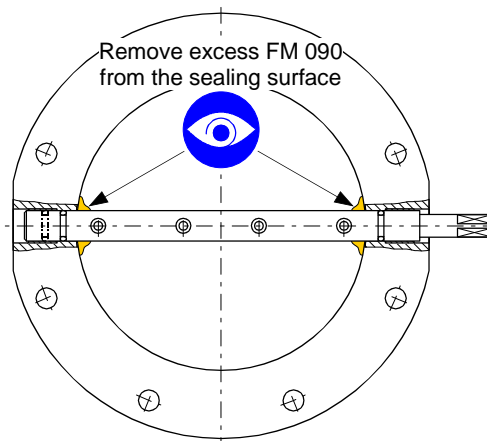
- 7** Lubricate the contact surfaces of the shaft and the visible surface of the O-ring that has been inserted into the groove with high vacuum lubricant FM 090.



- 8** Bring the shaft to the axial position shown in the drawing, insert the plug ...



... and remove excess lubricant from the sealing surface.

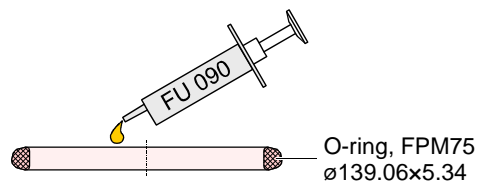


Mounting the O-ring to the valve plate

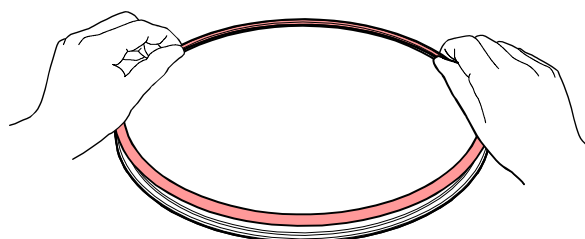
- 9** Lubricate the surface of the O-ring by applying a thin, uniform FU 090 film.



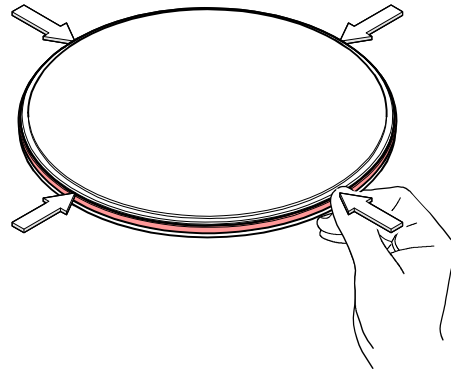
Use a new O-ring (→ "Spare Parts", 60).



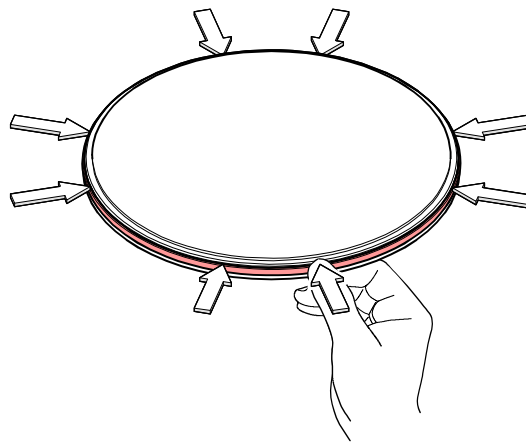
- 10** Mount the O-ring to the valve plate without twisting it ...



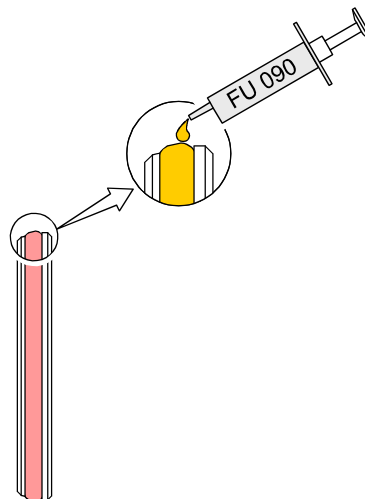
... and press it crosswise into the groove as shown in the illustration below.



- 11** Press the remaining parts of the O-ring level into the groove without twisting the O-ring.

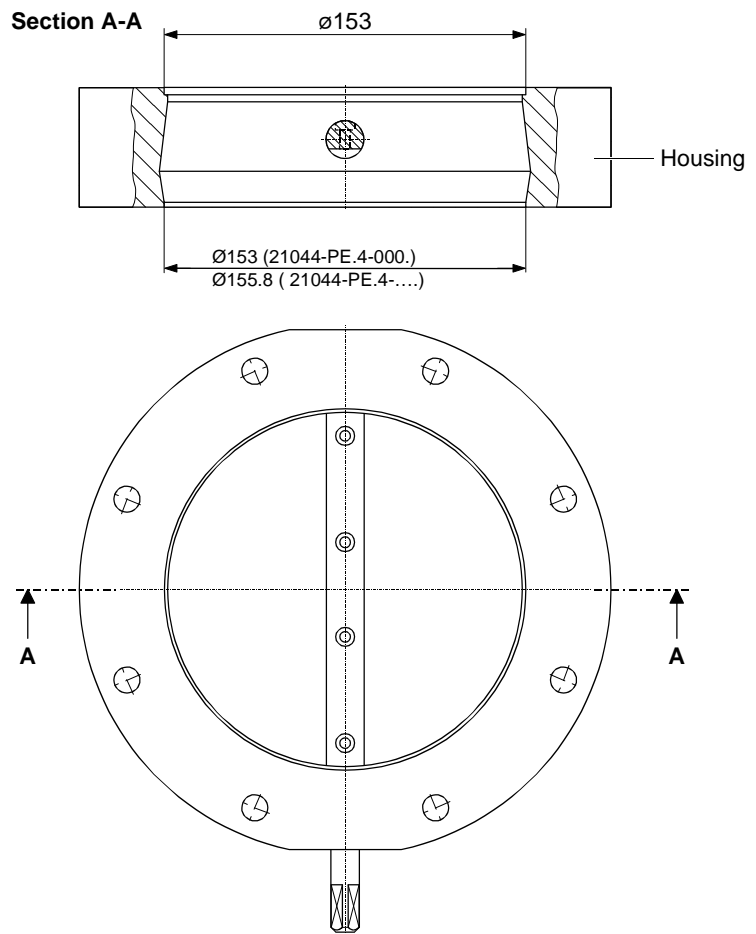


- 12** Lubricate the visible surface of the O-ring by applying a liberal, uniform FU 090 film.

