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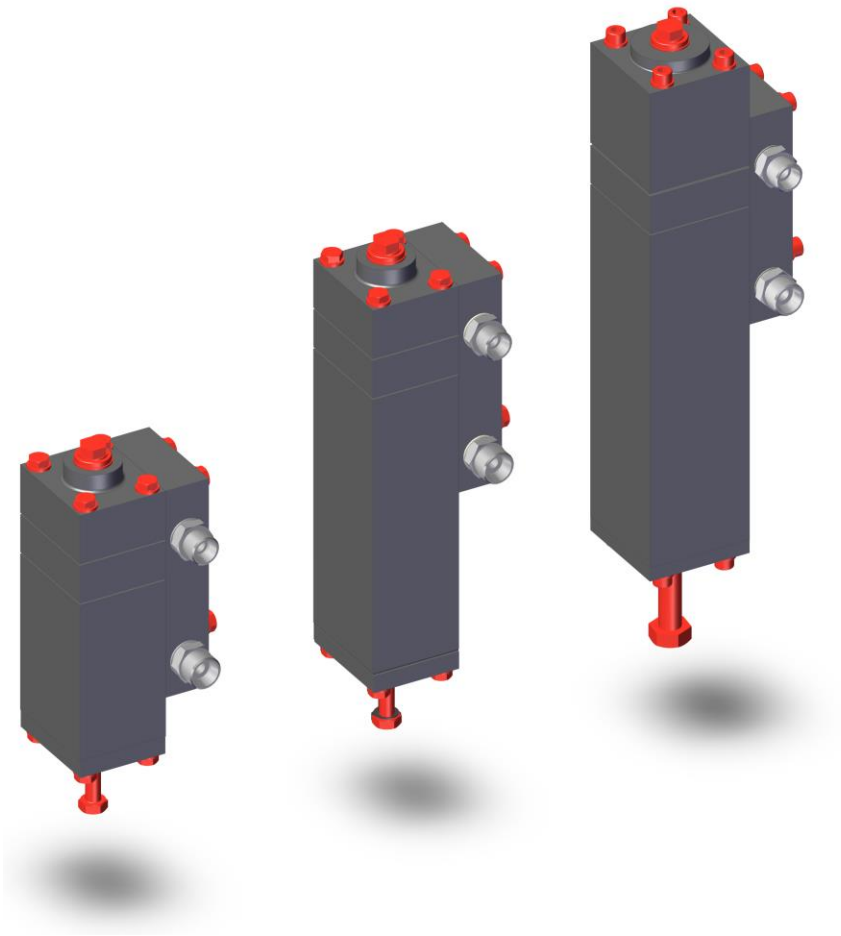

HON 670 / HON 671
Controllers

Component documentation,
Maintenance manual and spare parts

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1 General considerations

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1.1 About this component documentation

Validity and purpose

This component documentation applies for the controllers HON 670 / HON 671.

This component documentation provides all individuals with the information required in order to safely handle the device in connection with the following tasks:

- Maintenance and servicing
- Storage and disposal

Target group

This component documentation is intended for anyone who requires the following information concerning the product:

- Intended use
- Device models
- Technical specifications
- How it works
- Maintenance manual
- Spare parts drawings and spare parts lists

Illustration

Honeywell offers products with identical functions in a number of different sizes. For this reason, we are unable to guarantee that the illustrations in this documentation will match the dimensions of your product. In these cases, the illustrations should be viewed as a concept sketch.

Safety

Failing to observe the information provided in this document may lead to injuries, including death and material damages.

To ensure the safety, any persons handling the product must have read and understood the following parts of this document before they start with any work involving it:

- the chapter entitled Safety
- the chapters that describe the work to be done

Copyright notice

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Details about the manufacturer's liability

The manufacturer will not be liable for damages and malfunctions arising from failure to observe this component documentation and other applicable documents.

Constructive changes

The written approval from Honeywell Gas Technologies GmbH, Kassel, is required for any modifications and additions to the product. Any violation will void the legal liability for consequences arising thereof.

1.2 About the safety notices

Meaning

The information contained in the safety notices is intended to prevent personal injury. Safety notices contain the following information:

- Nature and source of the danger
- Possible consequences associated with the non-observance of the notice
- Procedures for the prevention of personal injury

Types of safety notices

This document contains the following types of safety notices:

Type of safety notice	Description	Sign
Basic safety notices	Superordinate safety notices not relating to a specific task: ▪ They contain a summarized description of hazards, risks and safety procedures associated with the handling of the device. ▪ Their purpose is to inform and educate the user about an existing danger and about practicing behavioral safety. ▪ They are suitable as safety instruction for all employees handling the device.	Recognizable by the heading of the chapter
Instruction-related safety notices	Safety notices containing specific instructions relating to the entire manual or a group of manuals	⚠DANGER ⚠WARNING ⚠CAUTION
Step-related safety notices	Safety notices containing specific instructions relating only to the step	**DANGER** **WARNING** **CAUTION**
Additional safety notice	Instruction to observe certain safety notices with reference to a location in the document where safety notices containing specific information about dangers, risks and specific instructions for safety procedures can be found	

Danger levels

The safety notices containing specific instructions are identified with a signal word. The signal word represents a certain danger level:

Danger level	If you fail to follow the instruction, then ...	And the consequence is ...
DANGER	an accident will happen	serious bodily injury or death.
WARNING	an accident may happen	possible serious bodily injury or death.
CAUTION	an accident may or will happen.	minor or moderate bodily injury.

Warnings about material damages

Warnings about possible material damages are identified with the word **Attention** in this document.

2 Description

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2.1 Intended use

Intended use

The controllers HON 670 / HON 671 are used to trigger safety equipment within a controlled gas system.

The controllers can be used for neutral, non-aggressive gases and the gases specified in DVWG Code of Practice G260.

Note: The device's operating limits concerning the gas, the operating pressure, and the operating temperature can be found either on the rating plate affixed to the device or in the device's technical specifications.

The use under different operating conditions must be coordinated in consultation with the manufacturer.

The controllers HON670 / HON671, which conform to DIN EN 334 / DIN EN 14382, are intended to be used for the following gas pressure regulators:

- HON 372
- HON 402
- HON 408
- HON 503
- HON 512
- HON 530
- HON 703
- HON 704
- HON 711
- HON 721
- HON 5020

Limitations of use

Please observe the following limitations of use:

- Do not use the device for any media other than those mentioned in the intended use or those discussed with and approved by the manufacturer.
- Do not use the device in any installation position other than the one documented in this component documentation.
- Do not use the device against the direction of flow specified on the device and in the component documentation.
- When replacing defective parts, only use original spare parts or manufacturer-approved standard parts.
- Do not attempt to modify or remodel the device on your own.

2.2 Device models

Variants of the controllers HON 670 / HON 671

The configuration levels of the controllers HON 670 / HON 671 can be varied in some respects using individual components.

The following individual components are always part of the device:

- Spring adjuster of the pilot spring
- Amplifying valve
- Comparator stage
- Base plate
- Pressure unit

The following individual components are installed in some versions of the device:

- Comparator stage
  - Diaphragm measuring unit
  - Diaphragm assembly with ball guide sleeve
  - Metal bellows measuring unit

Controllers HON 670 / HON 671 models

The comparator stage as an individual component is executed in three models with different designs in dependence on the control range (W_d) of the controller:

Series	Design for upper response pressure	Control range W_{dso}		Thread type
		[bar]	[psi]	
HON 670	K16: Diaphragm measuring unit	0.8 - 20	11.6 - 290	Metric, imperial
	K16: Diaphragm assembly with ball guide sleeve	10 - 40	145 - 580	
	K18: Metal bellows measuring unit	20 - 90	290 - 1305	

Series	Design for lower response pressure	Control range W_{dsu}		Thread type
		[bar]	[psi]	
HON 671	K17: Diaphragm measuring unit	2.0 - 20	29 - 290	Metric
	K17: Diaphragm assembly with ball guide sleeve	10 - 40	145 - 580	
	K19: Metal bellows measuring unit	20 - 90	290 - 1305	

The designs that use the imperial system of measurement feature ports that conform to Anglo-American thread standards and use inches as a unit.

The designs that use the metric system of measurement feature ports that conform to European thread standards and use metric units.

Versions and designs in this component documentation

The technical specifications and the spare parts lists and spare parts drawings in the appendix describe all the models of the HON 670 / HON 671 controllers.

The Maintenance section describes the controller using the example of the models with a diaphragm measuring unit and a metal bellows measuring unit. It does not explicitly describe every single version and design.

If you have trouble understanding the information in this documentation, contact the manufacturer without fail before starting any work on the device.

2.3 Labels/Markings

Illegible labels

⚠WARNING

Illegible information on the device poses a risk of injury due to resulting erroneous operation, use, or installation.

Labels, as well as inscriptions and stamping on the device, can eventually become soiled or otherwise unrecognizable to such an extent that users will not be warned effectively of hazards and may be unable to follow required operating instructions. This will pose a risk of injury.

⇨ Make sure to always keep all relevant labels in good condition so that they will be easily legible.

⇨ Immediately replace damaged and missing labels.

Identifying the device

Make sure you have the right component documentation for your device.

To identify your device, look at the nameplate.

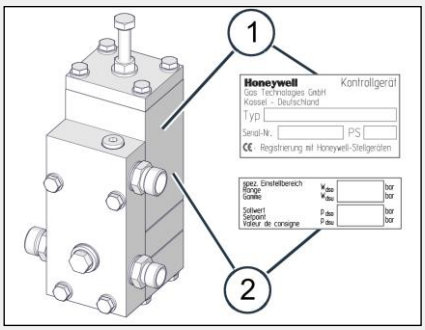
Verifying the technical specifications

Make sure that the conditions on site correlate with the information on the type plate and the technical specifications.

Technical specifications

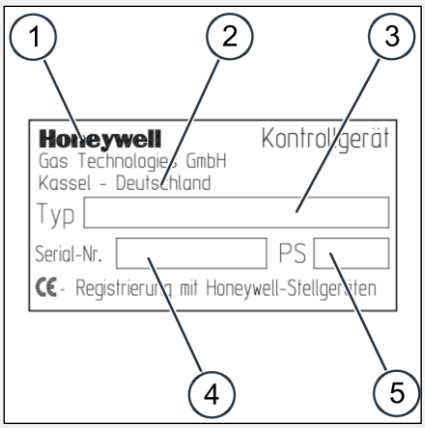
Locating the monitoring device's type plates

The monitoring device type plate locations are as follows:

Figure	No.	Description
	**1**	Type plate on the side of the monitoring device
	2	Additional type plate on the side of the monitoring device

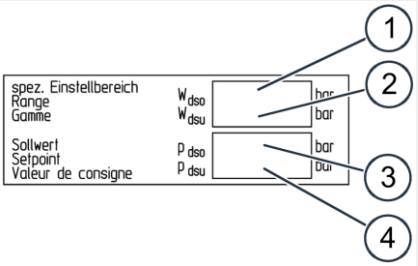
Interpreting the type plate on the monitoring device

The details on the type plate have the following meaning:

Figure	No.	Description
	**1**	Manufacturer ID
	2	Manufacturer's address
	3	Type designation
	4	Serial number
	5	PS = Maximum allowable pressure

Interpreting the additional type plate on the monitoring device

The details on the additional type plate mean the following:

Figure	No.	Description
	**1**	Specific adjustment range [bar] W_{dso} = Excess pressure
	2	Specific adjustment range [bar] W_{dso} = Insufficient pressure
	3	Setpoint to be set [bar] p_{dso} = Upper response pressure value
	4	Setpoint to be set [bar]; see configuration p_{dsu} = Lower response pressure value

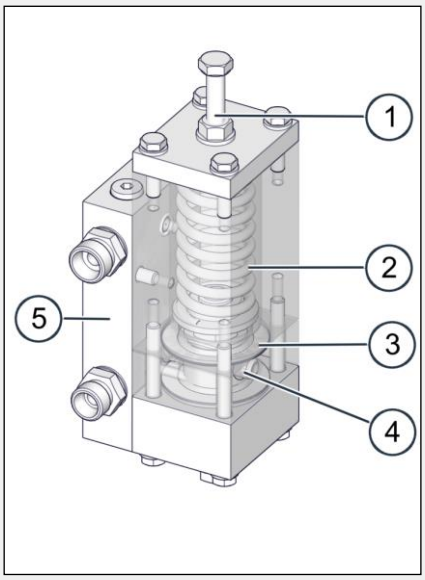
Labels on connection lines

Small color-coded text labels must be used to mark the controller's connection lines based on what the lines are used for.

2.4 Physical design and operation

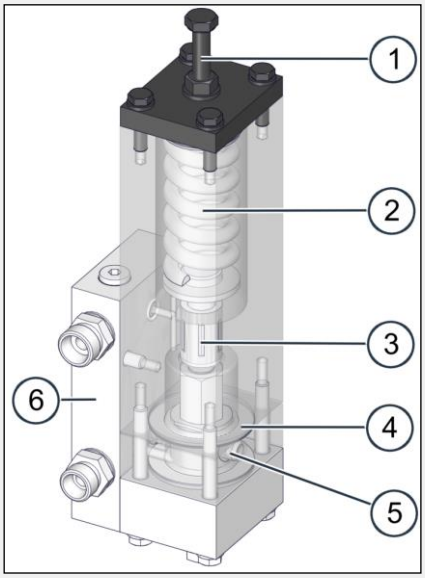
Physical design of the controllers K16 / K17

The controller is made up of the following individual components:

Figure	No.	Description
	**1**	Spring adjuster
	2	Pilot spring
	3	Comparator stage with diaphragm measuring unit
	4	Amplifying valve
	5	Base plate

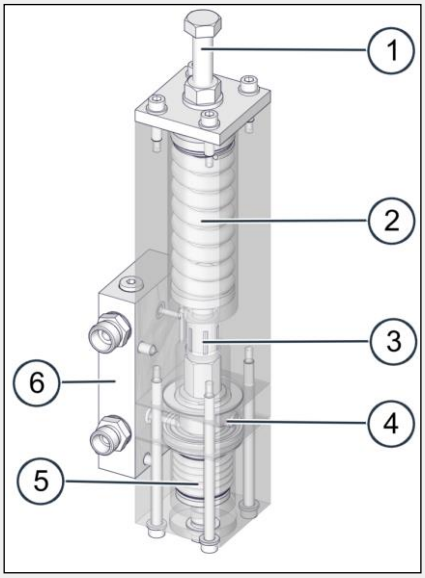
Physical design of the controllers K16 / K17 with ball guide sleeve

The controller is made up of the following individual components:

Figure	No.	Description
	**1**	Spring adjuster
	2	Pilot spring
	3	Ball guide sleeve
	4	Comparator stage with diaphragm measuring unit with ball guide sleeve
	5	Amplifying valve
	6	Base plate

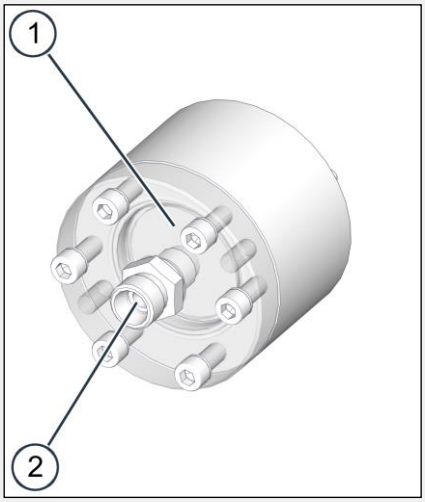
Physical design of the controllers K18 / K19

The controller is made up of the following individual components:

Figure	No.	Description
	**1**	Spring adjuster
	2	Pilot spring
	3	Ball guide sleeve
	4	Amplifying valve
	5	Comparator stage with metal bellows measuring unit
	6	Base plate

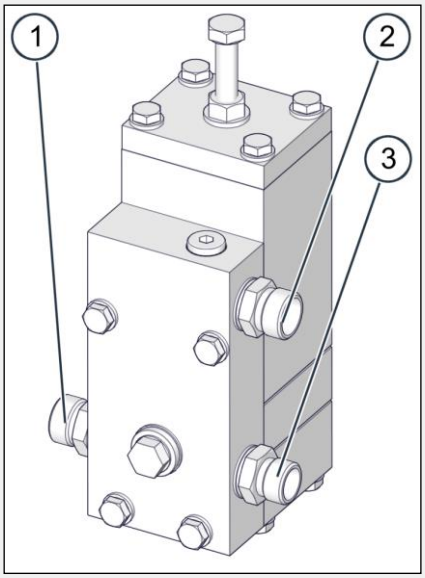
Physical design of the pressure unit

The pressure unit consists of the following individual components:

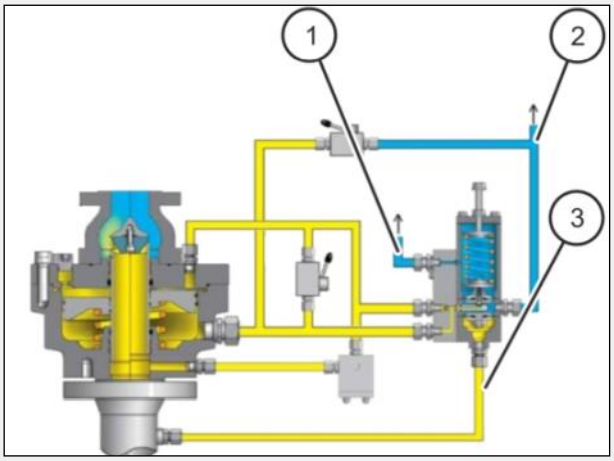
Figure	No.	Description
	**1**	Piston
	2	Controller connection

Controller connection lines

The controller features the following connections:

Figure	No.	Connection	Pipe connection thread type	
			Metric	**Imperial**
	**1**	Measuring line	E12L	1/2"
	2	Vent line	E12L	1/2"
	3	Pressure unit	E10L	3/8"

Functional diagram of the controller

Figure	No. / color	Description
	**1**	Vent line
	2	Bleed line
	3	Measuring line
		Outlet pressure
		Atmospheric pressure

How the controller works when the SAV responds

- The pressure in the system to be safeguarded is guided into the controller via the measuring line where it is applied to the upper side of the double diaphragm system and compared with the reference variable that is specified using the setpoint adjusting screw (force of the pilot spring).
- In the normal operating state, the amplifying valve is closed. The downstream system including the actuator of the SAV is pressureless.
- When the upper or lower response pressure is reached, the amplifying valve opens.
- Gas from the monitored system flows to the actuator of the safety shut-off valve.
- The piston of the pressure unit is moved and triggers the SAV's trip mechanism via the piston rod.
- The safety shut-off valve closes.

