

# Honeywell

THE POWER OF **CONNECTED**



## **Actuator assembly HON R100NG**

Component documentation,  
Maintenance manual and spare parts

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# 1 General considerations

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## 1.1 About this component documentation

<b>Validity and purpose</b>	<p>This component documentation applies to the HON R100NG actuator assembly. This component documentation provides all individuals with the information required in order to safely handle the device in connection with the following tasks:</p> <ul style="list-style-type: none"><li>▪ Transport</li><li>▪ Installation</li><li>▪ Maintenance</li><li>▪ Removal, storage, and disposal</li></ul> <hr/>
<b>Target group</b>	<p>This component documentation is intended for everyone working with or on the product:</p> <ul style="list-style-type: none"><li>▪ Transportation personnel</li><li>▪ Installation personnel</li><li>▪ Maintenance and service personnel</li></ul> <hr/>
<b>Illustration</b>	<p>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.</p> <hr/>
 <b>Safety</b>	<p>Failing to observe the information provided in this document may lead to injuries, including death and material damages.</p> <p>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:</p> <ul style="list-style-type: none"><li>▪ the chapter entitled Safety</li><li>▪ the chapters that describe the work to be done</li></ul> <hr/>
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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.

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**Constructive changes**

Changes and additions to the product must be approved by Honeywell Process Solutions in writing. Any violation will void the legal liability for consequences arising thereof.

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## 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: <ul style="list-style-type: none"> <li>▪ They contain a summarized description of hazards, risks and safety procedures associated with the handling of the device.</li> <li>▪ Their purpose is to inform and educate the user about an existing danger and about practicing behavioral safety.</li> <li>▪ They are suitable as safety instruction for all employees handling the device.</li> </ul>	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	  
Step-related safety notices	Safety notices containing specific instructions relating only to the step	<b>DANGER</b> <b>WARNING</b> <b>CAUTION</b>
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 HON R100NG actuator assembly must be used exclusively with a compatible pilot made by Honeywell. It is intended to be used, in combination with an appropriate pilot, as a gas pressure regulator in a regulating line. The actuator assembly is intended to be used to:

- Maintain the outlet pressure of a gas constant within a regulating line regardless of the influence of disturbance variables such as pressure changes and/or discharge changes.
- Reduce the gas pressure for the end consumer.

In addition, when combined with an appropriate pilot, the actuator assembly can be used to implement an active-monitor regulator configuration. As a gas pressure regulator, it can also be used at transfer stations used in gas transportation networks, as well as in power plants and industrial facilities. The HON R100NG actuator assembly unit can be used with natural gas or dry, non-aggressive industrial gases.

**Note:** The utilization limits of the device with regard to the medium, operating pressure and operating temperature can be gathered from the type plate attached on the device or the technical specifications.

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

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### 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

### HON R100NG actuator assembly models

The HON R100NG actuator assembly is available in two designs. In addition to the two basic configurations – the standard version and the fail-open version – an active monitor regulator circuit can be set up as well. The table below shows the different characteristics of these designs:

HON R100NG	HON R100NG-FO
Standard version	
fail-closed	fail-open
1", 2", 3", 4", 6", 8" nominal inlet sizes	1", 2", 3", 4", 6", 8" nominal inlet sizes
ANSI class 150 to class 600 pressure ratings	ANSI class 300, ANSI class 600 pressure ratings

### Versions and designs in this component documentation

The *technical specifications* (see page 15), as well as the spare parts lists and spare parts drawings in the *appendix* (see page 46), describe all the actuator assembly designs and versions.

The remaining sections describe the R100NG actuator assembly design in detail. However, other versions and models will be covered specifically as well when there are important differences that need to be pointed out.