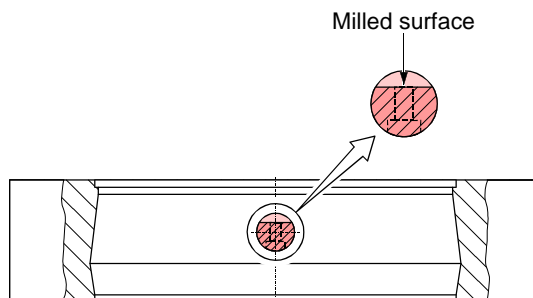


Lubricating the sealing surface

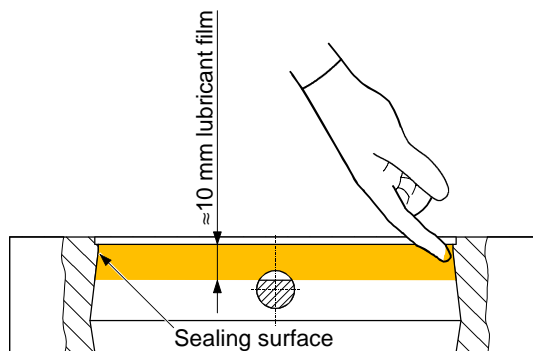
13 Position the housing as shown in the illustration, ...



... rotate the shaft until the milled surface is visible ...

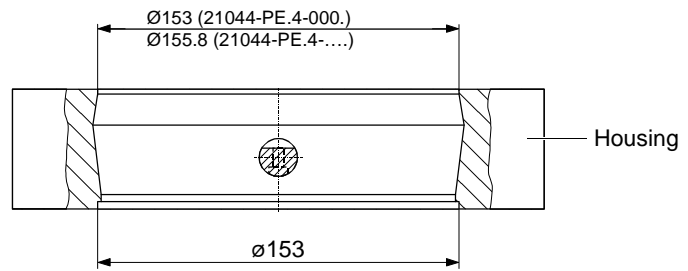


... and lubricate the sealing surface by applying a thin, uniform FU 090 film.

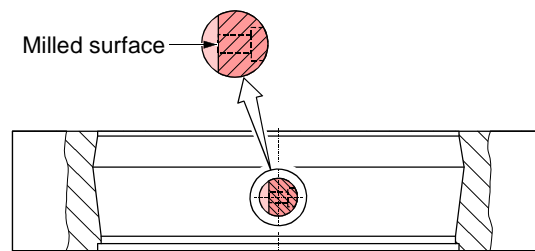


Pre-installing the valve plate

- 14** Turn the housing by 180°...

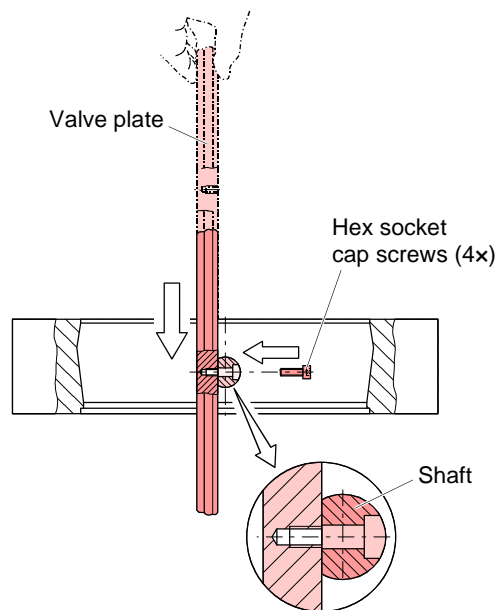


... and bring the shaft to the position shown in the illustration.

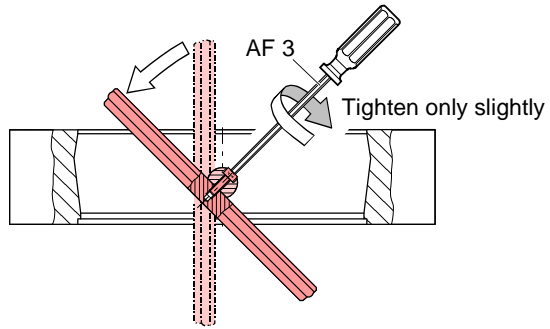


- 15** Carefully insert the valve plate into the housing on the side of milled shaft surface and manually turn in the new hex socket cap screws.

Use new hex socket cap screws (→ "Spare Parts", 60).

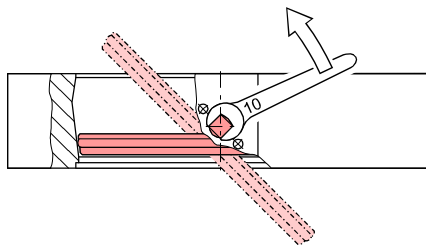


- 16 Tilt the valve plate by  $\approx 45^\circ$  and screw it to the shaft.

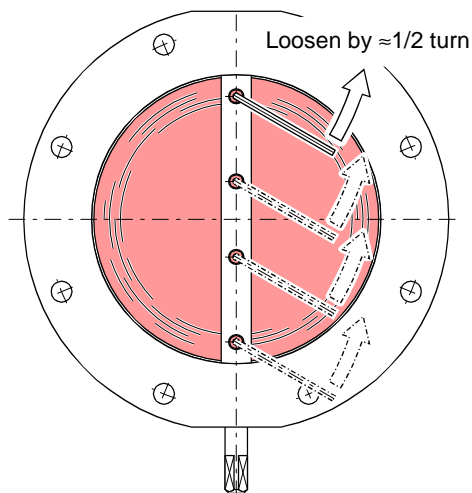


Centering and tightening the valve plate

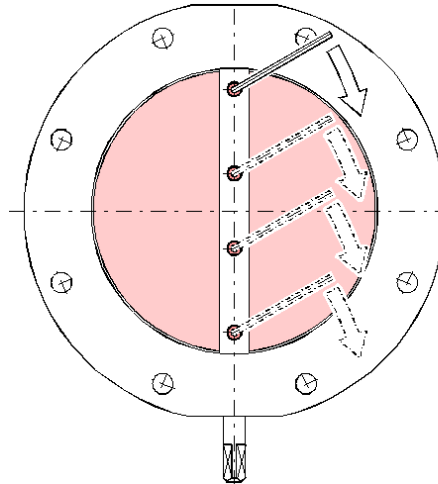
- 17 Bring the valve plate to the "closed" position by turning the square neck counter-clockwise, e.g. using a wrench.



- 18 Loosen the cap screws by  $\approx 1/2$  turn to allow the valve plate to center itself.



- 19 Tighten the cap screws to a torque as shown in the table below.