How the controller works when the SBV responds

- The pressure in the system to be safeguarded is guided into the controller via the measuring line where it is applied to the upper side of the double diaphragm system and compared with the reference variable that is specified using the setpoint adjusting screw (force of the pilot spring).
- In the normal operating state, the amplifying valve is closed. The pressures in the upper and lower actuator chamber of the actuator assembly are equal.
- When the monitored pressure reaches the set response pressure of the controller, the amplifying valve opens.
- The pressure in the actuator chamber below the driving piston is reduced.
- The system pressure on the upper side of the actuator moves the sleeve against the closing spring in the opening direction so that the blowdown procedure of the safety relief valve is enabled.
- If the monitored pressure then once again falls below the setpoint as adjusted, the amplifying valve closes and the pressure in the lower actuator chamber thus rises.
- When the pressure between the upper and the lower actuator chamber has equalized, the safety relief valve closes again on its own.

2.5 Technical specifications

Characteristic device values and materials

The following characteristic values apply to all control ranges:

	Value
Max. inlet pressure p_{umax}	100 bar (1450 psi)
Temperature range	-20 to +60 °C (-4 to +140 °F)
Materials	Case: Aluminum alloy Internal parts: Al alloy, stainless steel O-rings: rubber-like synthetic material diaphragms: rubber-like synthetic material

Actuating mechanisms for overpressure

Controller	Manual	Automatic for overpressure [bar]	Response time [sec.]
K16	Via manual actuator	0.8 - 40.00	0.1 - 0.3
K18	Via manual actuator	20.00 - 90.0	0.1 - 0.3

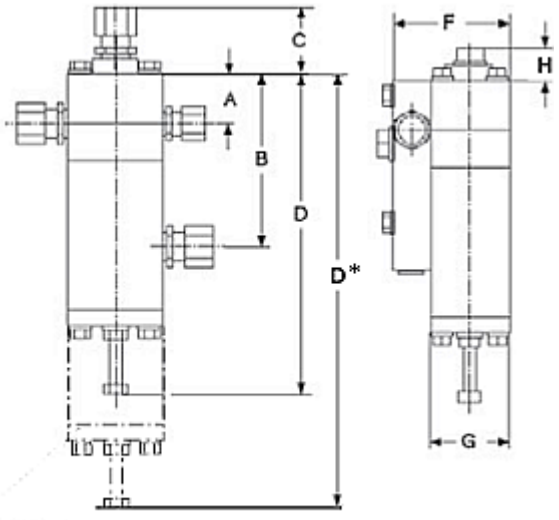
Actuating mechanisms for underpressure

Controller	Manual	Automatic for underpressure [bar]	Response time [sec.]
K17	Via manual actuator	2.0 - 40.00	0.1 - 0.3
K19	Via manual actuator	20.00 - 90.0	0.1 - 0.3

Controller dimensions

The figure below shows the dimensions for the controller K16 / K17 for the control range W_d= 0.8 – 40 bar:

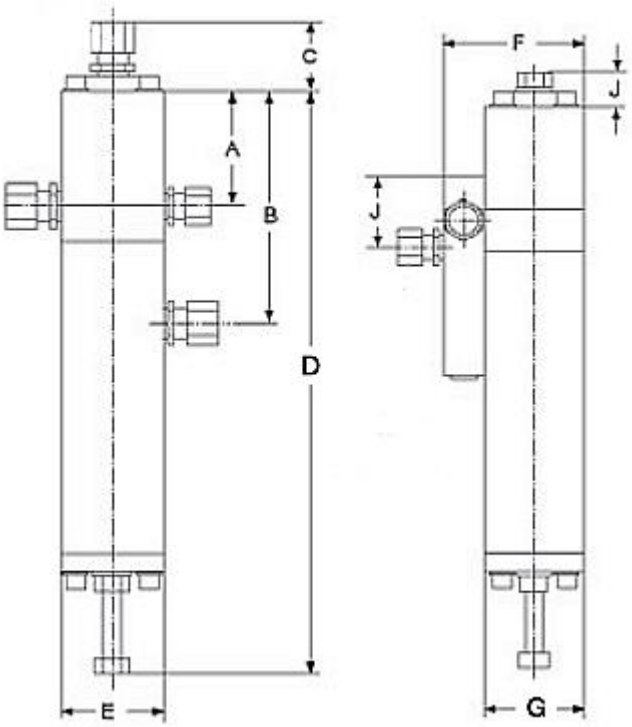
Comparator stage: Diaphragm measuring unit and diaphragm measuring unit with ball guide sleeve



*) Stage with ball guide sleeve

The figure below shows the dimensions for the controller K18 / K19 for the control range W_d= 20 – 90 bar:

Comparator stage: Metal bellows measuring unit



Dimensions:

Design	Controller	A	B	C	D	E	F	G	H	J
		[mm]								
SAV	K16 / K17	26	100		195	60	75	50	20	
	K16* / K17*	26	100		260	60	75	50	20	
	K18	60	131		340	60	85	60	18	
SBV	K16	26	100	40	195	60	75	50		38
	K18	60	131	37	340	60	85	60		38

*) Stage with ball guide sleeve

Gas properties

The properties of the gas conveyed through the controllers HON 670 / HON 671 must meet the requirements specified by the DVGW German Technical and Scientific Association for Gas and Water in the latest version of DVGW Code of Practice G 260 (A).

ATEX specifications

The device's mechanical components do not contain any potential sources of ignition, and accordingly do not fall under the scope of ATEX 95 (94/9/EC). The electrical components used on the device meet all applicable ATEX requirements.

3 Safety

Contents

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3.1 Basic safety rules

Target group of these rules

These rules are intended for any individuals handling the device.

Purpose of these rules

These rules are designed to make sure that any individuals working with or on the device will thoroughly familiarize themselves with the corresponding hazards and safety measures and will observe the safety notices contained in this component documentation and on the device. If you do not follow these rules, there is a risk of injury including death and material damages.

How to use this component documentation

Observe the following rules:

- Read the chapter entitled Safety and the chapters relating to your responsibilities in their entirety. It is vital that you have understood these contents.
- Always keep this component documentation in the vicinity of the device so that you can consult it when necessary.
- Include this component documentation if you are transferring ownership of the device.

Handling the device

Observe the following rules:

- Only individuals who meet the requirements set forth in this component documentation have permission to work with/on the device.
- The device's intended use includes its use in hazardous locations. All work with and on the device must be carried out only after the presence of an explosive atmosphere has been fully ruled out.
- Only use the device for the intended purpose. Never use the device for any other, potentially logical purposes.
- Follow all the safety measures outlined in this component documentation and on the device. In particular, wear the mandatory personal protective gear.
- Do not modify the device in any way, e. g. by removing parts or adding unapproved parts. In particular, you have no permission to modify or disable any safety contrivances.
- When replacing defective parts, only use original spare parts or manufacturer-approved standard parts.

Requirements concerning the workforce

Personnel must meet the following requirements:

- All personnel must meet the requirements corresponding to their duties.
- All personnel must read and understand this component documentation before working with/on the device.
- All occupational health and safety regulations that apply in your country must be complied with.
- All personnel must be provided with the personal protective equipment required for their work. This personal protective equipment must be in good condition at all times.
- All personnel must wear the personal protective equipment required for their work.

Conduct in the event of accidents

The device is designed and built such that the employees can work with it without being at risk. In spite of all the precautions, accidents can happen under unfavorable circumstances. Always consult the directives of your company concerning the protection of the workforce.

3.2 Requirements concerning the workforce, personal protective gear, workplaces

Requirements concerning the workforce

Individuals tasked with handling the device must meet the following requirements:

Personnel	Responsibilities	Required qualification
Mechanical fitter	▪ Mechanical removal and installation ▪ Maintenance and servicing	▪ Professional training and experience operating pressure equipment and systems ▪ Knowledge of the relevant standards and regulations ▪ Ability to identify and avoid dangers autonomously

Requirements for the personal protective gear

Any persons handling the device must be equipped with the following personal protective gear:

Task	Required personal protective gear
Mechanical activities involved in maintenance, storage, disposal	▪ Safety boots with protection for electrostatic discharge (ESD) ▪ Safety gloves

Workplace requirements

To ensure the safe handling of the device, the personnel must remain at the workplaces intended for performing their tasks.

The workplaces for performing the various tasks are at the following locations:

Task	Workplaces
▪ Maintenance, repairs ▪ Storage ▪ Disposal	All around the device, depending on the task

4 Maintenance

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4.1 Maintenance schedule

Meaning

The maintenance schedule provides an overview of the periodically required maintenance.

Maintenance schedule

Since the maintenance intervals are highly dependent on the operating conditions and the gas quality, it is impossible to provide set maintenance intervals. It is recommended to use maintenance intervals conforming to the specifications in DVGW Code of Practice G 495. In addition, the need for maintenance must be determined and documented on the basis of operational requirements and experience.

Maintenance must be carried out in compliance with all federal and state laws and regulations, as well as with the local rules and regulations set forth by the relevant utilities and authorities and any other applicable regulations.

4.2 Preparing for the maintenance

Preparation work for controller maintenance

Proceed as follows:

Step	Description	Explanation
1	Have the maintenance and servicing parts ready	Refer to the topic *Explanation of spare parts* to find out which spare parts drawings belong to your device model and have the corresponding maintenance and service parts ready before starting maintenance.
		▪ The spare parts that are always required for the controller's maintenance are listed in the spare parts kits for the controller. ▪ Spare part drawings and spare parts lists are listed in the *appendix* (see page 41).
		In addition to these maintenance parts, there are also servicing parts that need to be checked during maintenance in order to make sure that they are in working condition. Depending on their condition, these must be replaced as needed. Consequently, it is recommended that the required servicing parts be kept on hand as per the section *Servicing parts for controllers* in the topic *Maintenance and servicing parts for HON 670_671* to prevent downtimes.
2	Preparing special tools	In addition to standard tools, have the special tools required for your specific controller model ready to go before maintenance. Please refer to the *Special tools* section in *Lubricants, threadlockers, and special tools* (see page 65).
		You will also need a magnetic bowl for the maintenance of your controller to enable removal of the balls of the guide sleeve.

Step	Description	Explanation
3	Have the required lubricants and threadlockers ready	For specifications concerning the lubricants and threadlockers that must be used, please refer to the sections of the same name under *Lubricants, threadlockers, and special tools* (see page 65).
4	Removing the controller from the actuator assembly	**WARNING!** Risk of serious injury posed by pressurized components moving in an uncontrolled manner when handled improperly. If not handled properly or in the event of a defect, gas can escape from pressurized components under high pressure and cause serious injuries and even death. Before you start working on these components: ▪ Close all connections leading to the gas-carrying line. ▪ Establish a depressurized status. Residual amounts of energy must be depressurized as well. Before starting with the maintenance work, the controller must be removed from the actuator assembly with which it operates. For instructions on how to remove the controller, please refer to the user manual for the relevant gas pressure regulator. Keep in mind that it is always necessary to depressurize the actuator assembly (including the controller) and purge all gas-conveying lines with nitrogen before removal.

Sample maintenance instructions

The maintenance described below uses the controller with a diaphragm measuring unit and the controller with a metal bellows measuring unit as an example. Use the bills of materials to make sure that you replace all the maintenance parts relevant to your specific device model during maintenance.

4.3 Removing the pressure unit from the controller

Falling components

⚠CAUTION

Crush and impact hazard posed by components falling or toppling over accidentally.

When working with heavy components that have been removed or are yet to be installed, injury may result if the components start moving in an uncontrolled manner, e.g., fall down from the working surface or topple over.

⇨ Place removed components exclusively on level, horizontal working surfaces with enough load-bearing capacity.
⇨ If necessary, secure removed components so that they will not fall or topple over.
⇨ Wear the required personal protective equipment.
⇨ Exercise caution when performing the relevant tasks.

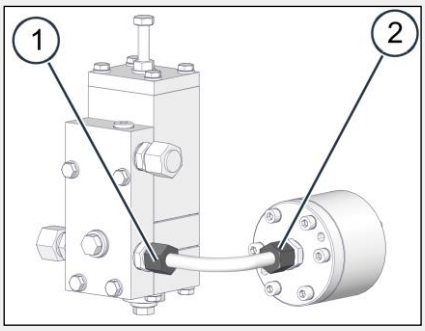
Cleaning

Observe the following cleaning instructions:

- Before assembly, all parts must be cleaned in order to remove any foreign particles (swarf) and soiling.
- If screws, bolts, or washers are replaced with identical new parts, any oil on these new parts must first be removed.

Removing the pressure unit from the controller

Proceed as follows:

Figure	Step	Description
	1	Unscrew screw connections (1) and (2) to disconnect the pipe connections. Take off the pressure unit.

Next task

Proceed as follows:

Maintenance on the controller with diaphragm measuring unit (see page 19)

Maintenance on the controller with metal bellows measuring unit (see page 27)

Maintenance on the pressure unit (see page 35)

4.4 Maintenance on the controller with diaphragm measuring unit

Falling components

⚠CAUTION

Crush and impact hazard posed by components falling or toppling over accidentally.

When working with heavy components that have been removed or are yet to be installed, injury may result if the components start moving in an uncontrolled manner, e.g., fall down from the working surface or topple over.

⇨ Place removed components exclusively on level, horizontal working surfaces with enough load-bearing capacity.

⇨ If necessary, secure removed components so that they will not fall or topple over.

⇨ Wear the required personal protective equipment.

⇨ Exercise caution when performing the relevant tasks.

Cleaning

Observe the following cleaning instructions:

- Before assembly, all parts must be cleaned in order to remove any foreign particles (swarf) and soiling.
- If screws, bolts, or washers are replaced with identical new parts, any oil on these new parts must first be removed.