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



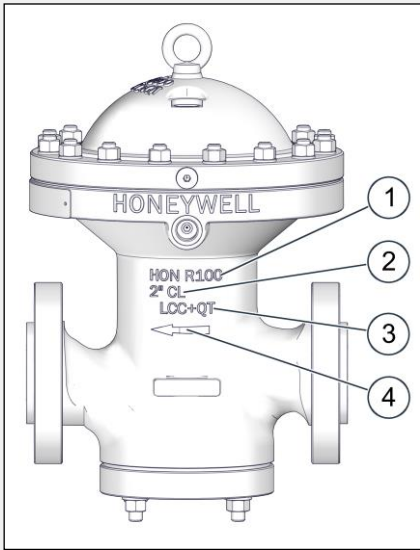
**Illegible information on the device poses a risk of injury due to resulting erroneous operation, use, or installation.**

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.

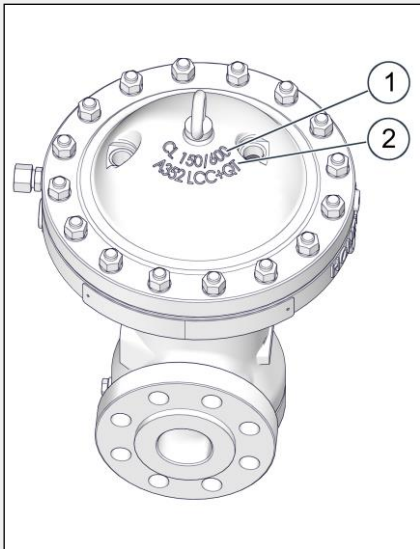
- ⇒ Make sure to always keep all relevant labels in good condition so that they will be easily legible.
- ⇒ Immediately replace damaged and missing labels.

### Labels on the HON R100NG actuator assembly

The following labels/markings can be found on the front of the actuator assembly:

Figure	No.	Meaning
	1	Name of the device
	2	Nominal size
	3	Body section materials
	4	Arrow indicating the direction of flow

The following labels/markings can be found at the top of the actuator assembly:

Figure	No.	Meaning
	1	ANSI pressure rating
	2	Material

<b>Nameplate</b>	For a detailed list of the information on the nameplate and what it means: <i>Identifying the actuator assembly</i> (see page 12)
<b>Labels on connection lines</b>	Small labels must be used to color-code and explicitly name the actuator assembly's connection lines based on what the lines are intended for and their minimum nominal size.

## 2.4 Identifying the actuator assembly

### Identifying the actuator assembly

Make sure you have the right component documentation for your actuator assembly.

To identify your actuator assembly, look at the nameplate.

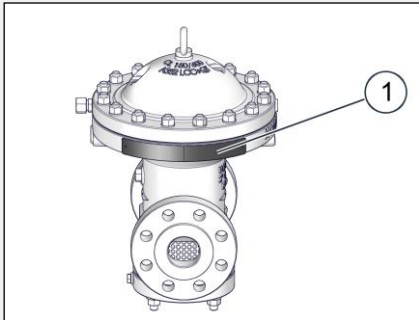
### Verifying the technical specifications

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

*Technical specifications* (see page 15)

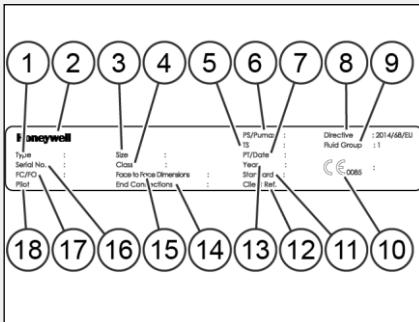
### Locating the type plate of the actuator assembly

The type plate of the actuator assembly can be found here:

Figure	No.	Description
	1	Actuator assembly side

### Interpreting the type plate of the actuator assembly

The details on the type plate have the following meaning:

Figure	No.	Meaning
	1	Model name
	2	Manufacturer
	3	Nominal size
	4	ANSI class
	5	Temperature range
	6	Maximum allowable pressure
	7	Manufacturing date
	8	Directive
	9	Fluid group
	10	CE marking
	11	In conformity with standard, e.g., DIN EN 334
	12	Customer revision No.
	13	Manufacturing date (year)
	14	Pressure rating
	15	Installation length
	16	Serial number of the device
	17	Default position (open / closed)
	18	Type of pilot