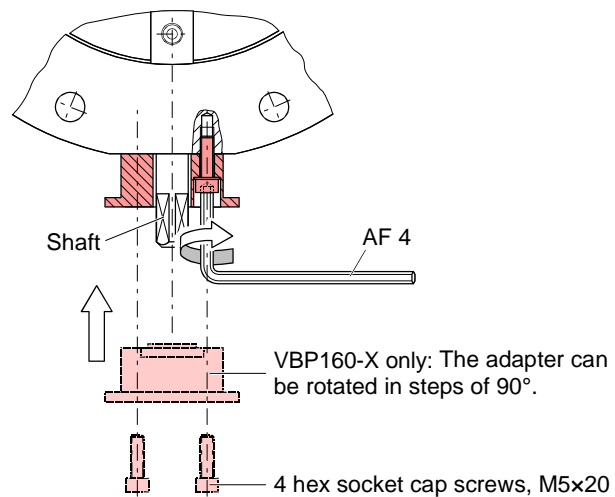


Tightening torque for hex socket screws

Valve	Screw Size	Tightening torque
21044-PE...-....	M4 x 12	3 Nm
21044-PE...-....	M5 x 12	5 Nm
21044-PE44-ADQ1	M5 x 16	10 Nm

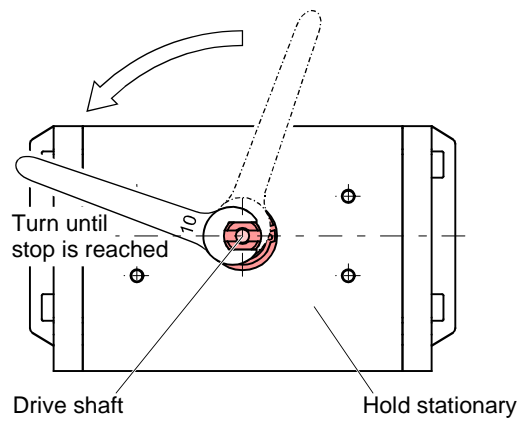
Mounting the actuator

- 20 Slide the adapter on the shaft and screw it to the housing. Tighten the M5 hex socket cap screws with torque of 5Nm.

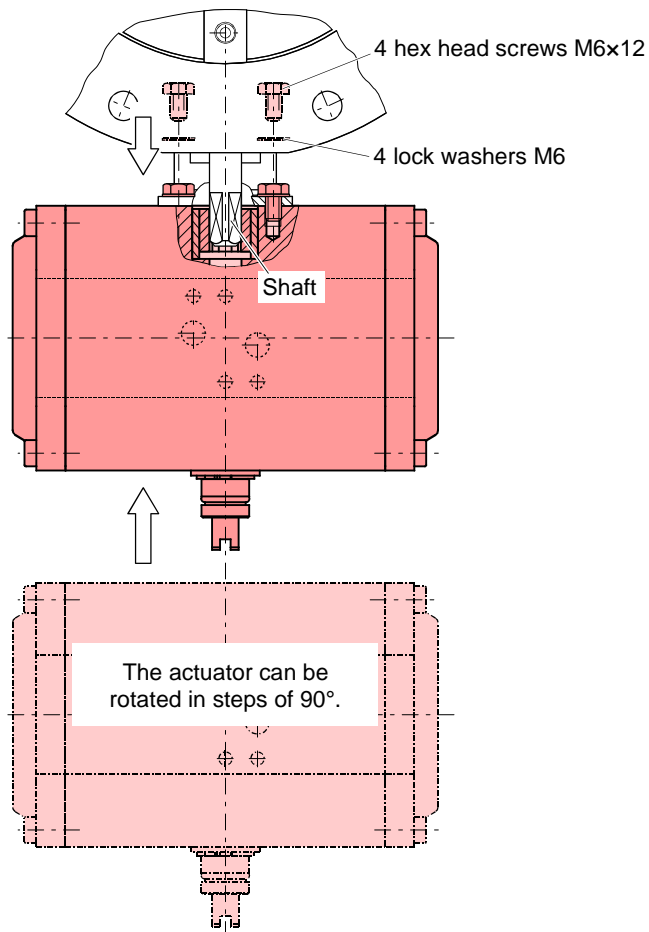


21

Make sure the actuator is in its initial position (Butterfly valve "closed"): turn the drive shaft counter-clockwise until the stop position is reached, ...



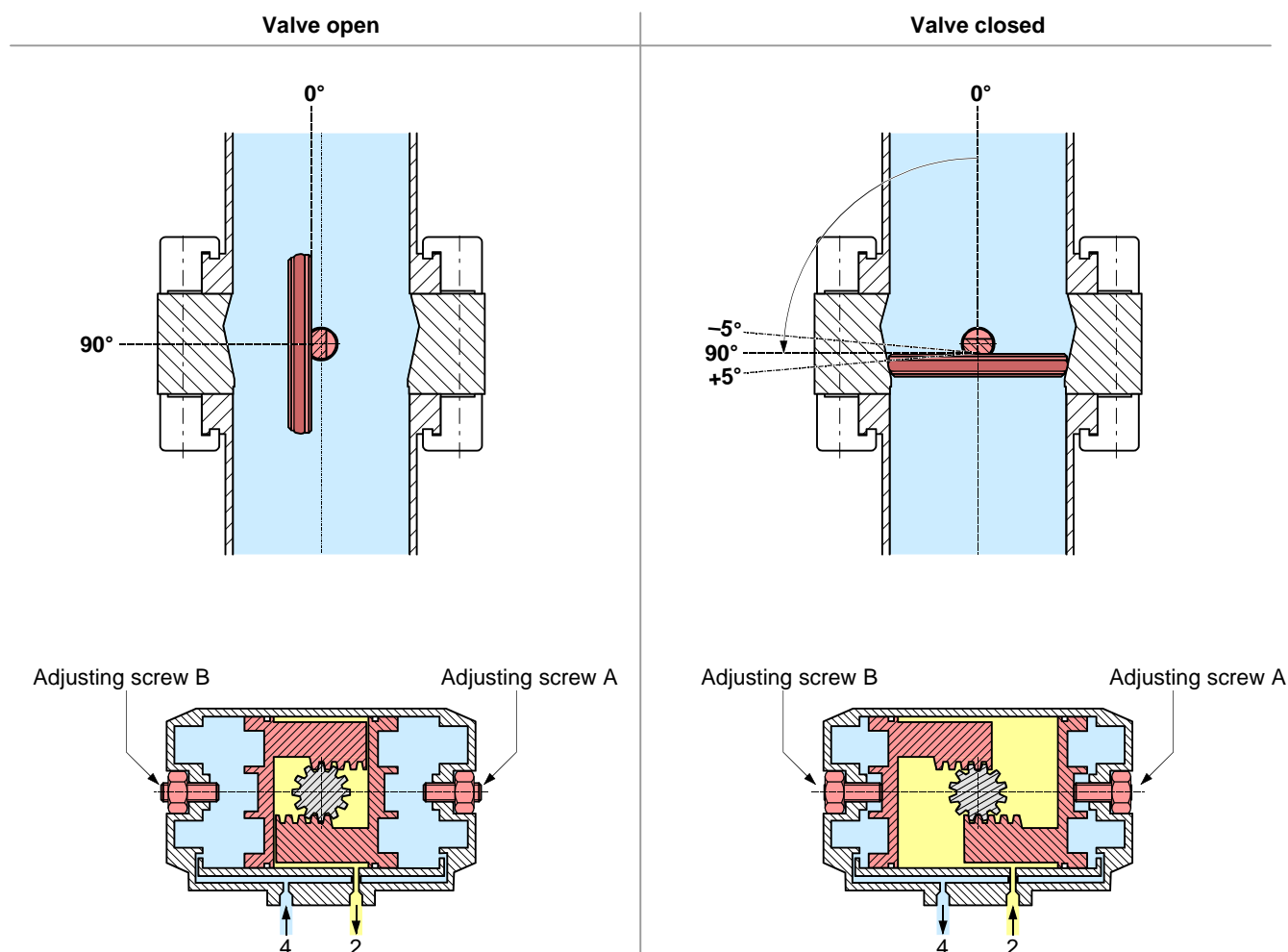
... position the actuator on the square neck of the shaft, slide it on the adapter until the stop position is reached, and screw it to the adapter. Tighten the M6 hex head screws with torque of 9Nm.