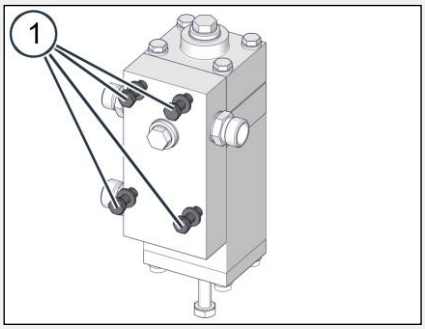
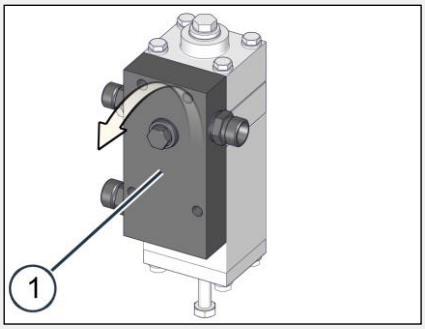
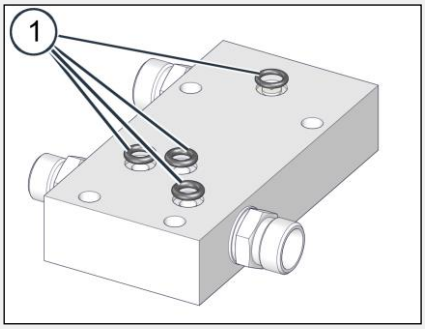
Tightening torques

Observe the tightening torques below when following the instructions in this section:

Part	Tightening torque	Step	Task
Screws of pilot spring cover	12 Nm (9 ft lbs)	4	Replace the O-ring of the pilot spring cover
Cap nut	20 Nm (15 ft lbs)	5	Assembling the double diaphragm system
Hex nut	20 Nm (15 ft lbs)	6	Assembling the double diaphragm system
Baseplate screws	12 Nm (9 ft lbs)	7	Mounting the controller
Screws of bottom cover	12 Nm (9 ft lbs)	8	Mounting the controller

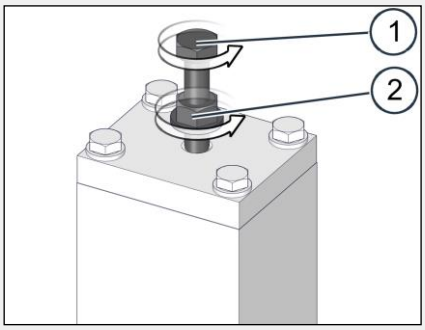
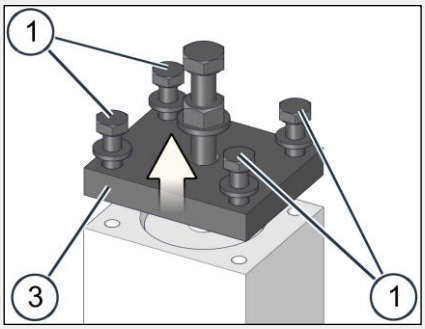
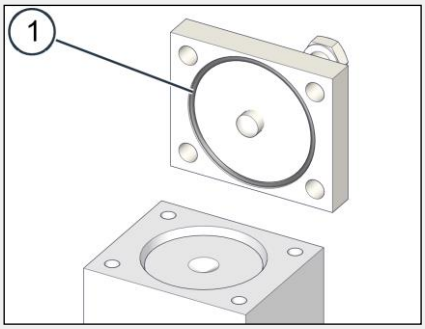
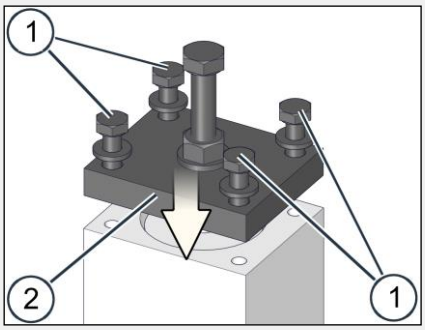
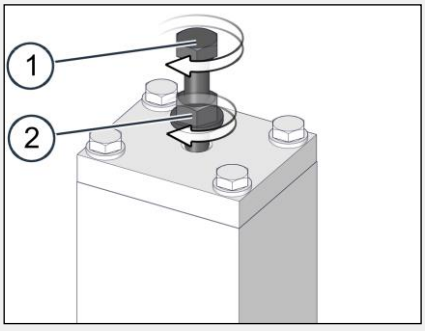
Replace O-rings of the baseplate

Proceed as follows:

Figure	Step	Description
	1	Unscrew the 4 screws (1) on the baseplate.
	2	Remove the baseplate (1).
	3	Replace the 4 O-rings (1) with 4 new, lubricated O-rings. Bear in mind that the O-rings differ. Note: See the appendix for the lubricants to be used.

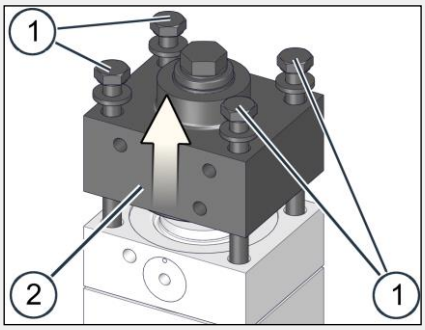
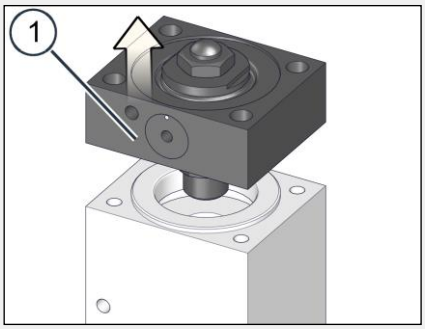
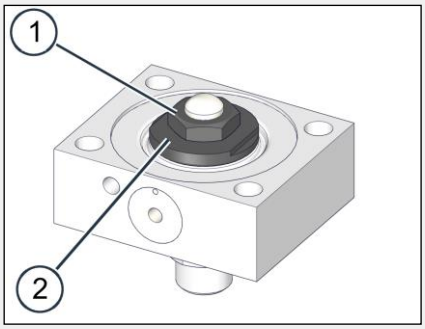
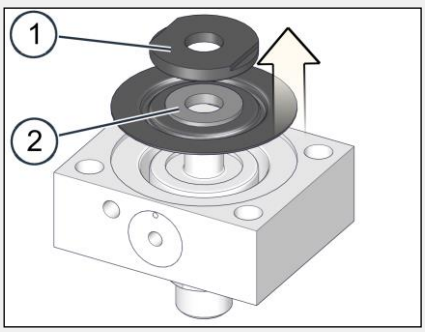
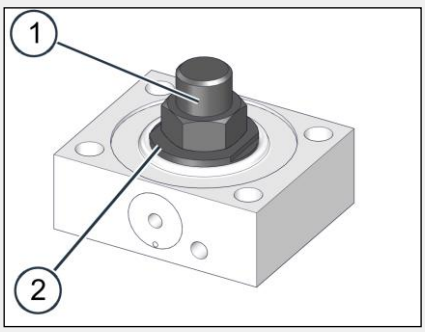
Replace the O-ring of the pilot spring cover

Proceed as follows:

Figure	Step	Description
	**1**	Release the tension on the pilot spring by loosening the hex flange nut (2) and unscrewing the spring adjuster (1) a few turns.
	**2**	Unscrew the 4 screws (1) of the cover and remove the cover (2). **CAUTION!** The cover and the pilot spring can spring out if the pilot spring is not completely relaxed
	**3**	Replace the O-ring (1) with a new, lubricated O-ring. Lubricate the thread surfaces. Note: See the appendix for the lubricants to be used.
	**4**	Put the cover (2) in place. Tighten the 4 screws (1) of the cover using a crosswise pattern. Tightening torque: 12 Nm (9 ft lbs)
	**5**	Screw the hex flange nut (2) back in a bit and screw in the spring adjuster (1) by a few turns. The correct setpoint adjustment cannot be carried out until before commissioning with the controller installed.

Dismantling and removing the double diaphragm system

Proceed as follows:

Figure	Step	Description
	**1**	Unscrew the 4 screws (1) of the lower cover and remove the lower cover (2).
	**2**	Remove the double diaphragm system (1) by lifting it off.
	**3**	Counter the diaphragm plate (2) and unscrew the hex nut (1).
	**4**	Remove the following parts: ▪ Diaphragm plate (1) ▪ Diaphragm (2)
	**5**	Turn the double diaphragm system over. Counter the diaphragm plate (2) and unscrew the cap nut (1).

Replacing the wear parts of the double diaphragm system

Proceed as follows:

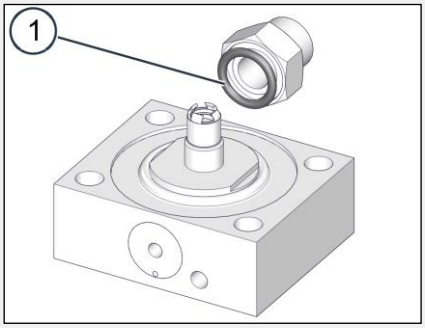
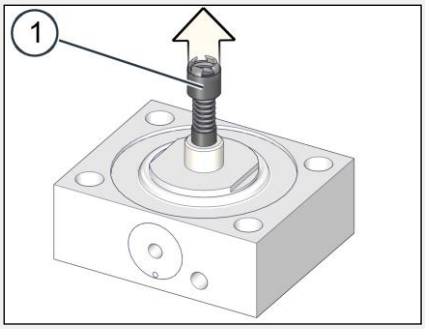
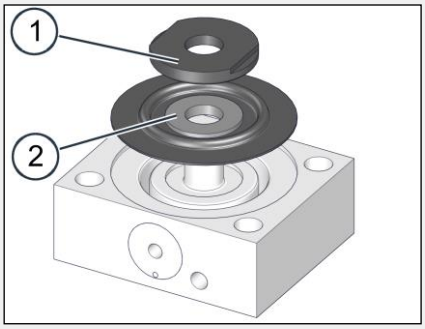
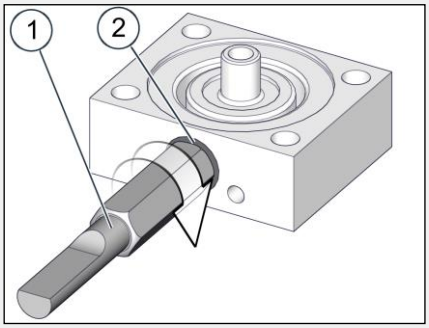
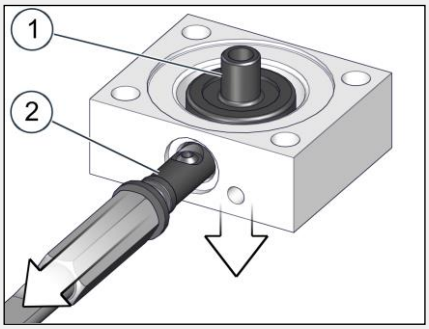
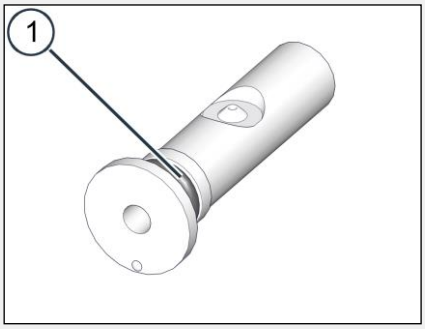
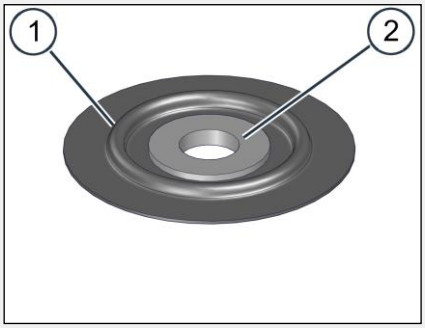
Figure	Step	Description
	**1**	Replace the O-ring (1) of the cap nut with a new, lubricated O-ring. Note: See the appendix for the lubricants to be used.
	**2**	Take out the piston (1).
	**3**	Remove the following parts: ▪ Diaphragm plate (1) ▪ Diaphragm (2)
	**4**	Screw the assembly aid (1) into the internal thread of the nozzle (2).
	**5**	Hold the connecting piece in place (1) and pull the nozzle (2) out.

Figure	Step	Description
	**6**	Replace the O-ring (1) with a new, lubricated O-ring. Check the edge of the nozzle for damage. Replace it if necessary. Note: See the appendix for the lubricants to be used.
	**7**	Replace the diaphragm (1). Place new snap-on gaskets (2) into the new diaphragms.

Assembling the double diaphragm system

Proceed as follows:

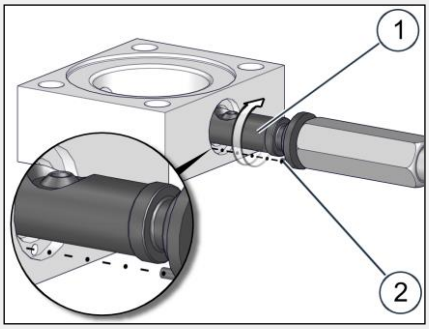
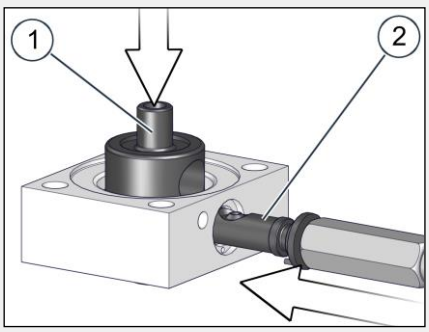
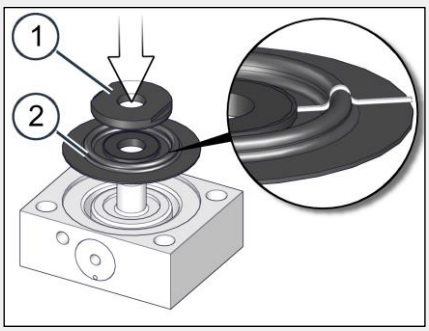
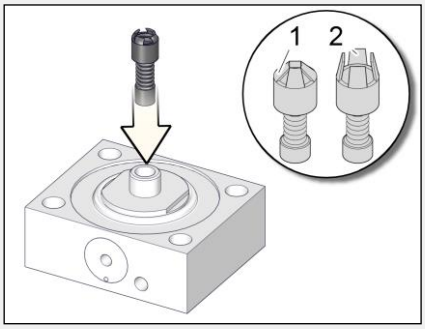
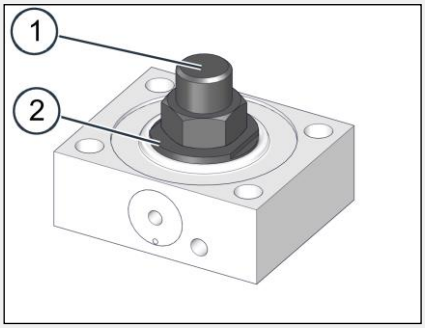
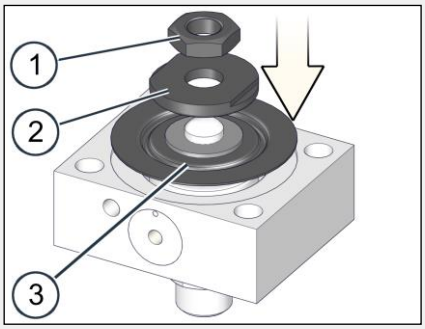
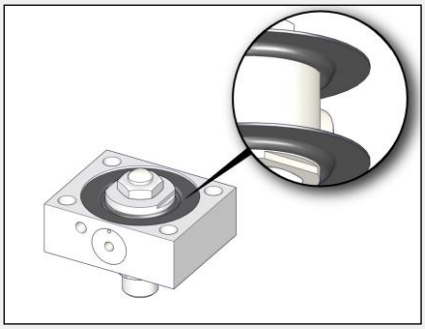
Figure	Step	Description
	**1**	Turn the nozzle (1) such that the pin (2) is positioned coaxially to the bore.
	**2**	Keep the connecting piece (1) in position and insert the nozzle (2) into the connecting piece (1) until it can go no further.
	**3**	Put the new diaphragm (2) and the diaphragm plate (1) in place. Make sure that the diaphragm is aligned correctly: The side of the diaphragm that has a depression at the center should be facing upward.

Figure	Step	Description
	**4**	Put a new piston (2) in place. Risk of confusion! Please observe the characterizing difference between the old and the new piston. Old piston (1): Castellated nut closed New piston (2): Castellated nut open
	**5**	Put on the cap nut (1). Counter the diaphragm plate (2) and tighten the cap nut firmly. Tightening torque: 20 Nm (15 ft lbs) When doing so, the castellated nut of the new piston will close.
	**6**	Turn the double diaphragm system over. Put the new diaphragm (3) and the diaphragm plate (2) in place. Counter the diaphragm plate and tighten the hex nut firmly (1). Tightening torque: 20 Nm (15 ft lbs)
	**7**	Make sure that the diaphragm is aligned correctly: The side of the diaphragm that has a depression at the center should be facing downward.

Mounting the controller

Proceed as follows:

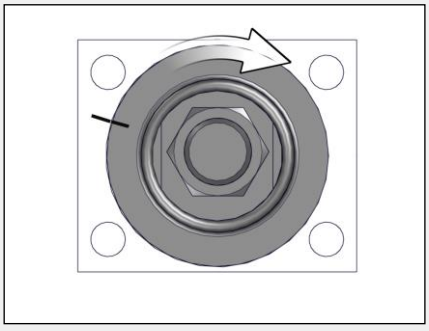
Figure	Step	Description
	**1**	To align the diaphragm plate correctly: Turn the diaphragm plate all the way to the right. Mark this position.