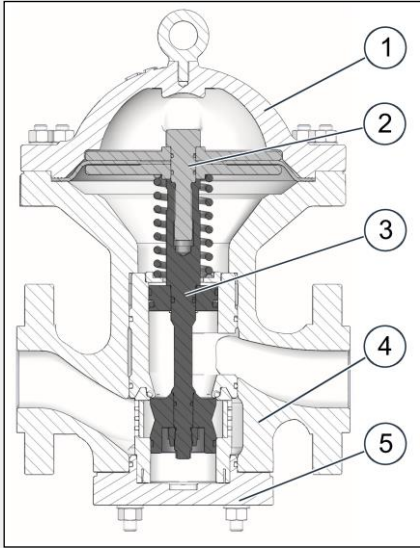
## 2.5 Layout and operation

**How it works in general**

In combination with an appropriate Honeywell pilot, the HON R100NG actuator assembly can be used as a gas pressure regulator in order to maintain the outlet pressure of a gas constant within the regulating line regardless of the influence of disturbance variables such as pressure changes and/or discharge changes.

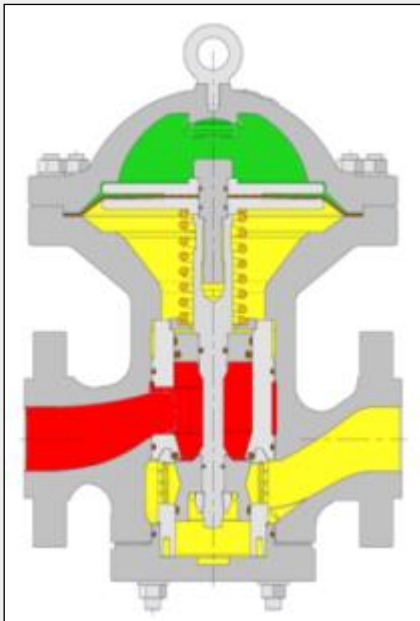



**Actuator assembly configuration**

Actuator assembly configuration:

Figure	No.	Description
	1	Dome
	2	Diaphragm unit
	3	Moving parts
	4	Valve housing
	5	Lower cover

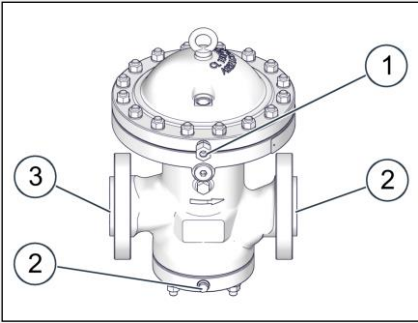
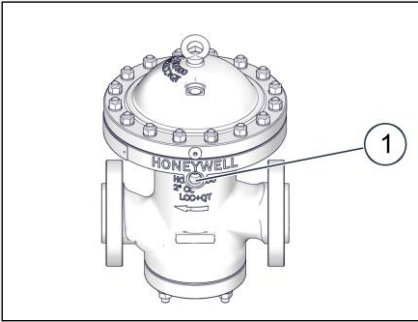
The parts (3) that move with the diaphragm unit (2) are shown in dark gray.

**Actuator assembly pressure sections**

Figure	Color	Meaning
		Inlet pressure
		Outlet pressure
		Motorization pressure

Actuator assembly connection lines

The HON R100NG and HON R100NG-FO actuator assembly versions feature the following ports:

Figure	No.	Connection
Front:		
	1	Motorization pressure
	2	Outlet pressure
	3	Inlet pressure
Back:		
	1	Outlet pressure feedback

How the actuator assembly works

HON R100NG	HON R100NG-FO
<ul style="list-style-type: none"><li>▪ In a depressurized state, the compression spring will push the diaphragm upward so that the valve disc will close, creating a seal at the edge leading to the expansion sleeve (fail-close).</li><li>▪ The set pressure will produce a force component that acts on the diaphragm from above.</li><li>▪ The force components are compared at the diaphragm.</li><li>▪ If the set pressure is greater than the compression spring and outlet pressure acting from below, the valve disc will be pushed downward. This will open a corresponding gap between the inlet pressure and outlet pressure areas.</li></ul>	<ul style="list-style-type: none"><li>▪ In a depressurized state, the compression spring will push the diaphragm downward, causing the valve disc to be pushed downward and opening a gap between the inlet pressure and outlet pressure areas (fail-open).</li><li>▪ The set pressure and the compression spring will produce force components that act on the diaphragm from above.</li><li>▪ The intermediate pressure will produce a force component that acts on the diaphragm from below.</li><li>▪ The force components are compared at the diaphragm.</li><li>▪ If the set pressure is greater than the intermediate pressure acting from below, the valve disc will seal off the inlet pressure and outlet pressure areas from each other.</li></ul>