## 6.2.4 Adjusting the Actuator (Spare Part)

Functional principle of the actuator



If compressed air is admitted to the compressed air connection <4>, the pistons move towards each other and the valve plate opens in position "0°". If compressed air is admitted to compressed air connection <2> and compressed air connection <4> is vented, the pistons move away from each other and the valve plate closes in position 90°. In this position, the pivot angle of the valve plate can be adjusted by  $\pm 5^\circ$  with adjusting screw A or B and secured with the corresponding counter nut while the valve is not under pressure.

The parallelism of the valve plate may change due to operation, prolonged storage, contamination, etc. The valve plate is tight at a parallelism  $\leq 5$  mm.

### Preconditions

- Valve deinstalled (→ 27)
- Actuator installed (→ 47)
- Compressed air connection established (→ 13)
- If necessary, power connection(s) established (→ 19)

### Procedure

- 1 Open and close the valve by admitting compressed air to the actuator.

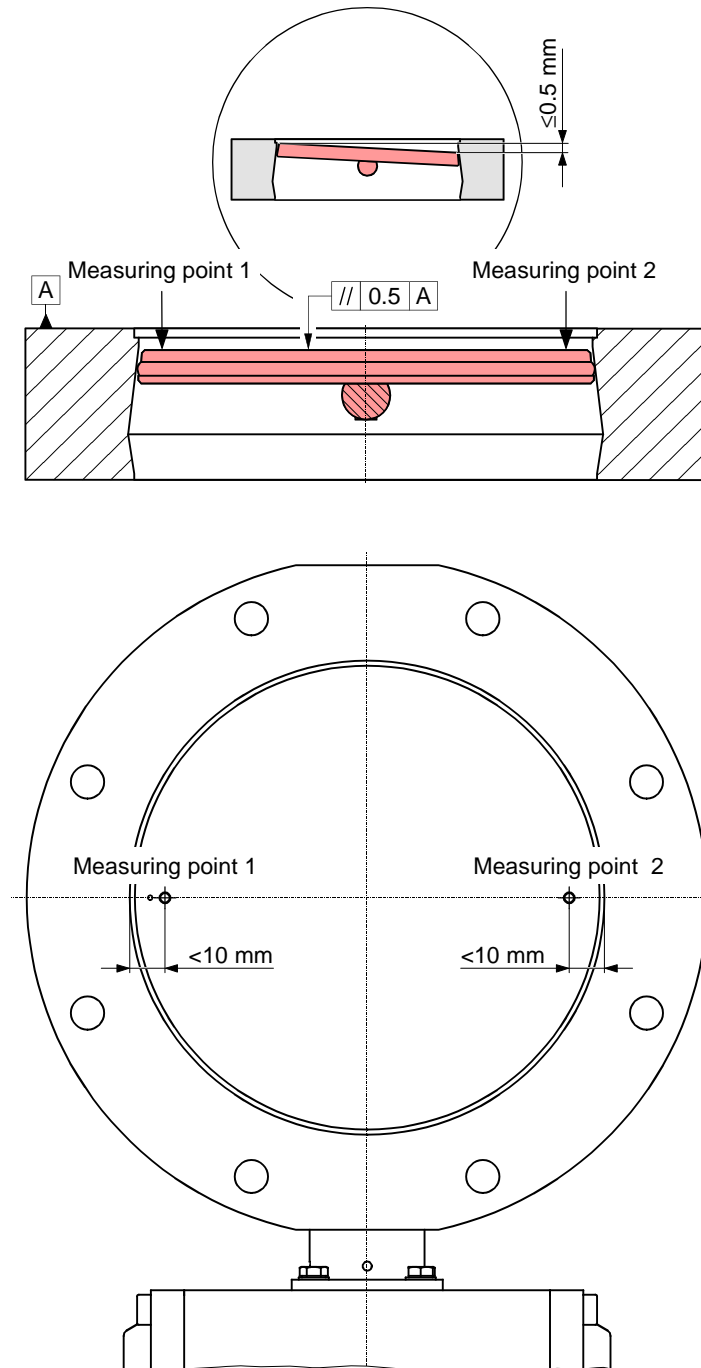
**2** Determine parallelism.

Parallelism  $\leq 0.5$  mm: ✓ Adjustment completed

Parallelism  $> 0.5$  mm: Go to step **3**

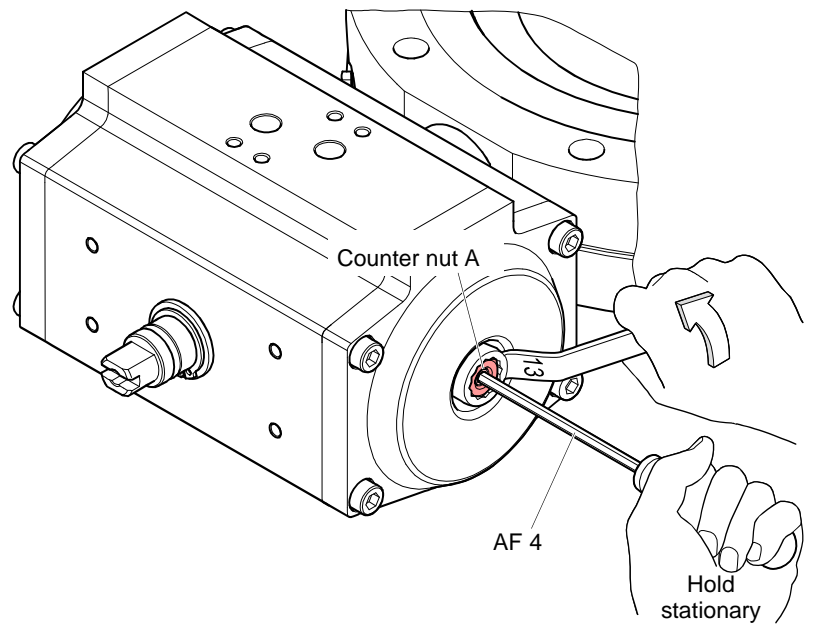


The valve plate is tight at a parallelism  $\leq 5$  mm.