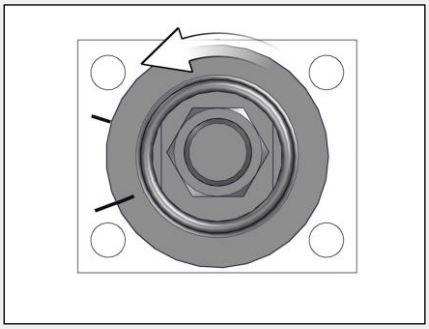
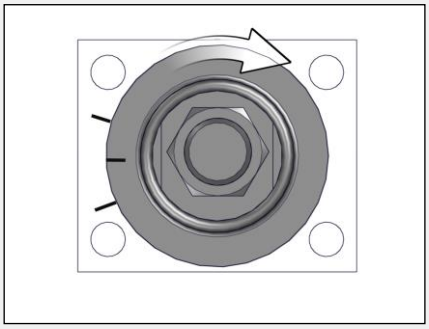
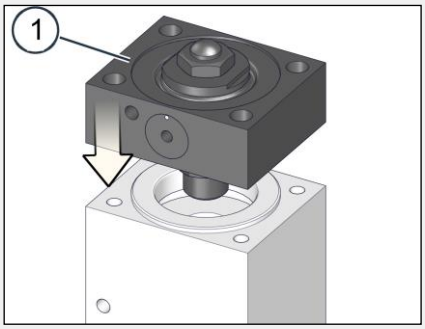
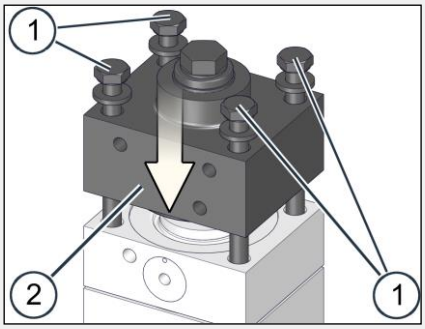
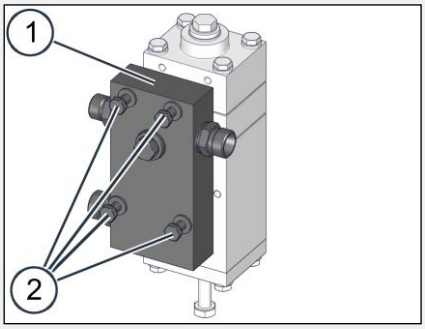
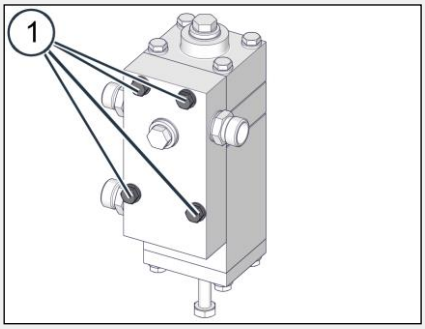
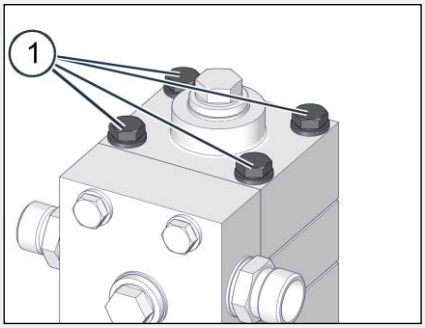
Figure	Step	Description
	**2**	Turn the diaphragm plate all the way to the left. Mark this position.
	**3**	Turn the diaphragm plate to the central position between the two marks. The diaphragm plate is now aligned correctly.
	**4**	Put the double diaphragm system into place.
	**5**	Put the bottom cover (2) in place. Tighten the 4 screws (1) only finger tight.
	**6**	Mount the baseplate (1). Tighten the 4 screws (2) only finger tight.

Figure	Step	Description
	**7**	Tighten the 4 screws (1) on the baseplate using a crosswise pattern. Tightening torque: 12 Nm (9 ft lbs)
	**8**	Tighten the 4 screws (1) using a crosswise pattern. Tightening torque: 12 Nm (9 ft lbs)

Final inspection

Conduct a final inspection to check whether the following criteria are met:

- The screw connections on the controller have been checked for a secure fit.

If ...	then ...
at least one criterion is not met	you should correct the error before proceeding with the next task.
all criteria are met	you may proceed with the next task.

Next task

Depending on the specific controller version, proceed as indicated in the relevant section:

Maintenance on the pressure unit (see page 35)

4.5 Maintenance on the controller with metal bellows measuring unit

Falling components

⚠CAUTION

Crush and impact hazard posed by components falling or toppling over accidentally.

When working with heavy components that have been removed or are yet to be installed, injury may result if the components start moving in an uncontrolled manner, e.g., fall down from the working surface or topple over.

⇨ Place removed components exclusively on level, horizontal working surfaces with enough load-bearing capacity.

⇨ If necessary, secure removed components so that they will not fall or topple over.

⇨ Wear the required personal protective equipment.

⇨ Exercise caution when performing the relevant tasks.

Cleaning

Observe the following cleaning instructions:

- Before assembly, all parts must be cleaned in order to remove any foreign particles (swarf) and soiling.
- If screws, bolts, or washers are replaced with identical new parts, any oil on these new parts must first be removed.

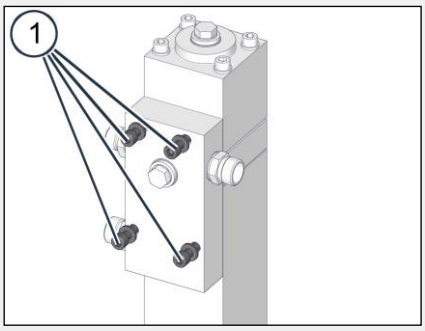
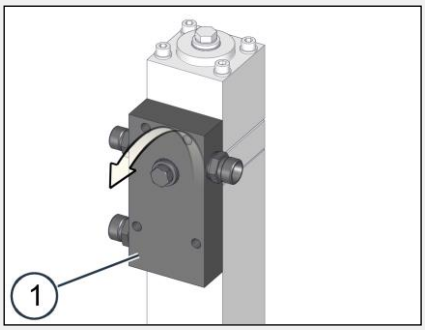
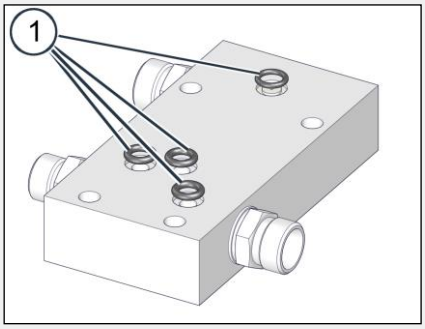
Tightening torques

Observe the tightening torques below when following the instructions in this section:

Part	Tightening torque	Step	Task
Screws of pilot spring cover	12 Nm (9 ft lbs)	4	Replace the O-ring of the pilot spring cover
Cap nut	15 Nm (11 ft lbs)	5	Assembling the diaphragm system
Metal bellows screw	15 Nm (11 ft lbs)	6	Assembling the diaphragm system
Screws of bottom cover	12 Nm (9 ft lbs)	7	Assembling the controller
Baseplate screws	8 Nm (6 ft lbs)	7	Assembling the controller

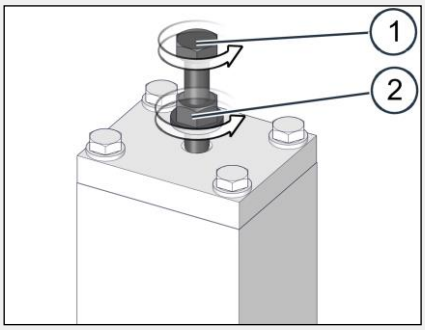
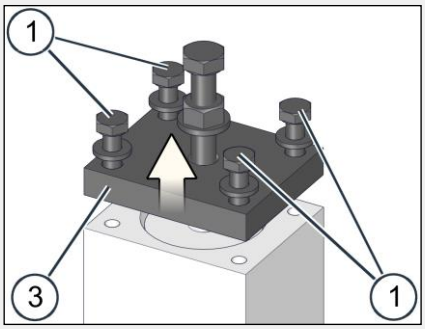
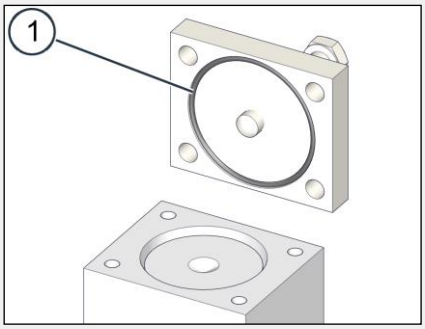
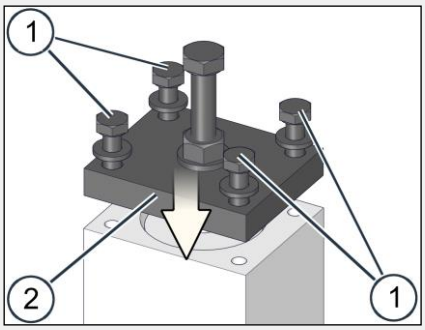
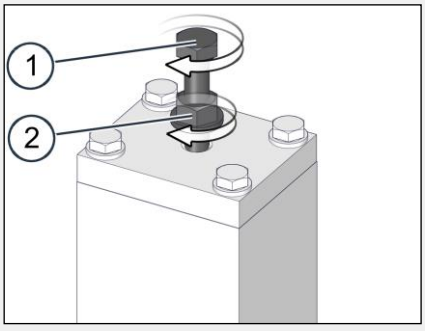
Replace O-rings of the baseplate

Proceed as follows:

Figure	Step	Description
	**1**	Unscrew the 4 screws (1) on the baseplate.
	**2**	Remove the baseplate (1).
	**3**	Replace the 4 O-rings (1) with 4 new, lubricated O-rings. Bear in mind that the O-rings differ. Note: See the appendix for the lubricants to be used.

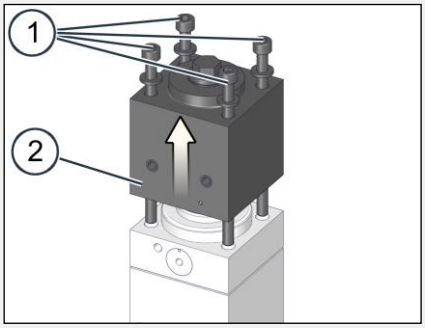
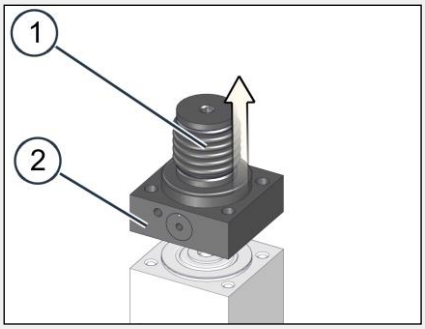
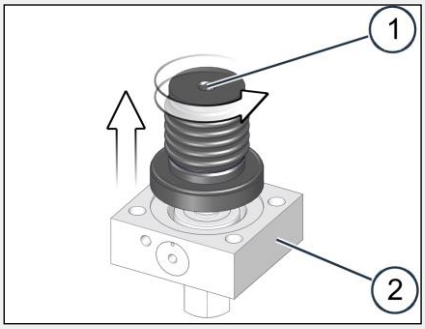
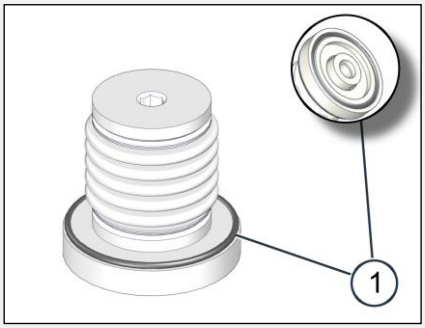
Replace the O-ring of the pilot spring cover

Proceed as follows:

Figure	Step	Description
	**1**	Release the tension on the pilot spring by loosening the hex flange nut (2) and unscrewing the spring adjuster (1) a few turns.
	**2**	Unscrew the 4 screws (1) of the cover and remove the cover (2). **CAUTION!** The cover and the pilot spring can spring out if the pilot spring is not completely relaxed
	**3**	Replace the O-ring (1) with a new, lubricated O-ring. Lubricate the thread surfaces. Note: See the appendix for the lubricants to be used.
	**4**	Put the cover (2) in place. Tighten the 4 screws (1) of the cover using a crosswise pattern. Tightening torque: 12 Nm (9 ft lbs)
	**5**	Screw the hex flange nut (2) back in a bit and screw in the spring adjuster (1) by a few turns. The correct setpoint adjustment cannot be carried out until before commissioning with the controller installed.

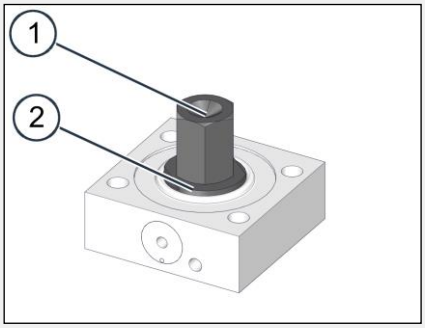
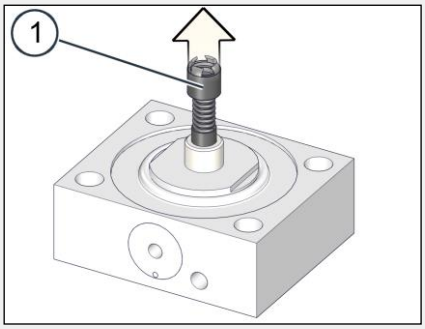
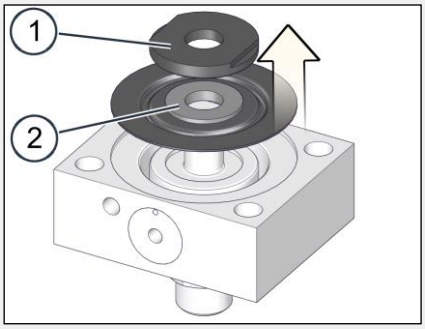
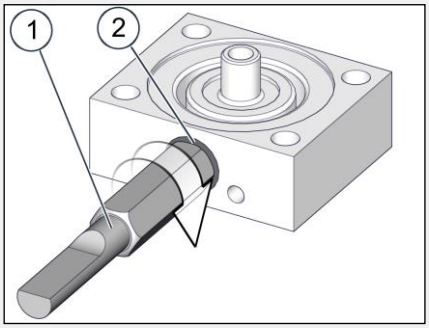
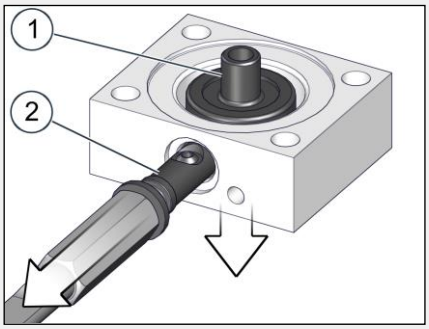
Replacing the O-rings of the metal bellows

Proceed as follows:

Figure	Step	Description
	**1**	Unscrew the 4 screws (1) of the lower cover and lift the cover off (2).
	**2**	Lift off the metal bellows (1) with the base plate (2).
	**3**	Unscrew the metal bellows (1) from the base plate (2).
	**4**	Replace the 2 O-rings (1) with 2 new, lubricated O-rings. Note: See the appendix for the lubricants to be used.

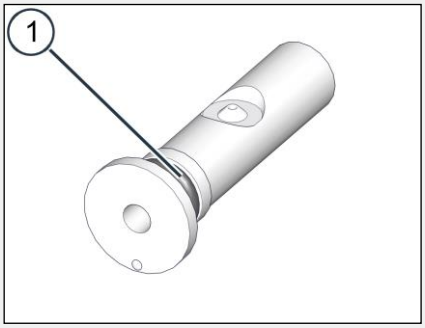
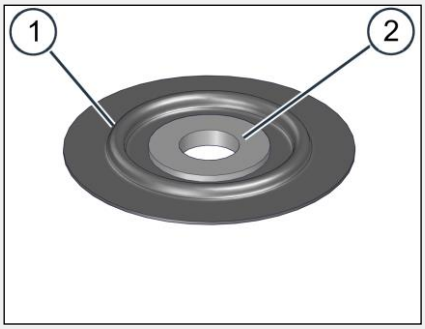
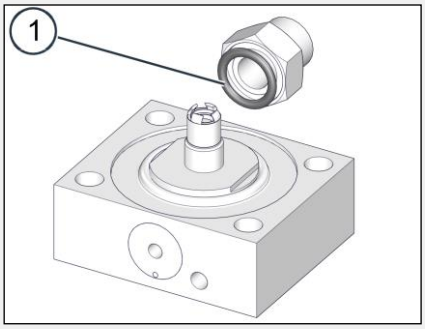
Disassembling the diaphragm system

Proceed as follows:

Figure	Step	Description
	**1**	Turn the diaphragm system over. Counter the diaphragm plate (2) and unscrew the cap nut (1).
	**2**	Take out the piston (1).
	**3**	Remove the following parts: ▪ Diaphragm plate (1) ▪ Diaphragm (2)
	**4**	Screw the assembly aid (1) into the internal thread of the nozzle (2).
	**5**	Hold the connecting piece in place (1) and pull the nozzle (2) out.