## 2.6 Technical specifications

### Characteristic device values and materials

The following characteristic values apply to all setpoint ranges:

	Value
Max. inlet pressure $p_{\text{umax}}$	100 bar (1450 psi)
Temperature range	-20 to +60 °C (-4 to +140 °F)
Materials	Case: Cast steel/Steel Internal parts: Steel Diaphragm: NBR with nylon fabric insert Gaskets: NBR, PTFE

### Pressure rating and flange facing standards

There are various flange facings for the nominal diameters of 1" (DN 25); 2" (DN 50); 3" (DN 80); 4" (DN 100), and 6" (DN 150), as specified in the following standards:

- **ASME B16.5**  
Pressure rating as per Class 150; 300; 600 / Class 150 = 20 bar;  
Class 300 = 51 bar; Class 600 = 102 bar  
Flange facing: Raised face; ring joint
- **DIN EN 1759-1**  
Pressure rating as per Class 150; 300; 600 / Class 150 = 20 bar;  
Class 300 = 51 bar; Class 600 = 102 bar  
Flange facing: B flange; J flange
- **DIN EN 1092-1**  
Pressure rating as per PN 16; 25; 40 / PN 16 = 16 bar; PN 25 = 25 bar;  
PN 40 = 40 bar  
Flange facing: B flange

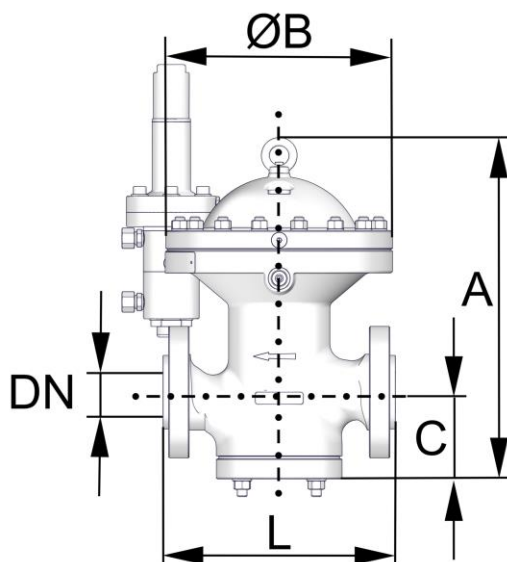
### Connection lines

An overview of the connection lines for the HON R100NG can be found in the *Layout and operation* (see page 13) section.

The actuator assembly's ports have the following sizes:

Device model	Connection	Size	Pipe diameter [mm]
HON R100NG HON R100NG-FO	Motorization pressure	G1/2"	10, 12
HON R100NG HON R100NG-FO	Outlet pressure feedback	G1/2"	10, 12
HON R100NG HON R100NG-FO	Outlet pressure	G1/4"	10

HON R100NG  
dimensions and  
weights when using  
P095 pilot as an  
example



Size	Class	A inch (mm)	B inch (mm)	C inch (mm)	L inch (mm)	Weight* lbs (kg)
1" (DN 25)	300	19.96 (507)	9.06 (230)	3.74 (95)	8.50 (216)	110 (50)
1" (DN 25)	600					110 (50)
2" (DN 50)	300	25.47 (647)	11.42 (290)	4.72 (120)	11.50 (292)	205 (93)
2" (DN 50)	600					209 (95)
3" (DN 80)	300	29.41 (747)	13.78 (350)	5.91 (150)	14.02 (356)	346 (157)
3" (DN 80)	600					353 (160)
4" (DN 100)	300	32.76 (832)	16.93 (430)	6.89 (175)	17.01 (432)	595 (270)
4" (DN 100)	600					617 (280)
6" (DN 150)	300	42.80 (1087)	24.61 (625)	9.84 (250)	22.01 (559)	1457 (661)
6" (DN 150)	600					1521 (690)
8" (DN 200)	300	51.85 (1317)	25.79 (655)	12.20 (310)	25.98 (660)	2006 (910)
8" (DN 200)	600					2094 (950)

\*The P095 pilot used in this example weighs: 17.6 lbs (8 kg).