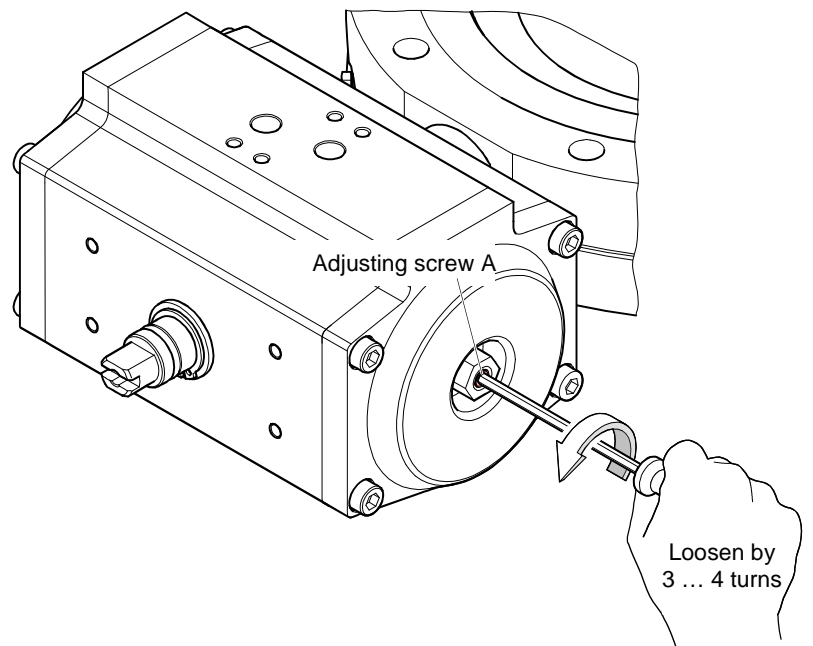


**3** Open the valve.

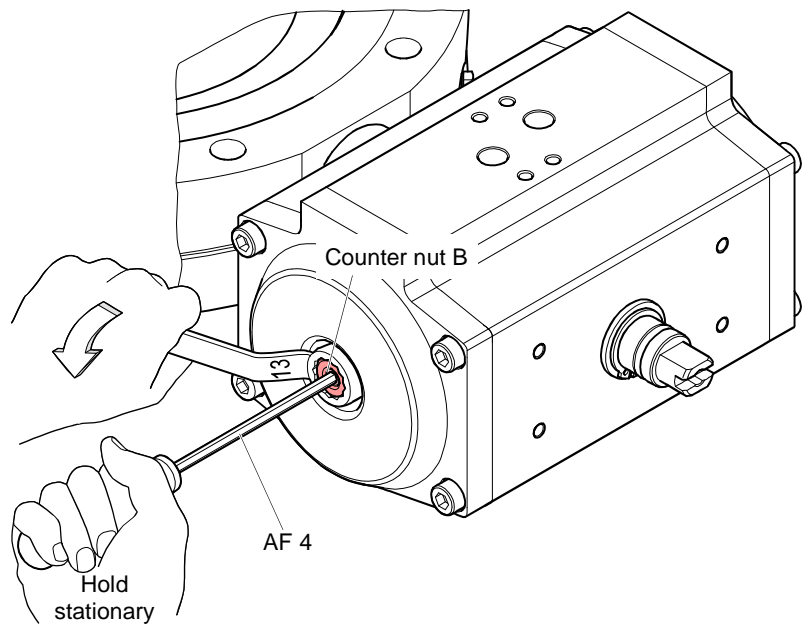
**4** Untighten counter nut A ...



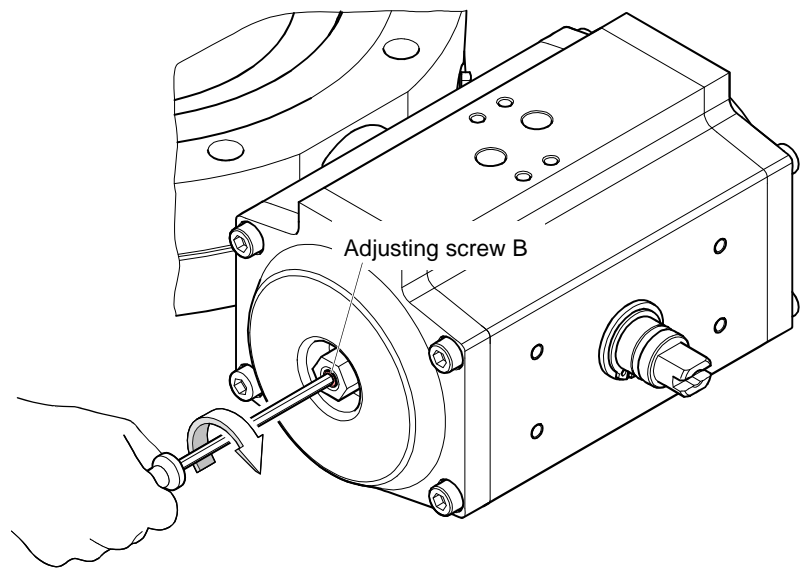
... and loosen adjusting screw A by 3 ... 4 turns.



**5** Untighten counter nut B ...

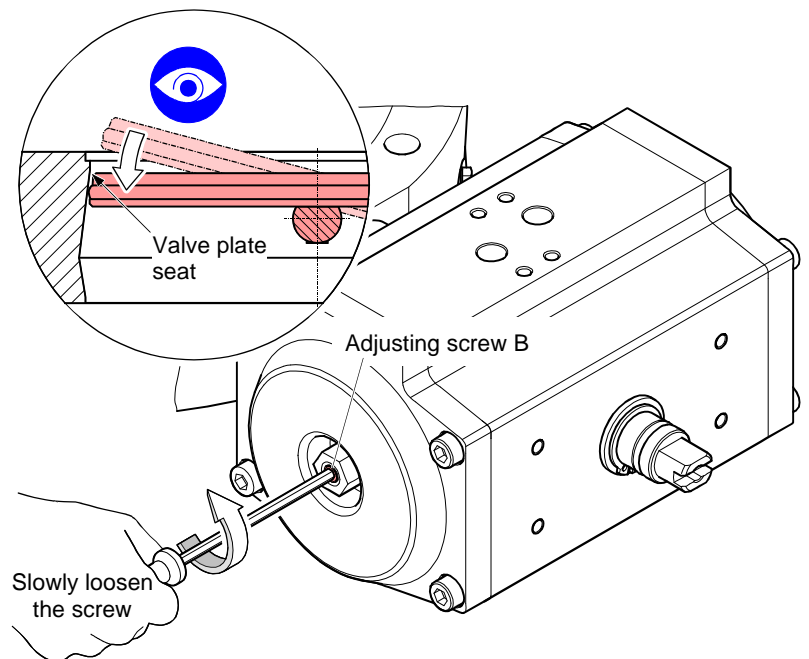


... and turn in adjusting screw B by 3 ... 4 turns.