Replacing the wear parts of the diaphragm system

Proceed as follows:

Figure	Step	Description
	**1**	Replace the O-ring (1) with a new, lubricated O-ring. Check the edge of the nozzle for damage. Replace the nozzle if necessary. Note: See the appendix for the lubricants to be used.
	**2**	Replace the diaphragm (1). Place a new snap-on gasket (2) into the new diaphragm.
	**3**	Replace the O-ring (1) of the cap nut with a new, lubricated O-ring. Note: See the appendix for the lubricants to be used.

Assembling the diaphragm system

Proceed as follows:

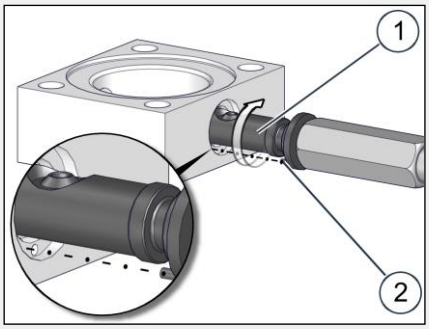
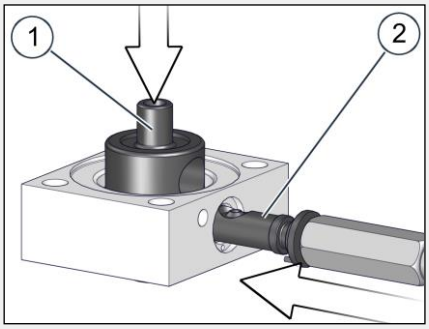
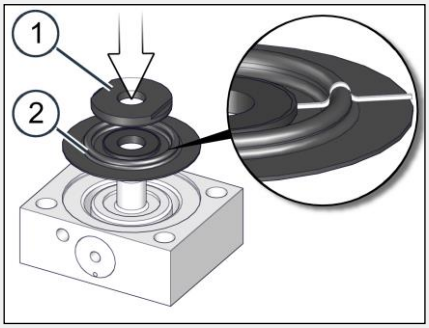
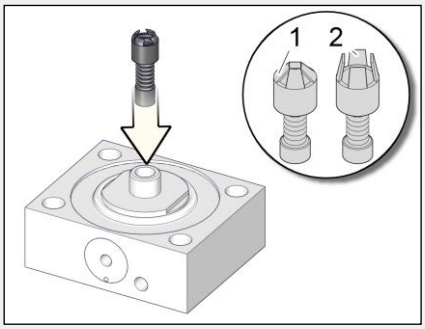
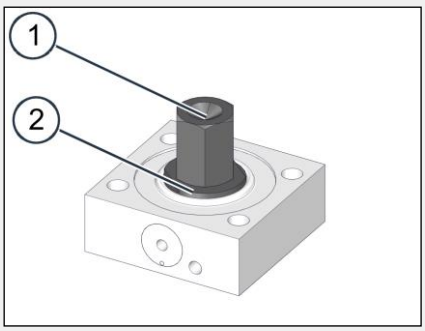
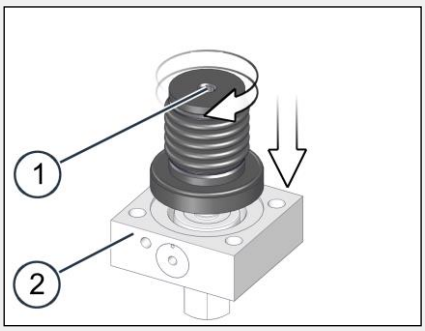
Figure	Step	Description
	**1**	Turn the nozzle (1) such that the pin (3) is positioned coaxially to the bore.

Figure	Step	Description
	**2**	Keep the connecting piece (1) in position and insert the nozzle (2) into the connecting piece (1) until it can go no further.
	**3**	Put the new diaphragm (2) and the diaphragm plate (1) in place. Make sure that the diaphragm is aligned correctly: The side of the diaphragm that has a depression at the center should be facing upward.
	**4**	Insert the new piston (2). Risk of confusion! Please observe the characterizing difference between the old and the new piston: Old piston (1): Castellated nut closed New piston (2): Castellated nut open
	**5**	Put the cap nut (1) in place. Counter the diaphragm plate (2) and tighten the cap nut firmly. Tightening torque: 15 Nm (11 ft lbs) When doing so, the castellated nut of the new piston will close.
	**6**	Turn the diaphragm system and screw the metal bellows (1) onto the base plate (2). Tighten the screws firmly. Tightening torque: 15 Nm (11 ft lbs)

Assembling the controller

Proceed as follows:

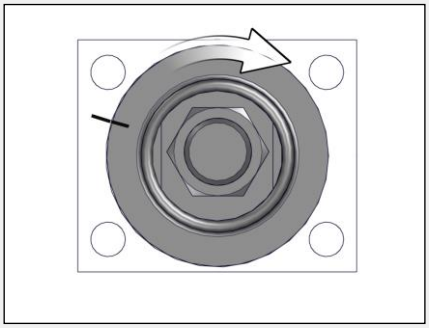
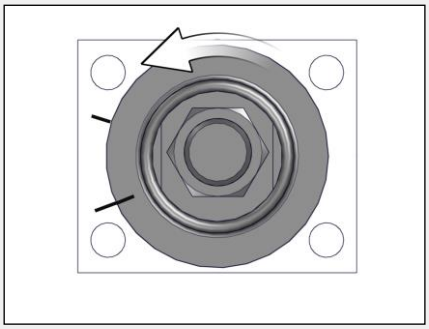
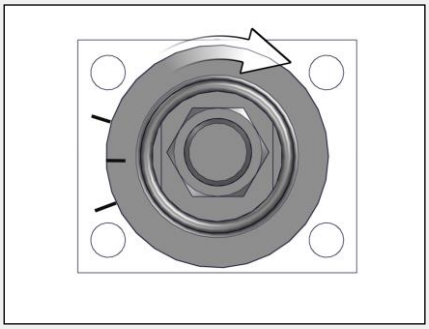
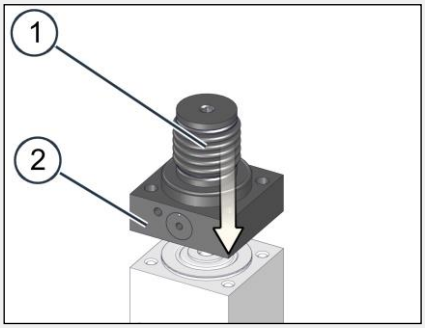
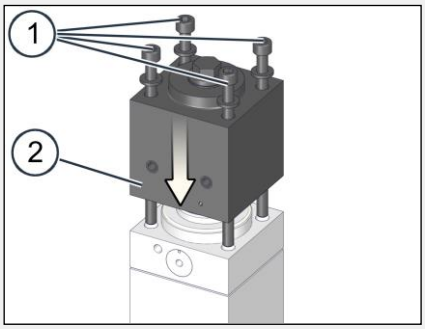
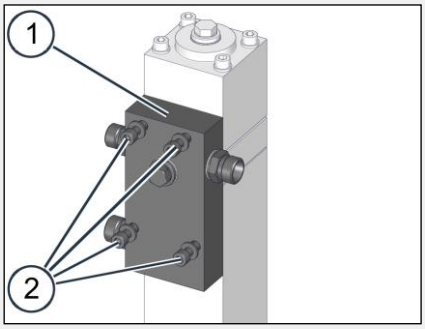
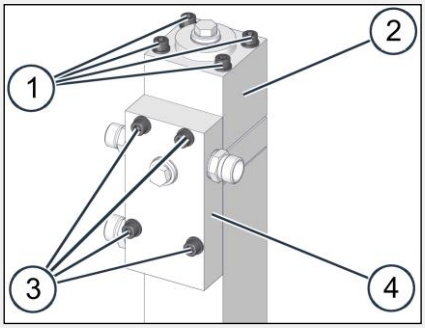
Figure	Step	Description
	**1**	To align the diaphragm plate correctly: Turn the diaphragm plate all the way to the right. Mark this position.
	**2**	Turn the diaphragm plate all the way to the left. Mark this position.
	**3**	Turn the diaphragm plate to the central position between the two marks. The diaphragm plate is now aligned correctly.
	**4**	Put the metal bellows (1) with the base plate (2) in place.
	**5**	Put the lower cover (2) in place. Tighten the 4 screws (1) of the lower cover only finger tight.

Figure	Step	Description
	**6**	Put on the baseplate (1). Tighten the 4 screws (2) of the baseplate only finger tight.
	**7**	Align the lower cover (2) and the baseplate (4) with the corners of the body exactly. Tighten the screws (1) of the lower cover using a crosswise pattern. Tightening torque: 12 Nm (9 ft lbs) Tighten the screws (3) of the baseplate using a crosswise pattern. Tightening torque: 8 Nm (6 ft lbs)

Final inspection

Conduct a final inspection to check whether the following criteria are met:

- The screw connections on the controller have been checked for a secure fit.

If ...	then ...
at least one criterion is not met	you should correct the error before proceeding with the next task.
all criteria are met	you may proceed with the next task.

Next task

Proceed as follows:

Maintenance on the pressure unit (see page 35)

4.6 Maintenance on the pressure unit

Falling components

⚠CAUTION

Crush and impact hazard posed by components falling or toppling over accidentally.

When working with heavy components that have been removed or are yet to be installed, injury may result if the components start moving in an uncontrolled manner, e.g., fall down from the working surface or topple over.

⇨ Place removed components exclusively on level, horizontal working surfaces with enough load-bearing capacity.
⇨ If necessary, secure removed components so that they will not fall or topple over.
⇨ Wear the required personal protective equipment.
⇨ Exercise caution when performing the relevant tasks.

Cleaning

Observe the following cleaning instructions:

- Before assembly, all parts must be cleaned in order to remove any foreign particles (swarf) and soiling.
- If screws, bolts, or washers are replaced with identical new parts, any oil on these new parts must first be removed.

Tightening torques

Observe the tightening torques below when following the instructions in this section:

Part	Tightening torque	Step
Cover screws	8 Nm (6 ft lbs)	8

Maintenance on the pressure unit

Proceed as follows:

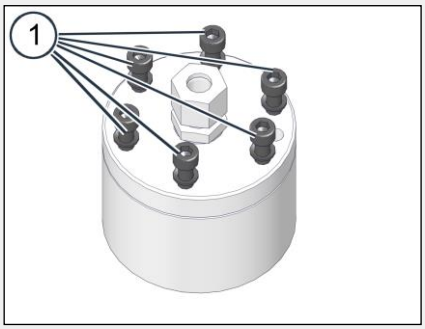
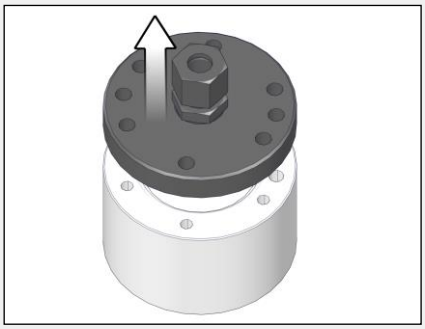
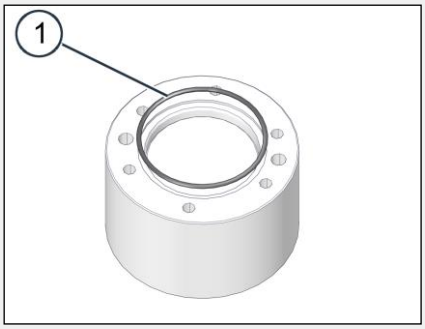
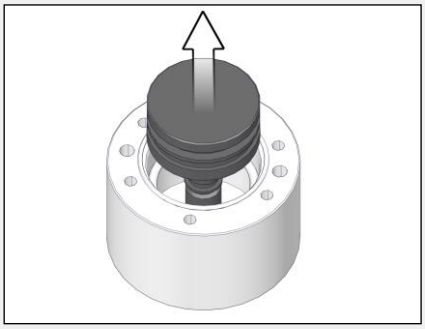
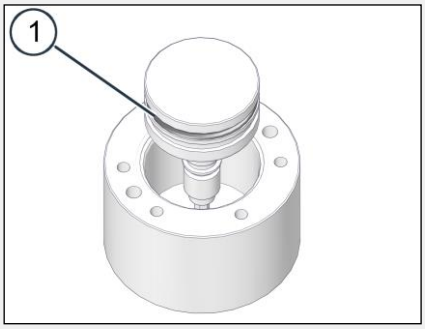
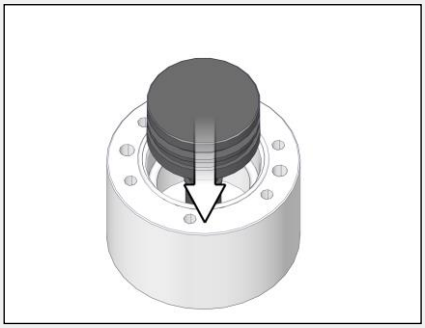
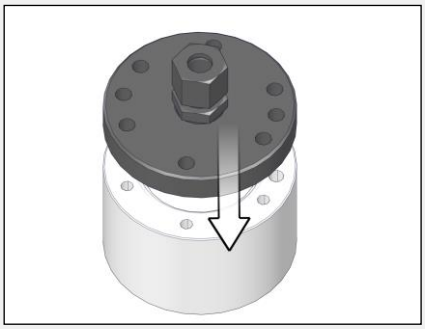
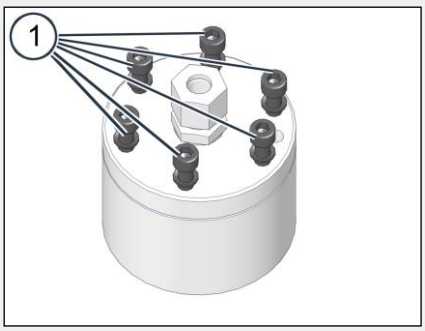
Figure	Step	Description
	**1**	Unscrew and remove the 6 screws (1) of the cover.
	**2**	Remove the cover.
	**3**	Replace the O-ring with a new, lubricated O-ring. Note: See the appendix for the lubricants to be used.
	**4**	Take out the piston.

Figure	Step	Description
	**5**	Replace the piston seal (1) with a new, lubricated piston seal.
	**6**	Insert the piston.
	**7**	Put the cover in place.
	**8**	Tighten the 6 screws (1) using a crosswise pattern. Tightening torque: 8 Nm (6 ft lbs)

Next task

Proceed as follows:

Mounting the pressure unit on the controller

4.7 Mounting the pressure unit on the controller

Falling components

⚠CAUTION

Crush and impact hazard posed by components falling or toppling over accidentally.

When working with heavy components that have been removed or are yet to be installed, injury may result if the components start moving in an uncontrolled manner, e.g., fall down from the working surface or topple over.

⇨ Place removed components exclusively on level, horizontal working surfaces with enough load-bearing capacity.

⇨ If necessary, secure removed components so that they will not fall or topple over.

⇨ Wear the required personal protective equipment.

- Exercise caution when performing the relevant tasks.

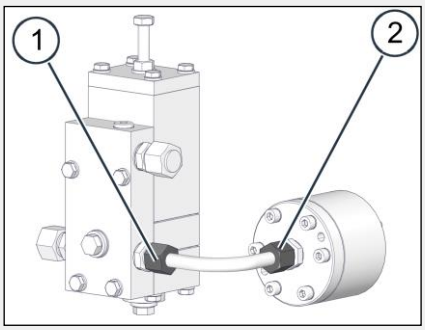
Cleaning

Observe the following cleaning instructions:

- Before assembly, all parts must be cleaned in order to remove any foreign particles (swarf) and soiling.
- If screws, bolts, or washers are replaced with identical new parts, any oil on these new parts must first be removed.

Mounting the pressure unit on the controller

Proceed as follows:

Figure	Step	Description
	1	Mount the pipe joint on the screw connections (1) and (2).

Next task

Proceed as follows:

Completing the maintenance (see page 38)

4.8 Completing the maintenance

Mounting the controller on the actuator assembly

For instructions on how to install the controller on the actuator assembly with which it will operate, please refer to the user manual for the relevant gas pressure regulator. Keep in mind that it is always necessary to check the entire gas pressure regulator for internal and external leaks and fix them before putting it into operation for the first time or putting it back into operation.

Next task

Depending on what you want to do next, proceed as indicated in the relevant section:

- *Storing the device* (see page 39)
- *Disposing of the device* (see page 40)

5 Storage and disposal

Contents

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Disposing of the device	40

5.1 Storing the device

Storage of the packing units

Observe the following rules:

- Do not store the device outdoors.
- Store the device in a dry and dust-free environment on a flat surface.
- Do not expose the device to any aggressive media, ozone or ionizing radiation or to direct heat sources.
- Storage conditions:
  - Temperature: 0 °C to 25 °C (32 °F to 77 °F)
  - Relative humidity: < 55%.
- Avoid mechanical vibrations.
- Storage periods:
  - When storing the device for up to one year:
    Store the device in its original packaging and in the same condition it was delivered. All protective caps of the device must remain in place.
  - If the device is stored longer than 1 year (e.g., as a backup device):
    Store the device in the original packaging as it was originally delivered and check it annually for damage and soiling. Consider the storage period in the maintenance cycles.

Note: Please also observe any storage information provided on the packaging.

Storage of spare parts

The following rules apply to the storage of spare parts:

- Apply an appropriate protective agent to assemblies at risk of corrosion.
- If stored correctly, O-rings and gaskets should not be kept longer than 7 years.
- Store the spare parts in the original package until they are used.

Storing devices that have already been in operation and that are intended to be put back into operation later on

Observe the following rules:

- All device openings and fittings must be sealed and protected from soiling and damage.
- The device's maintenance condition must be indicated with a label:
  - Date when maintenance was last performed
  - Operating times and operation cycles since the last time maintenance was performed
- Do not store the device outdoors.
- Store the device in a dry and dust-free environment on a flat surface.
- Do not expose the device to any aggressive media, ozone or ionizing radiation or to direct heat sources.
- Storage conditions:
  - Temperature: 0 °C to 25 °C (32 °F to 77 °F)
  - Relative humidity: < 55%.
- Avoid mechanical vibrations.
- Storage periods: Check the device for damage and soiling at least annually. When it comes to maintenance cycles, take the preceding operating time into account in addition to the storage time.

5.2 Disposing of the device

Appropriate disposal

Comply with the legally stipulated disposal rules. Observe the following details pertaining to the appropriate disposal (not all of the items may be applicable to your device):

- Dispose of the metals according to their types and grades (steel scrap, cast iron scrap, light alloy scrap, nonferrous heavy metal scrap, synthetic rubber scrap, electronic scrap).
- Recycle elements made of synthetic materials.
- Dispose of any other components according to the quality of the materials.

6 Appendix

Contents

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Lubricants, threadlockers, and special tools	65

6.1 Re-engage differential

	Pilot spring			Overpressure		Underpressure		
	Spring no.	Wire diameter (mm)	Color marking	Specific control range W_{dso} (bar)	Re-engage differential Δp_{wo} between p_{dso} and normal operating pressure (bar)	Specific control range W_{dsu} (bar)	Re-engage differential Δp_{wu} between normal operating pressure and p_{dsu} (bar)	Accuracy group AG ***
K16	0	3.2 *	blue	0.8 - 1.5	0.1			2.5
	1	4.5	black	1 - 5	0.2			2.5/1
	2	5	grey	2 - 10	0.4			1
	3	6.3	brown	5 - 20	0.8			1
	4	7	red	10 - 40	1.2			1
K17	2	5 **	grey			2 - 10	0.4	5
	3	6.3	brown			5 - 20	0.8	5
	4	7	red			10 - 40	1.2	5
K18	1	9		20 - 90	1.5			1
K19	1	9				20 - 90	1.5	1

*) Omitted on SAV HON 711, DN 25 to DN 150. Control range W_{dso} with spring 1 here as of 1 bar to 5 bar.

**) on SAV HON 711/S2 control range W_{dsu} with spring as of 2 bar to 10 bar

***) The better accuracy group applies for the 2nd half of the control range.

6.2 Additional information regarding spare parts

Spare parts categories

Spare parts fall into the following categories:

Spare parts category	Definition
Maintenance part	Spare parts that always have to be replaced during maintenance.
Servicing parts	Spare parts that need to be checked during maintenance and that must be replaced if necessary due to their condition.
	Spare parts that qualified personnel employed by the company operating the device is allowed to replace in order to convert the device (e.g., when changing the pressure range).
	Spare parts that qualified personnel employed by the company operating the device is allowed to replace in the event of a fault or defect.
Miscellaneous spare part	Parts that are listed in the spare part drawings in addition to maintenance and servicing parts so as to improve communications between the customer and the manufacturer, but that are not allowed to be ordered or replaced without first contacting the manufacturer.

Maintenance and servicing parts for controller

- The spare parts always required for maintenance of the controller are grouped together into spare parts kits appropriate for the device in question. Each spare parts kit has its own part number (part no.).
- Individual maintenance and servicing parts can be ordered using the corresponding part number, which is specified in the bill of materials for the controllers. The required number of maintenance or servicing parts is specified under the relevant part number in the “Part No.” column. If no quantity is specified, this means that only one unit is required.

Control ranges

The spare part drawings for the controllers HON 670 / HON 671 are divided into the following six control ranges:

- W_d = 0.8 – 20 bar (K16: diaphragm measuring unit)
- W_d = 10 – 40 bar (K16: diaphragm measuring unit with ball guide sleeve)
- W_d = 2.0 – 20 bar (K17: diaphragm measuring unit)
- W_d = 10 – 40 bar (K17: diaphragm measuring unit with ball guide sleeve)
- W_d = 20 – 90 bar (K18: metal bellows measuring unit)
- W_d = 20 – 90 bar (K19: metal bellows measuring unit)

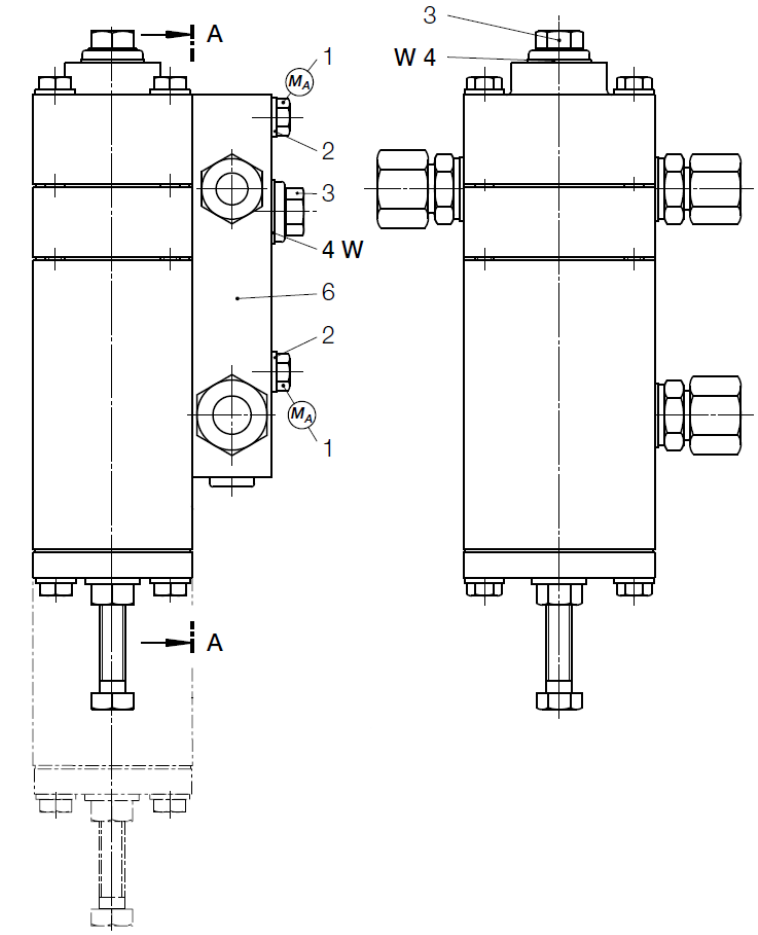
Overview of spare parts drawings

The spare parts drawings are subdivided as follows:

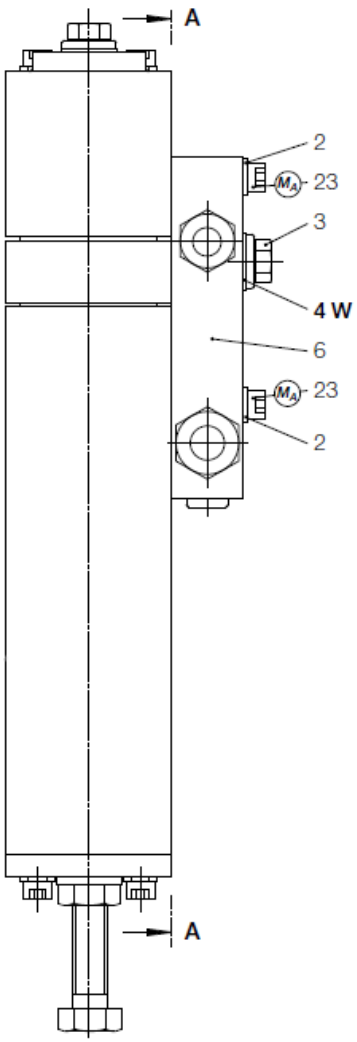
- K16, K17, K18, K19: Spare parts drawing for baseplate and connections
- K16: Spare parts drawing for diaphragm measuring unit
  - Spare parts kits for SAV response (NBR, FKM and NBR low-temperature variants)
  - Spare parts kits for SBV response (NBR and FKM variants)
- K16: Spare parts drawing for diaphragm measuring unit with guide sleeve
  - Spare parts kits for SAV response (NBR, FKM and NBR low-temperature variants)
  - Spare parts kits for SBV response (NBR and FKM variants)
- K17: Spare parts drawing for diaphragm measuring unit
  - Spare parts kits for SAV response (NBR, FKM and NBR low-temperature variants)
- K17: Spare parts drawing for diaphragm measuring unit with guide sleeve
  - Spare parts kits for SAV response (NBR, FKM and NBR low-temperature variants)
- K18: Spare parts drawing for metal bellows measuring unit
  - Spare parts kits for SAV response (NBR, FKM and NBR low-temperature variants)
  - Spare parts kits for SBV response (NBR and FKM variants)
- K19: Spare parts drawing for metal bellows measuring unit
  - Spare parts kits for SAV response (NBR, FKM and NBR low-temperature variants)
- K16, K17, K18, K19: Spare parts drawing for pressure unit

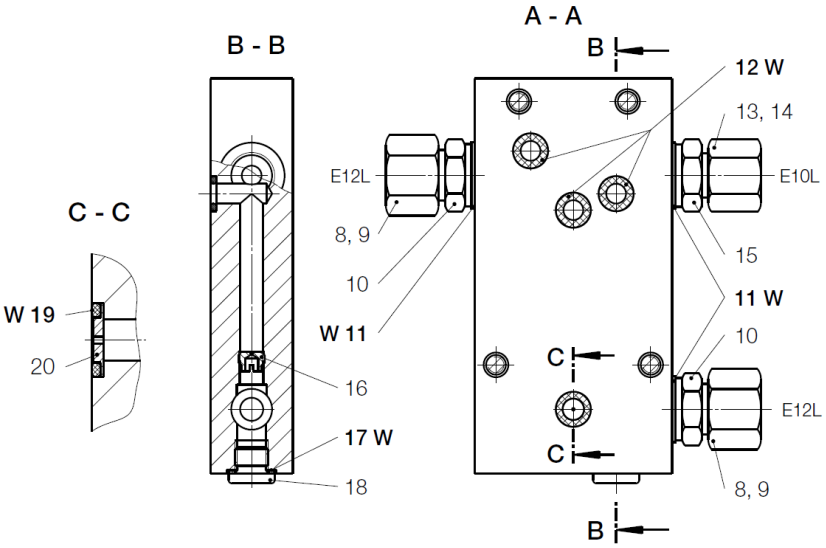
6.3 K16, K17, K18, K19: Spare parts drawing for baseplate and connections

K16, K17



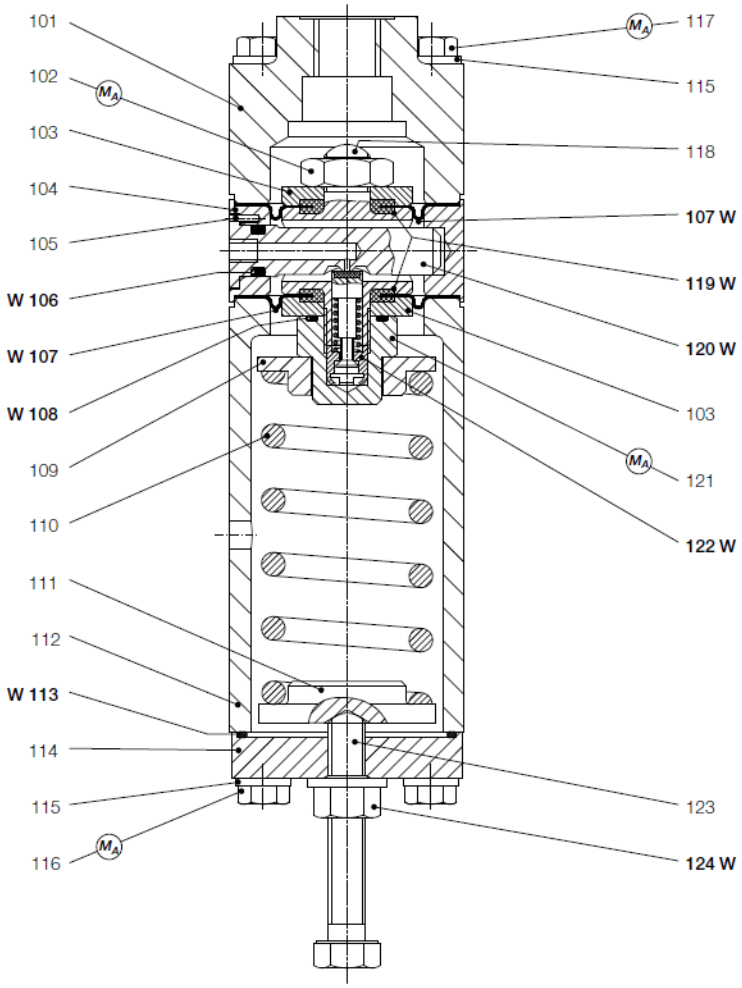
K18, K19





6.4 K16: Spare parts drawing for diaphragm measuring unit

Controller 16 diaphragm measuring unit W_{do} 0.8 bar to 20 bar
Stage - rising performance curve



Spare parts kits

K16 diaphragm measuring unit for SAV response, NBR variant

Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit for SAV response, NBR variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 106 ▪ 2 each of no. 107* ▪ 1 each of no. 108 ▪ 1 each of no. 113 ▪ 2 each of no. 119 ▪ 1 each of no. 122 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-001

K16 diaphragm measuring unit for SAV response, FKM variant

Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit for SAV response, FKM variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 106 ▪ 2 each of no. 107* ▪ 1 each of no. 108 ▪ 1 each of no. 113 ▪ 2 each of no. 119 ▪ 1 each of no. 122 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-002

K16 diaphragm measuring unit for SAV response, NBR low-temperature variant

Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit for SAV response, NBR low-temperature variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 106 ▪ 2 each of no. 107* ▪ 1 each of no. 108 ▪ 1 each of no. 113 ▪ 2 each of no. 119 ▪ 1 each of no. 122 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-005

K16 diaphragm measuring unit for SBV response, NBR variant

Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit for SBV response, NBR variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 106 ▪ 2 each of no. 107* ▪ 1 each of no. 108 ▪ 1 each of no. 113 ▪ 2 each of no. 119 ▪ 1 each of no. 122 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-003

K16 diaphragm measuring unit for SBV response, FKM variant

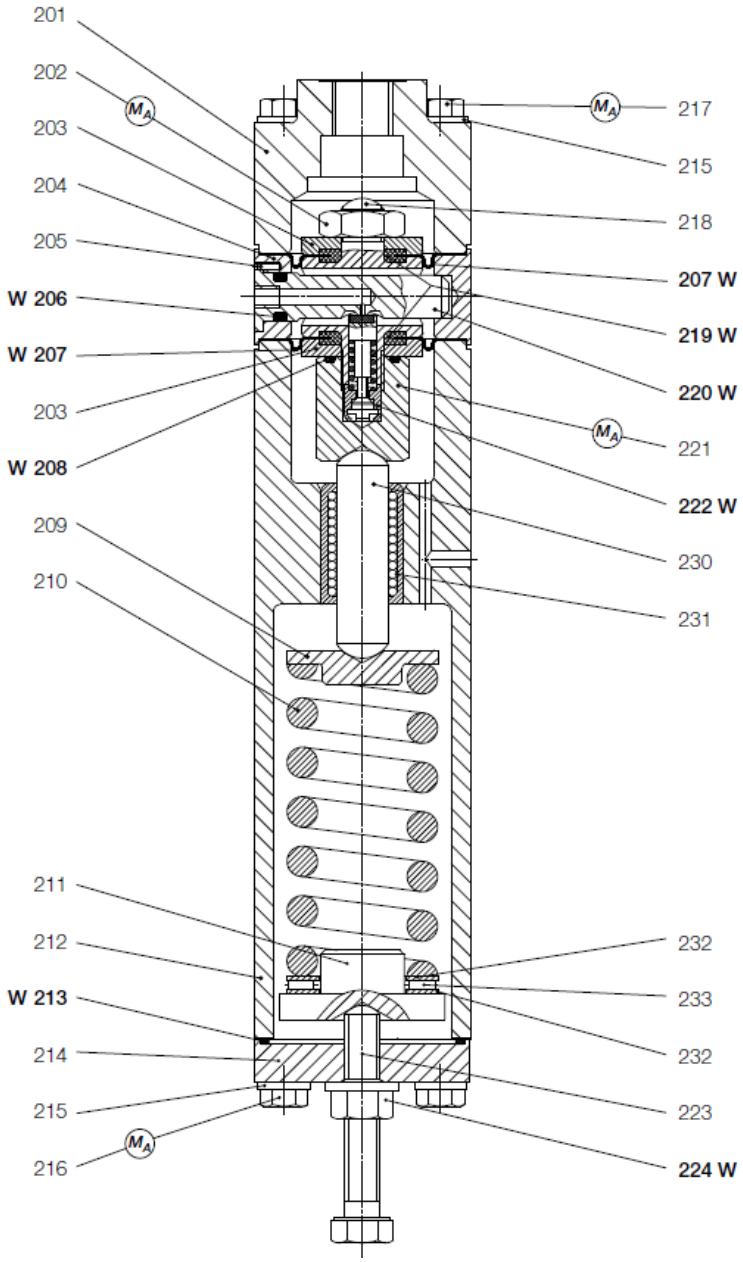
Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit for SBV response, FKM variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 106 ▪ 2 each of no. 107* ▪ 1 each of no. 108 ▪ 1 each of no. 113 ▪ 2 each of no. 119 ▪ 1 each of no. 122 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-004