**6** Close the valve.

- 7** Slowly loosen adjusting screw B until the valve plate has reached the valve plate seat.



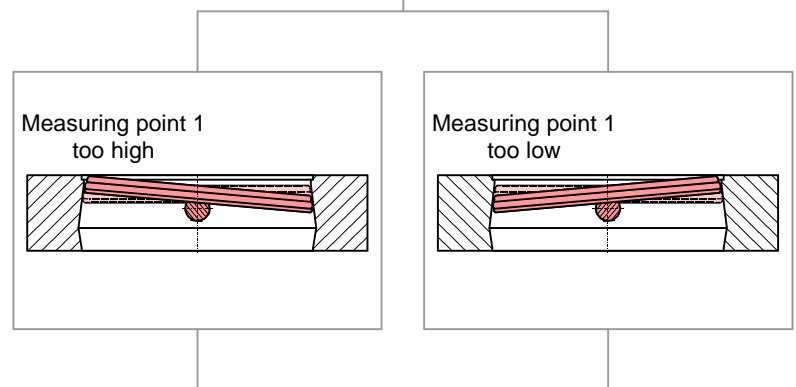
- 8** Determine parallelism:

Parallelism  $\leq 0.5$  mm: Go to step **10**

Parallelism  $> 0.5$  mm: Go to step **9**

- 9**

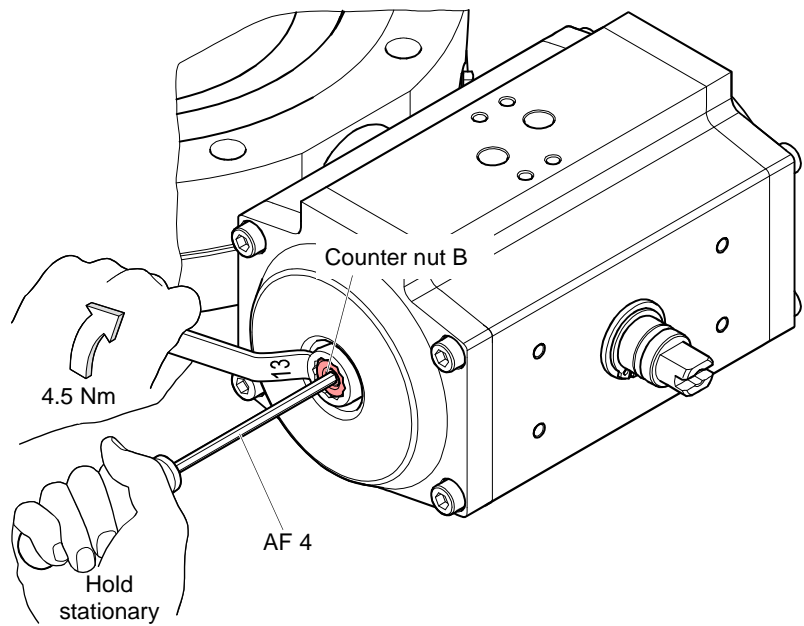
Position valve plate



- Go back to step **7**

- Open the valve
- Turn in adjusting screw B by  $\approx \frac{1}{2}$  turn, according to the position of the valve plate
- Close the valve and go to step **8**

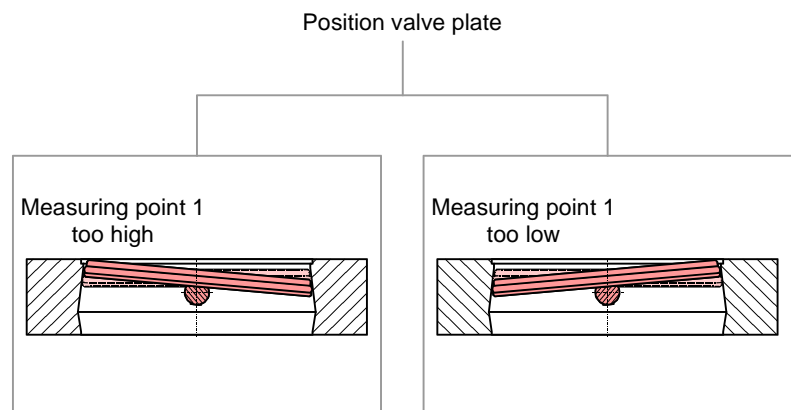
- 10** Tighten counter nut B with a torque of 4.5 Nm ...



... and perform one switching cycle.

- 11** Determine parallelism:  
 Parallelism  $\leq 0.5$  mm: Go to step **13**  
 Parallelism  $> 0.5$  mm: Go to step **12**