*) Optionally nos. 107; 207; 407; 507 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded 33/28/0,52+PTFE

6.5 K16: Spare parts drawing for diaphragm measuring unit with ball guide sleeve

Controller 16 diaphragm measuring unit with ball guide sleeve W_{do} 10 bar to 40 bar

Stage - rising performance curve



Spare parts kits

K16 diaphragm measuring unit with ball guide sleeve for SAV response, NBR variant

Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit with ball guide sleeve for SAV response, NBR variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 206 ▪ 2 each of no. 207* ▪ 1 each of no. 208 ▪ 1 each of no. 213 ▪ 2 each of no. 219 ▪ 1 each of no. 222 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-001

K16 diaphragm measuring unit with ball guide sleeve for SAV response, FKM variant

Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit with ball guide sleeve for SAV response, FKM variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 206 ▪ 2 each of no. 207* ▪ 1 each of no. 208 ▪ 1 each of no. 213 ▪ 2 each of no. 219 ▪ 1 each of no. 222 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-002

K16 diaphragm measuring unit with ball guide sleeve for SAV response, NBR low-temperature variant

Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit with ball guide sleeve for SAV response, NBR low-temperature variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 206 ▪ 2 each of no. 207* ▪ 1 each of no. 208 ▪ 1 each of no. 213 ▪ 2 each of no. 219 ▪ 1 each of no. 222 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-005

K16 diaphragm measuring unit with ball guide sleeve for SBV response, NBR variant

Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit with ball guide sleeve for SBV response, NBR variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 206 ▪ 2 each of no. 207* ▪ 1 each of no. 208 ▪ 1 each of no. 213 ▪ 2 each of no. 219 ▪ 1 each of no. 222 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-003

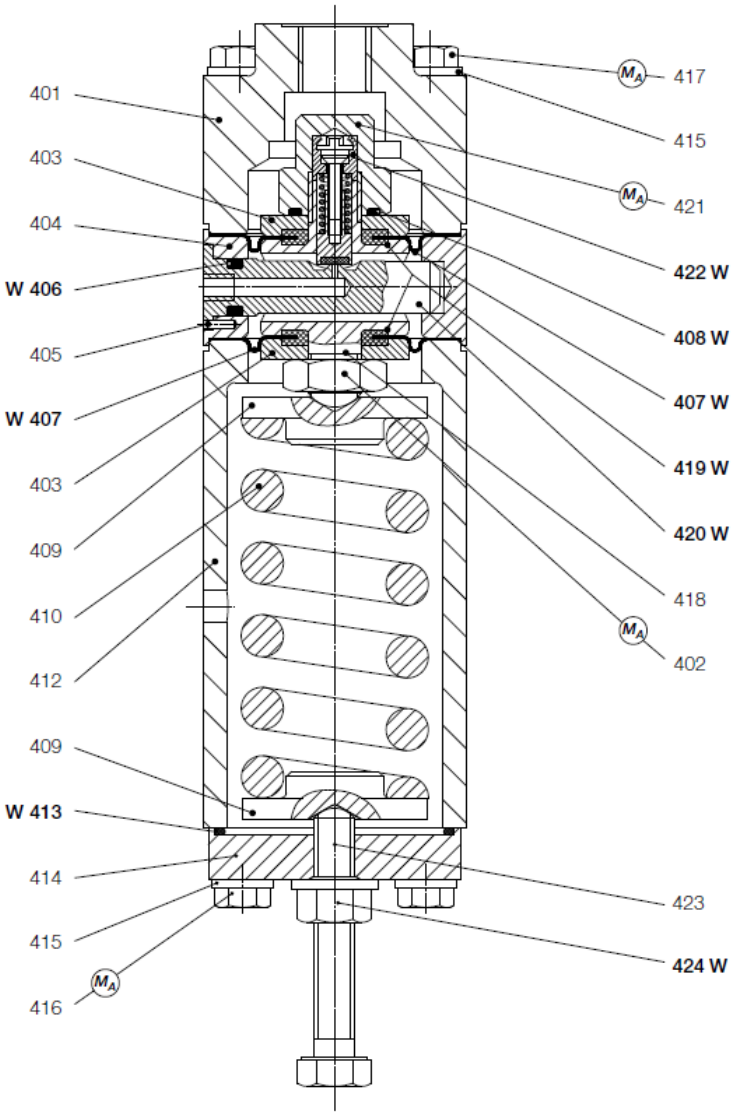
K16 diaphragm measuring unit with ball guide sleeve for SBV response, FKM variant

Name	Description	Part no.
Spare parts kit K16 diaphragm measuring unit with ball guide sleeve for SBV response, FKM variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 206 ▪ 2 each of no. 207* ▪ 1 each of no. 208 ▪ 1 each of no. 213 ▪ 2 each of no. 219 ▪ 1 each of no. 222 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-004

*) Optionally nos. 107; 207; 407; 507 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded 33/28/0,52+PTFE

6.6 K17: Spare parts drawing for diaphragm measuring unit

Controller 17 diaphragm measuring unit W_{du} 2.0 bar to 20 bar
Stage - falling performance curve



Spare parts kits

K17 diaphragm measuring unit for SAV response, NBR variant

Name	Description	Part no.
Spare parts kit K17 diaphragm measuring unit for SAV response, NBR variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 406 ▪ 2 each of no. 407* ▪ 1 each of no. 408 ▪ 1 each of no. 413 ▪ 2 each of no. 419 ▪ 1 each of no. 422 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-001

K17 diaphragm measuring unit for SAV response, FKM variant

Name	Description	Part no.
Spare parts kit K17 diaphragm measuring unit for SAV response, FKM variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 406 ▪ 2 each of no. 407* ▪ 1 each of no. 408 ▪ 1 each of no. 413 ▪ 2 each of no. 419 ▪ 1 each of no. 422 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-002

K17 diaphragm measuring unit for SAV response, NBR low-temperature variant

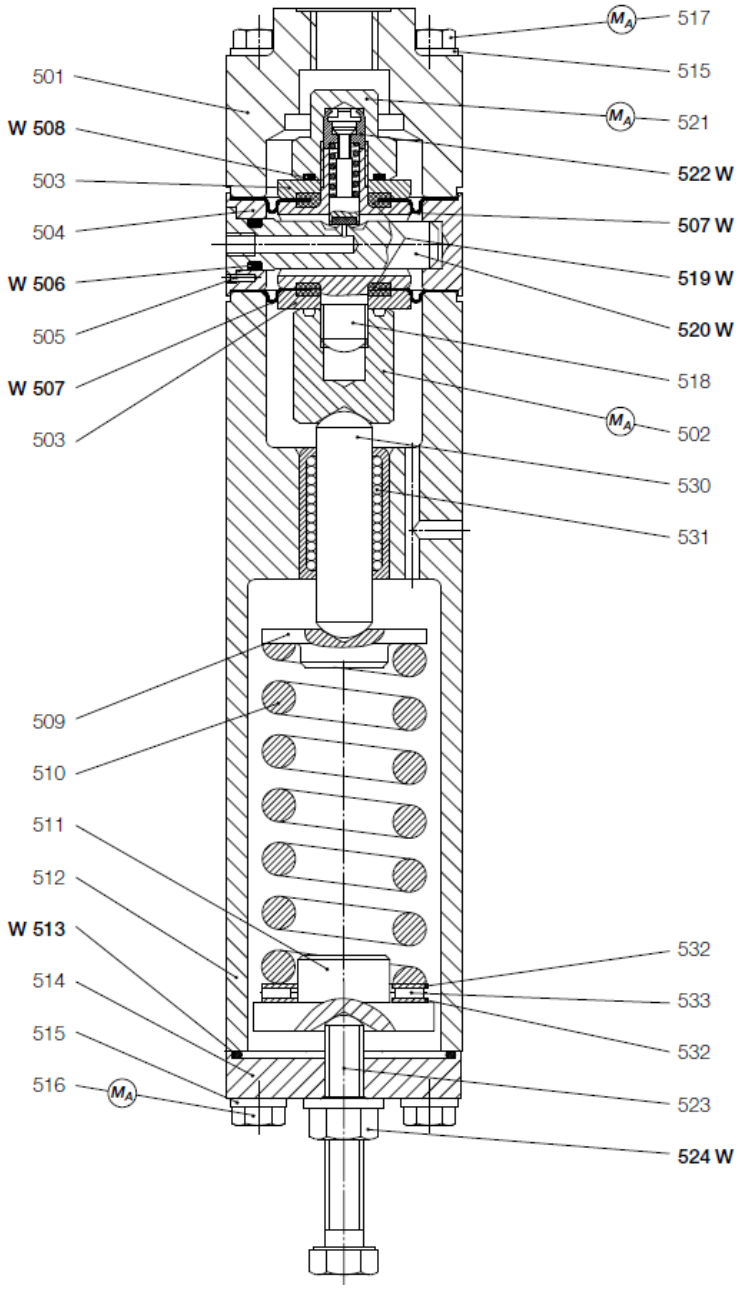
Name	Description	Part no.
Spare parts kit K17 diaphragm measuring unit for SAV response, NBR low-temperature variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 406 ▪ 2 each of no. 407* ▪ 1 each of no. 408 ▪ 1 each of no. 413 ▪ 2 each of no. 419 ▪ 1 each of no. 422 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-005

*) Optionally nos. 107; 207; 407; 507 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded 33/28/0,52+PTFE

6.7 K17: Spare parts drawing for diaphragm measuring unit with ball guide sleeve

Controller 17 diaphragm measuring unit W_{du} 10 bar to 40 bar

Stage - falling performance curve



Spare parts kits

K17 diaphragm measuring unit with ball guide sleeve for SAV response, NBR variant

Name	Description	Part no.
Spare parts kit K17 diaphragm measuring unit with ball guide sleeve for SAV response, NBR variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 506 ▪ 2 each of no. 507* ▪ 1 each of no. 508 ▪ 1 each of no. 513 ▪ 2 each of no. 519 ▪ 1 each of no. 522 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-001

K17 diaphragm measuring unit with ball guide sleeve for SAV response, FKM variant

Name	Description	Part no.
Spare parts kit K17 diaphragm measuring unit with ball guide sleeve for SAV response, FKM variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 506 ▪ 2 each of no. 507* ▪ 1 each of no. 508 ▪ 1 each of no. 513 ▪ 2 each of no. 519 ▪ 1 each of no. 522 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-002

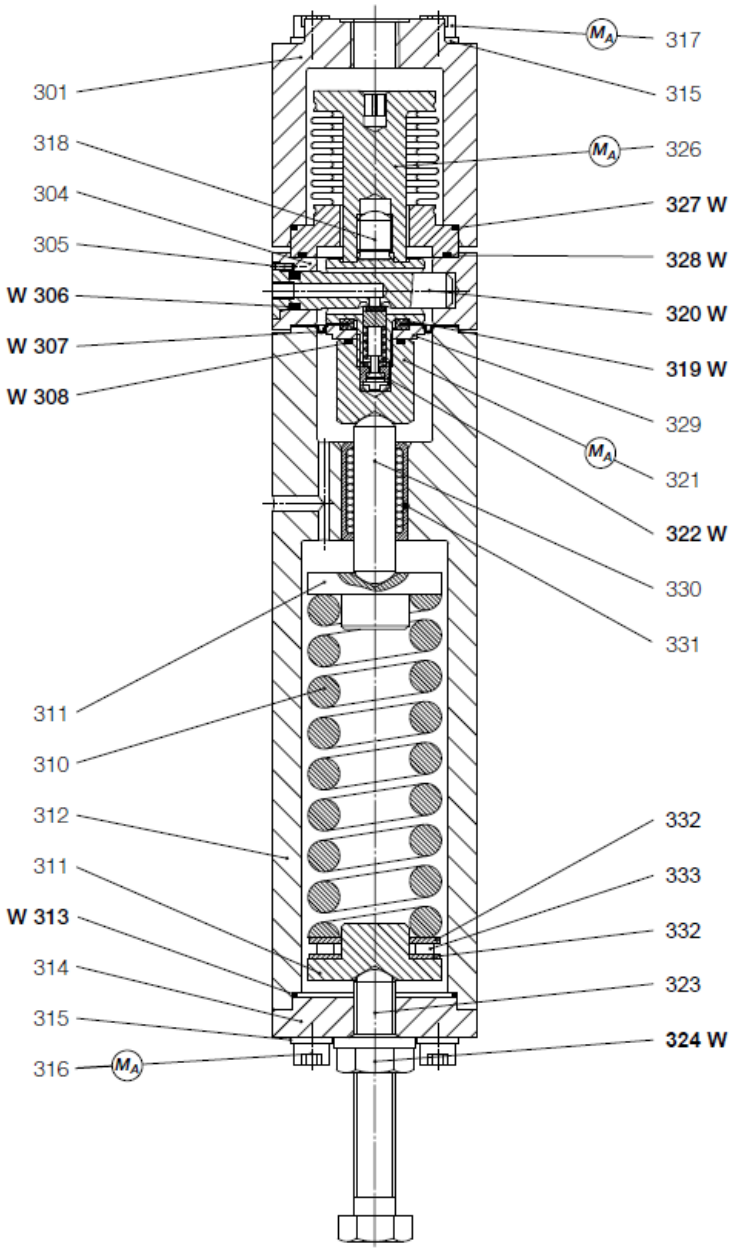
K17 diaphragm measuring unit with ball guide sleeve for SAV response, NBR low-temperature variant

Name	Description	Part no.
Spare parts kit K17 diaphragm measuring unit with ball guide sleeve for SAV response, NBR low-temperature variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 506 ▪ 2 each of no. 507* ▪ 1 each of no. 508 ▪ 1 each of no. 513 ▪ 2 each of no. 519 ▪ 1 each of no. 522 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-005

*) Optionally nos. 107; 207; 407; 507 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded 33/28/0,52+PTFE

6.8 K18: Spare parts drawing for metal bellows measuring unit

Controller 18 metal bellows measuring unit W_{do} 20 bar to 90 bar
Stage - rising performance curve



Spare parts kits

K18 metal bellows measuring unit for SAV response, NBR variant

Name	Description	Part no.
Spare parts kit K18 metal bellows measuring unit NBR variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 306 ▪ 1 each of no. 307* ▪ 1 each of no. 308 ▪ 1 each of no. 313 ▪ 1 each of no. 319 ▪ 1 each of no. 322 ▪ 1 each of no. 327 ▪ 1 each of no. 328 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-006

K18 metal bellows measuring unit for SAV response, FKM variant

Name	Description	Part no.
Spare parts kit K18 metal bellows measuring unit FKM variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 306 ▪ 1 each of no. 307* ▪ 1 each of no. 308 ▪ 1 each of no. 313 ▪ 1 each of no. 319 ▪ 1 each of no. 322 ▪ 1 each of no. 327 ▪ 1 each of no. 328 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-007

K18 metal bellows measuring unit for SAV response, NBR low-temperature variant

Name	Description	Part no.
Spare parts kit K18 metal bellows measuring unit NBR low-temperature variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 306 ▪ 1 each of no. 307* ▪ 1 each of no. 308 ▪ 1 each of no. 313 ▪ 1 each of no. 319 ▪ 1 each of no. 322 ▪ 1 each of no. 327 ▪ 1 each of no. 328 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-008

K18 metal bellows measuring unit for SBV response, NBR variant

Name	Description	Part no.
Spare parts kit K18 metal bellows measuring unit for SBV response, NBR variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 306 ▪ 1 each of no. 307* ▪ 1 each of no. 308 ▪ 1 each of no. 313 ▪ 1 each of no. 319 ▪ 1 each of no. 322 ▪ 1 each of no. 327 ▪ 1 each of no. 328 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-003