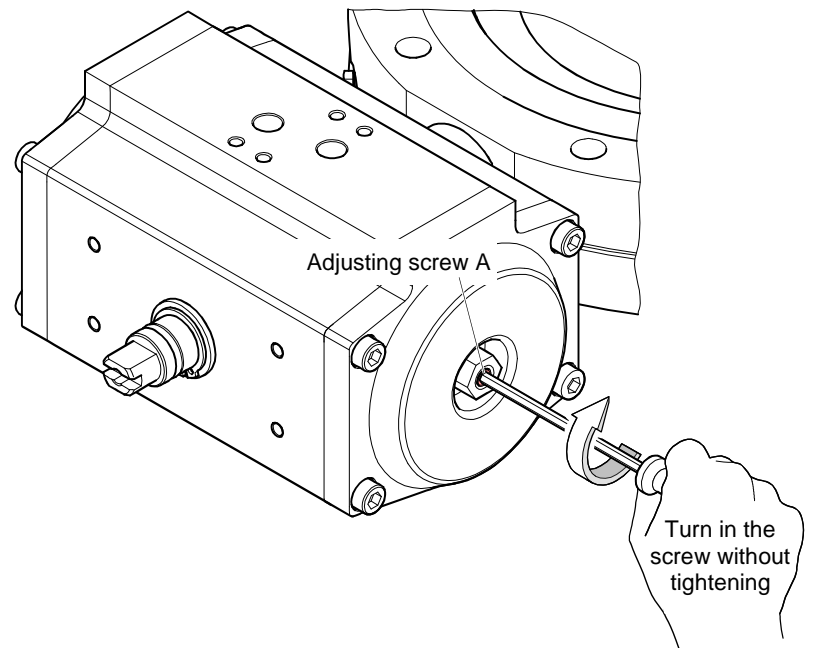
**12**



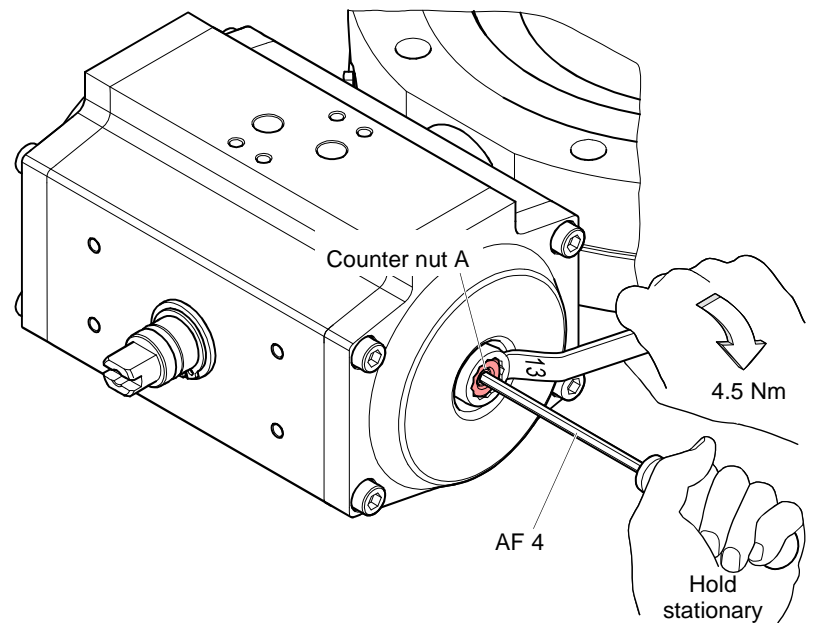
- Untighten counter nut B
- Go back to step **7**

- Open the valve
- Untighten counter nut B
- Turn in adjusting screw B by  $\approx \frac{1}{2}$  turn, according to the position of the valve plate
- Close the valve and go to step **3**

- 13 Turn in adjusting screw A to the stop without tightening it ...



... and tighten counter nut A with a torque of 4.5 Nm.



- 14 Perform five switching cycles.

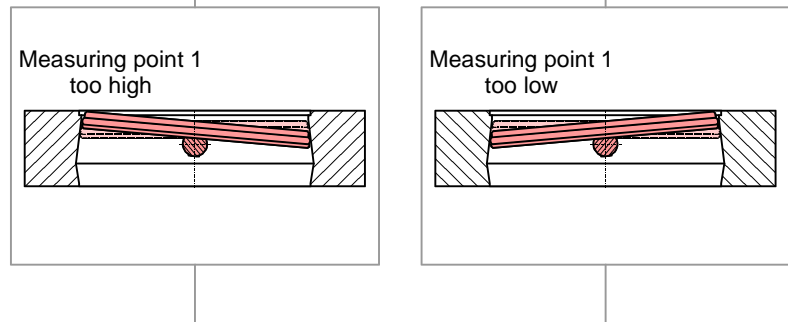
- 15 Determine parallelism:

Parallelism  $\leq 0.5$  mm: ✓ Adjustment completed

Parallelism  $> 0.5$  mm: Go to step 16

16

Position valve plate

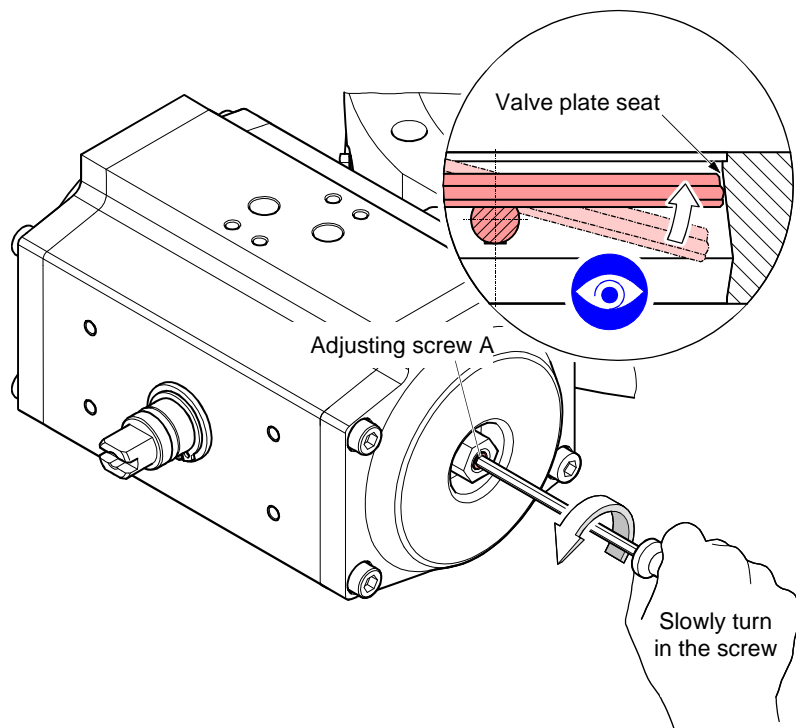


- Untighten counter nut A and go to step 17

- Untighten counter nut B
- Turn in adjusting screw B by  $\approx \frac{1}{2}$  turn, according to the position of the valve plate
- Close the valve and go to step 3

17

Slowly loosen adjusting screw A until the valve plate has reached the valve plate seat



18

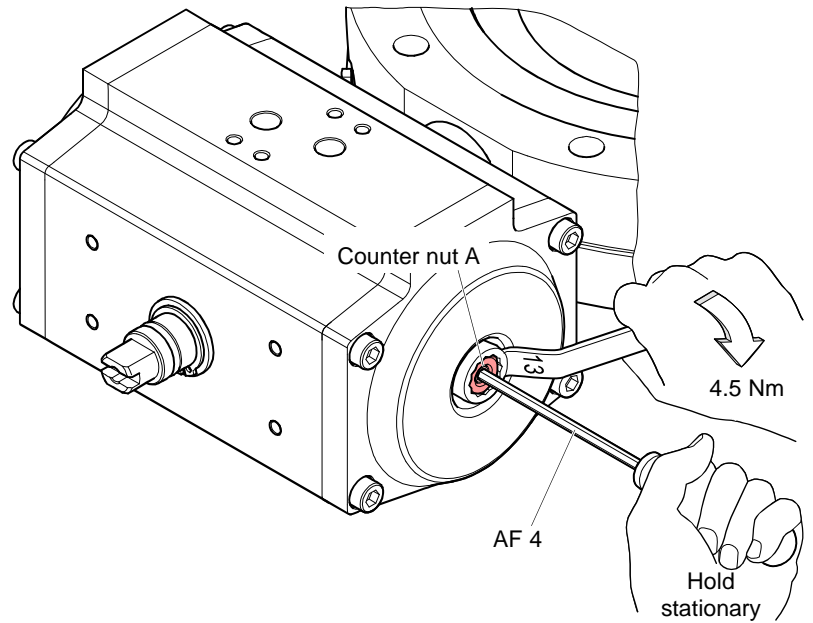
Determine parallelism:

Parallelism  $\leq 0.5$  mm: Go to step 19

Parallelism  $> 0.5$  mm: Go to step 16



- 19 Tighten counter nut A with a torque of 4.5 Nm ...



... and perform five switching cycles.

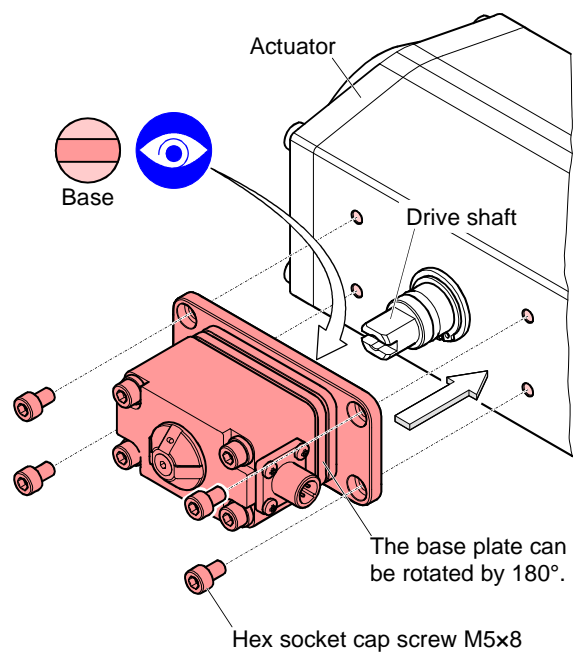
- 20 Determine parallelism.

Parallelism  $\leq 0.5$  mm: ✓ Adjustment finished

Parallelism  $> 0.5$  mm: Go to step 16

### 6.2.5 Installing the Position Indicator

Slide the position indicator on the drive shaft and mount it to the actuator with four hex socket cap screws.

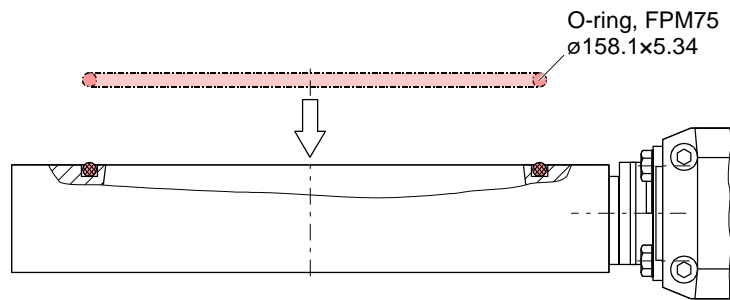


### 6.2.6 Valve 21044-PE.4-....: Placing the O-ring in the Sealing Groove of the Housing

Lubricate the O-ring by applying a thin, uniform FU 090 film and insert the O-ring level into the sealing groove without twisting it.



Use a new O-ring (→ "Spare Parts", 60).



## 7 Accessories



Pilot valve	Ordering number
230 VAC, 50 ... 60 Hz	586579
115 VAC, 50 ... 60 Hz	586580
24 VAC, 50 ... 60 Hz	586581
24 VDC	586582

Further information →  16.

Position indicator	Ordering number
Load capacity 230 V, 1 A	587850

Further information →  21.

Connection elements	Ordering number
for 21044-PE14-000., comprising	580706
8 threaded rods M10x117	
16 claw grips M10/23	
16 washers	
16 hex nuts M10	
for 21044-PE..-ABA., comprising	580723
8 threaded rods M10x102	
8 claw grips M10/23	
8 claw grips M10/19	
16 washers	
16 hex nuts M10	
Others	On request

Further information →  10 (21044-PE.4-000.)  
 →  12 (21044-PE.4-....).

Heater and insulation shell for 21044-PE..-ABA.	Ordering number
Heater	580625
Insulation shell	580630

## 8 Spare Parts

Seal kit		Ordering number
	for 21044-PE.4-000., comprising 1 O-ring, FPM75, $\varnothing 139.06 \times 5.34$ 2 O-rings, FPM75, $\varnothing 10 \times 3$ 4 hexagon socket head cap screws, M4x12-A2-70-spp	580255
	for 21044-PE.4-ABA., comprising 1 O-ring, FPM75, $\varnothing 139.06 \times 5.34$ 2 O-rings, FPM75, $\varnothing 10 \times 3$ 1 O-ring, FPM75, $\varnothing 158.1 \times 5.34$ 4 hexagon socket head cap screws, M4x12-A2-70-spp	580259
	others	on request
Actuator		Ordering number
	for 21044-PE...-..., comprising 1 actuator, 8 bar, 80 Nm	587852

## 9 Consumables

High vacuum lubricants		Ordering number
	FM 090, 30 g	583409
	FU 090, 10 g	N-6951-011

## 10 Returning the Product

**WARNING**

**WARNING: forwarding contaminated products**

Contaminated products (e.g. radioactive, toxic, caustic or biological hazard) can be detrimental to health and environment.

Products returned should preferably be free of harmful substances. Adhere to the forwarding regulations of all involved countries and forwarding companies and enclose a duly completed declaration of contamination<sup>1</sup>. The form can be downloaded from our website [www.vatvalve.com](http://www.vatvalve.com).

Products that are not clearly declared as "free of harmful substances" are decontaminated at the expense of the customer.

Products not accompanied by a duly completed declaration of contamination are returned to the sender at his own expense.

## 11 Disposal

**DANGER**

**DANGER: contaminated parts**

Contaminated parts can be detrimental to health and environment. Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

**WARNING**

**WARNING: substances detrimental to the environment**

Products or parts thereof (mechanical and electric components, operating fluids etc.) can be detrimental to the environment. Dispose of such substances in accordance with the relevant local regulations.

Separating the components

After disassembling the product, separate its components according to the following criteria:

Contaminated components

Contaminated components (radioactive, toxic, caustic, or biological hazard etc.) must be decontaminated in accordance with the relevant national regulations, separated according to their materials, and disposed of.

Other components

Such components must be separated according to their materials and recycled.