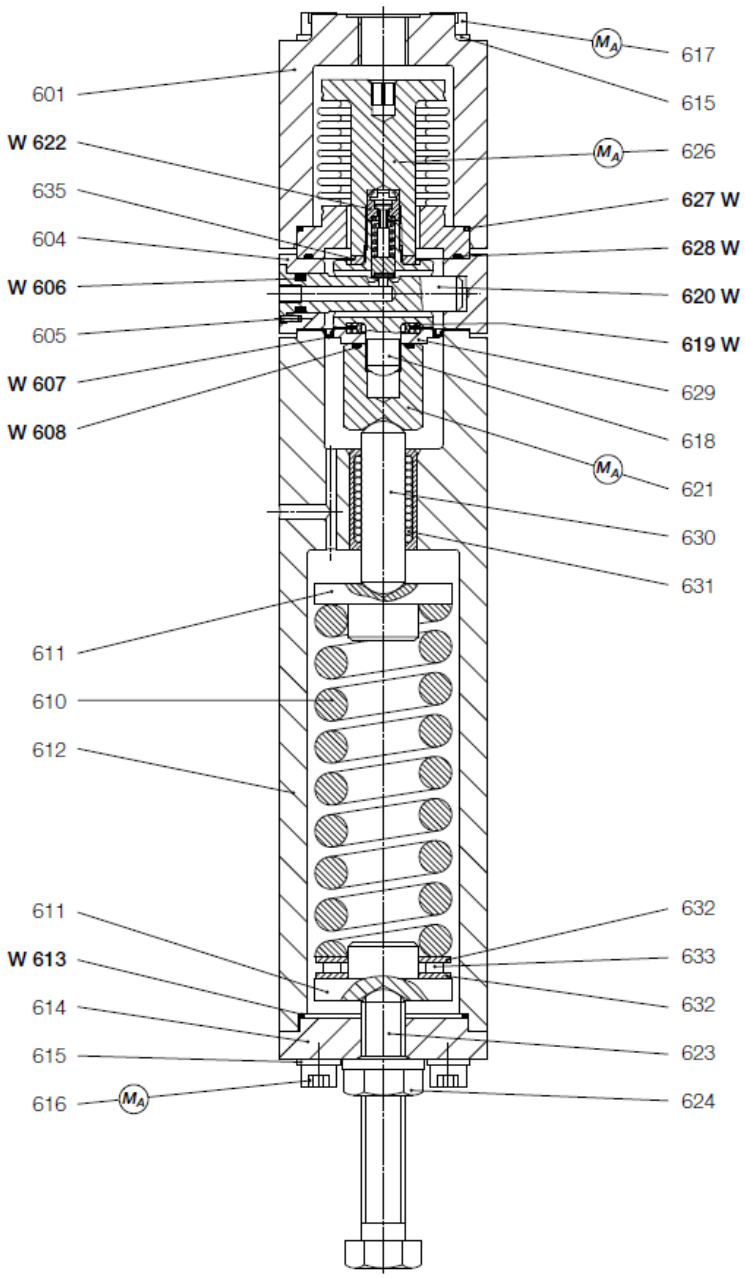
K18 metal bellows measuring unit for SBV response, FKM variant

Name	Description	Part no.
Spare parts kit K18 metal bellows measuring unit for SBV response, FKM variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 306 ▪ 1 each of no. 307* ▪ 1 each of no. 308 ▪ 1 each of no. 313 ▪ 1 each of no. 319 ▪ 1 each of no. 322 ▪ 1 each of no. 327 ▪ 1 each of no. 328 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-004

*) Optionally no. 307 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded

6.9 K19: Spare parts drawing for metal bellows measuring unit

Controller 19 metal bellows measuring unit W_{du} 20 bar to 90 bar
Stage - falling performance curve



Spare parts kits

K19 metal bellows measuring unit for SAV, NBR variant

Name	Description	Part no.
Spare parts kit K19 metal bellows measuring unit for SAV response, NBR variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 606 ▪ 1 each of no. 607* ▪ 1 each of no. 608 ▪ 1 each of no. 613 ▪ 1 each of no. 619 ▪ 1 each of no. 622 ▪ 1 each of no. 627 ▪ 1 each of no. 628 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-006

K19 metal bellows measuring unit for SAV response, FKM variant

Name	Description	Part no.
Spare parts kit K19 metal bellows measuring unit for SAV response, FKM variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 606 ▪ 1 each of no. 607* ▪ 1 each of no. 608 ▪ 1 each of no. 613 ▪ 1 each of no. 619 ▪ 1 each of no. 622 ▪ 1 each of no. 627 ▪ 1 each of no. 628 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-007

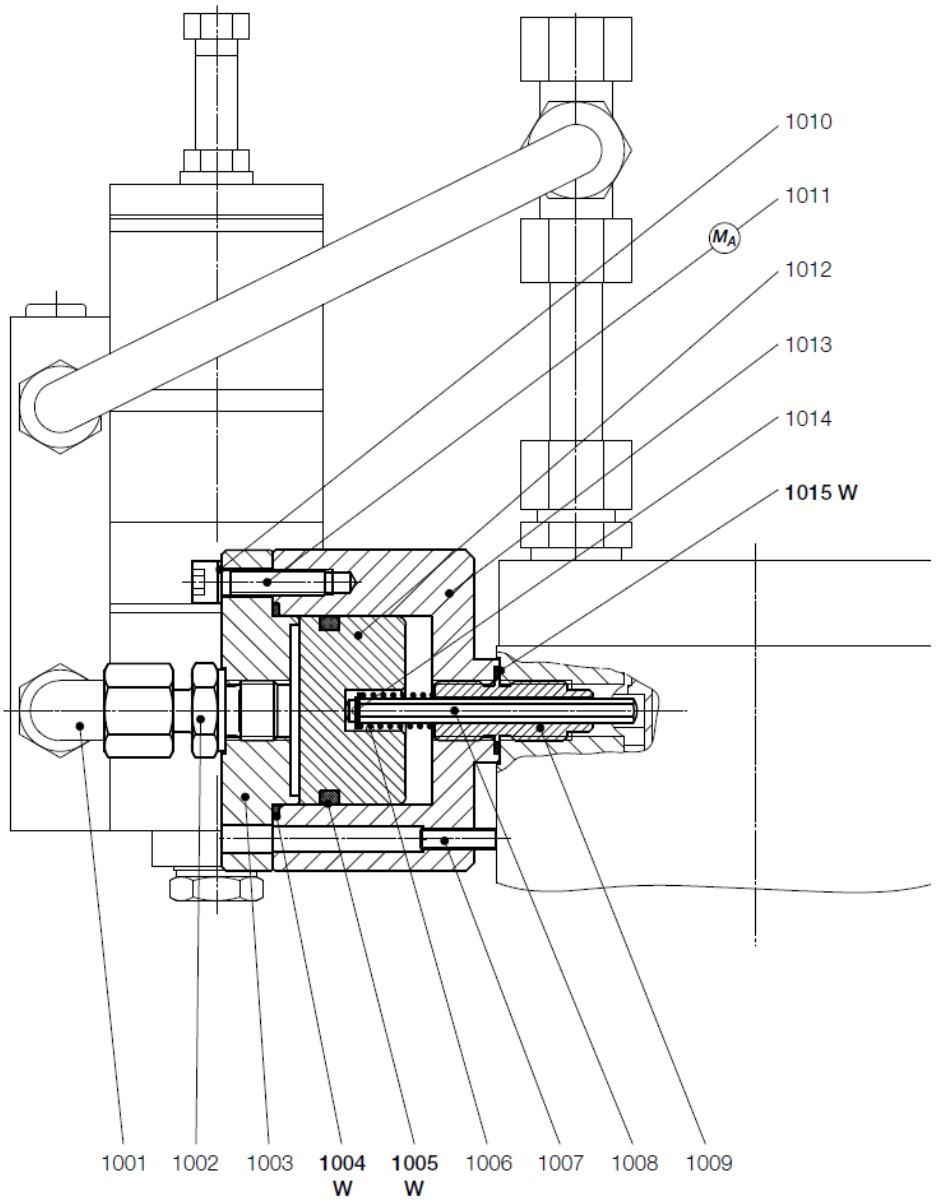
K19 metal bellows measuring unit for SAV response, NBR low-temperature variant

Name	Description	Part no.
Spare parts kit K19 metal bellows measuring unit for SAV response, NBR low-temperature variant	Consisting of: ▪ 3 each of no. 12 ▪ 1 each of no. 19 ▪ 1 each of no. 606 ▪ 1 each of no. 607* ▪ 1 each of no. 608 ▪ 1 each of no. 613 ▪ 1 each of no. 619 ▪ 1 each of no. 622 ▪ 1 each of no. 627 ▪ 1 each of no. 628 ▪ 1 each of no. 1004 ▪ 1 each of no. 1005	K670-008

*) Optionally no. 607 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded

6.10 K16, K17, K18, K19: Spare parts drawing for pressure unit

Pressure unit



6.11 Maintenance and servicing parts for the controllers

Maintenance parts for baseplate

K16	K17	K18	K19		NBR	FKM	NBR low-temperature variant
No. / Letter	No. / Letter	No. / Letter	No. / Letter	Name	Part no.	Part no.	Part no.
12	12	12	12	O-ring	20225-RMK (3 units)	20633-RMK (3 units)	100444-RMK (3 units)

K16	K17	K18	K19		NBR	FKM	NBR low-temperature variant
19	19	19	19	O-ring	20231-RMK	20658-RMK	100445-RMK

Maintenance parts for diaphragm measuring unit

K16	K17		SAV response		
No. / Letter	No. / Letter	Name	NBR Part no.	FKM Part no.	NBR low-temperature variant Part no.
106	406	O-ring	20225-RMK	20633-RMK	100444-RMK
107	407	Diaphragm, beaded	10000191* (2 units)	10000191* (2 units)	10000191* (2 units)
108	408	O-ring	20332-RMK	20704	100992-RMK
113	413	O-ring	20293-RMK	20705	100331-RMK
119	419	Snap-on gasket	10000066 (2 units)	18357450 (2 units)	10000066 (2 units)
122	422	Piston, pre-assembled	10009662	10009662	10009662

*) Optionally nos. 107; 407 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded

Maintenance parts for diaphragm measuring unit

K16		SBV response	
No. / Letter	Name	NBR Part no.	FKM Part no.
106	O-ring	20225-RMK	20633-RMK
107	Diaphragm, beaded	10000191* (2 units)	10000191* (2 units)
108	O-ring	20332-RMK	20704
113	O-ring	20293-RMK	20705
119	Snap-on gasket	10000066 (2 units)	18357450 (2 units)
122	Piston, pre-assembled	10000186	10000186

*) Optionally no. 107 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded

Maintenance parts for diaphragm measuring unit with ball guide sleeve

K16	K17		SAV response		
No. / Letter	No. / Letter	Name	NBR Part no.	FKM Part no.	NBR low-temperature variant Part no.
206	506	O-ring	20225-RMK	20633-RMK	100444-RMK

K16	K17		SAV response		
No. / Letter	No. / Letter	Name	NBR Part no.	FKM Part no.	NBR low-temperature variant Part no.
207	507	Diaphragm, beaded	10000191* (2 units)	10000191* (2 units)	10000191* (2 units)
208	508	O-ring	20332-RMK	20704	100992-RMK
213	513	O-ring	20293-RMK	20705	100331-RMK
219	519	Snap-on gasket	10000066 (2 units)	18357450 (2 units)	10000066 (2 units)
222	522	Piston, pre-assembled	10009662	10009662	10009662

*) Optionally nos. 207; 507 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded

Maintenance parts for diaphragm measuring unit with ball guide sleeve

K16		SBV response		
No. / Letter	Name	NBR Part no.	FKM Part no.	
206	O-ring	20225-RMK	20633-RMK	
207	Diaphragm, beaded	10000191* (2 units)	10000191* (2 units)	
208	O-ring	20332-RMK	20704	
213	O-ring	20293-RMK	20705	
219	Snap-on gasket	10000066 (2 units)	18357450 (2 units)	
222	Piston, pre-assembled	10000186	10000186	

*) Optionally no. 207 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded

Maintenance parts for metal bellows measuring unit

	K18	K19		SAV response		
	No. / Letter	No. / Letter	Name	NBR Part no.	FKM Part no.	NBR low-temperature variant Part no.
	306	606	O-ring	20225-RMK	20633-RMK	100444-RMK
	307	607	Diaphragm, beaded	10000191*	10000191*	10000191*
	308	608	O-ring	20332-RMK	20704	100992-RMK
	313	613	O-ring	20293-RMK	20705	100992-RMK
	319	619	Snap-on gasket	10000066	18357450	10000066
	322	622	Piston, pre-assembled	10000186	10000186	10000186
	327	627	O-ring	20293-RMK	20705	100331-RMK

	K18	K19			SAV response	
	No. / Letter	No. / Letter	Name	NBR Part no.	FKM Part no.	NBR low-temperature variant Part no.
	328	628	O-ring	20416	20706-RMK	101299

*) Optionally nos. 307; 607 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded

Maintenance parts for metal bellows measuring unit

	K18			SBV response	
	No. / Letter	Name	NBR Part no.	FKM Part no.	NBR low-temperature variant Part no.
	306	O-ring	20225-RMK	20633-RMK	100444-RMK
	307	Diaphragm, beaded	10000191*	10000191*	10000191*
	308	O-ring	20332-RMK	20704	100992-RMK
	313	O-ring	20293-RMK	20705	100992-RMK
	319	Snap-on gasket	10000066	18357450	10000066
	322	Piston, pre-assembled	10000186	10000186	10000186
	327	O-ring	20293-RMK	20705	100331-RMK
	328	O-ring	20416	20706-RMK	101299

*) Optionally no. 307 sprayed with Teflon Mat.No.: 10002796 diaphragm, beaded

Maintenance parts for pressure unit

K16	K17	K18	K19		NBR	FKM	NBR low-temperature variant
No. / Letter	No. / Letter	No. / Letter	No. / Letter	Name	Part no.	Part no.	Part no.
1004	1004	1004	1004	O-ring	20398	21114-RMK	100968-RMK
1005	1005	1005	1005	O-ring	20336	20599	100967-RMK
1015	1015	1015	1015	O-ring	20310-RMK*	20748-RMK*	101464-RMK*

*) HON 721 only

Servicing parts for controllers

K16	K17	K16*	K17*	K18	K19		
No. / Letter						**Name**	**Part no.**
109						Spring plate suitable for control ranges:	
						▪ Wdso 0.8 bar - 1.5 bar	10000096
						▪ Wdso 1 bar - 5 bar	10000096
						▪ Wdso 2 bar - 10 bar	10000096
						▪ Wdso 5 bar - 20 bar	10000096
110						Compression spring optionally:	
						▪ Wdso 0.8 bar - 1.5 bar	10009675
						▪ Wdso 1 bar - 5 bar	10009671
						▪ Wdso 2 bar - 10 bar	10000139
						▪ Wdso 5 bar - 20 bar	10000115
111						Spring plate suitable for control ranges:	
						▪ Wdso 0.8 bar - 1.5 bar	10000114
						▪ Wdso 1 bar - 5 bar	10000114
						▪ Wdso 2 bar - 10 bar	10000114
						▪ Wdso 5 bar - 20 bar	10000114
		409				Spring plate suitable for control ranges:	
						▪ Wdsu 2 bar -10 bar	10000114
						▪ Wdsu 5 bar - 20 bar	10000114
		410				Compression spring optionally:	
						▪ Wdsu 2 bar -10 bar	10000139
						▪ Wdsu 5 bar - 20 bar	10000115
120						SAV valve insert	10009672
120						SBV valve insert	10000061
	220					SAV valve insert	10009672
	220					SBV valve insert	10000061
		420				SAV valve insert	10009672
			520			SAV valve insert	10009672
				320		SAV valve insert	10011776
				320		SBV valve insert	10011775
					620	SAV valve insert	10011776

*) Diaphragm system with ball guide sleeve

6.12 Lubricants, threadlockers, and special tools

Lubricants

Important! All parts must be slightly greased.

Use the following lubricants:

Application	Lubricant	Part no.
▪ All O-rings	Silicone grease	27 081
▪ Spring plate depression ▪ Thread of cover ▪ All fastening screws ▪ All fittings	Assembly paste	27 091

Threadlocker

Important! All parts must be coated slightly.

Use the following threadlockers:

Application	Threadlocker	Part no.
▪ Closing cap threads ▪ Hex nut threads	LOCTITE	26 688

Special tools

You will need the following special tools for maintenance purposes:

Application	Special tools	Part no.
Topic: ▪ *Maintenance on the controller with diaphragm measuring unit* (see page 27) ▪ *Maintenance on the controller with metal bellows measuring unit* (see page 27)	Assembly aid	19 083 319

Subject to change without notice

Scan these QR Codes to see how Honeywell's integrated gas solutions can help you to better manage your gas assets and optimize your value chain.

Additional information

To learn more about Honeywell's product contact your Honeywell Process Solutions representative, or visit www.honeywellprocess.com or www.hongastec.de.

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June 2021 – REV -