#### ATEX specifications

The mechanical components of the device do not have any potential ignition sources. Consequently, they are not subject to the requirements of the ATEX 95 Equipment Directive (94/9/EU).



### 3 Safety

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### 3.1 Basic safety rules

<b>Target group of these rules</b>	These rules are intended for any individuals handling the device.
<b>Purpose of these rules</b>	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.
<b>How to use this component documentation</b>	<p>Observe the following rules:</p> <ul style="list-style-type: none"> <li>▪ Read the chapter entitled Safety and the chapters relating to your responsibilities in their entirety. It is vital that you have understood these contents.</li> <li>▪ Always keep this component documentation in the vicinity of the device so that you can consult it when necessary.</li> <li>▪ Include this component documentation if you are transferring ownership of the device.</li> </ul>
<b>Handling the device</b>	<p>Observe the following rules:</p> <ul style="list-style-type: none"> <li>▪ Only individuals who meet the requirements set forth in this component documentation have permission to work with/on the device.</li> <li>▪ 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.</li> <li>▪ Only use the device for the intended purpose. Never use the device for any other, potentially logical purposes.</li> <li>▪ Follow all the safety measures outlined in this component documentation and on the device. In particular, wear the mandatory personal protective gear.</li> <li>▪ 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.</li> <li>▪ When replacing defective parts, only use original spare parts or manufacturer-approved standard parts.</li> </ul>
<b>Requirements concerning the workforce</b>	<p>Personnel must meet the following requirements:</p> <ul style="list-style-type: none"> <li>▪ All personnel must meet the requirements corresponding to their duties.</li> <li>▪ All personnel must read and understand this component documentation before working with/on the device.</li> <li>▪ All occupational health and safety regulations that apply in your country must be complied with.</li> <li>▪ 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.</li> <li>▪ All personnel must wear the personal protective equipment required for their work.</li> </ul>
<b>Conduct in the event of accidents</b>	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
Skilled person or expert	Any work on and with the device	<ul style="list-style-type: none"> <li>Professional training and experience operating pressure equipment and systems</li> <li>Knowledge of the relevant standards and regulations</li> <li>Ability to identify and avoid dangers autonomously</li> </ul>
Certified, independent competent person	Safety checks	<ul style="list-style-type: none"> <li>Professional training</li> <li>Knowledge of the relevant standards and regulations</li> <li>Ability to identify and avoid dangers autonomously</li> </ul>
Carrier	Company-to-company transport	<ul style="list-style-type: none"> <li>Professional training and experience transporting pressure equipment and systems</li> <li>Knowledge of the relevant standards and regulations</li> <li>Ability to identify and avoid dangers autonomously</li> <li>Knowledge with securing hauling distances</li> <li>Knowledge with the use of hoisting equipment</li> </ul>
Transportation personnel	Intra-company transport	Professional training and experience with the transport using stackers, etc.
Mechanical fitter	Mechanical installation	<ul style="list-style-type: none"> <li>Professional training and experience operating pressure equipment and systems</li> <li>Knowledge of the relevant standards and regulations</li> <li>Ability to identify and avoid dangers autonomously</li> </ul>
Tasked with the commissioning	<ul style="list-style-type: none"> <li>Initial start-up</li> <li>Renewed start-up</li> </ul>	<ul style="list-style-type: none"> <li>Professional training and experience operating pressure equipment and systems</li> <li>Knowledge of the relevant standards and regulations</li> <li>Ability to identify and avoid dangers autonomously</li> </ul>
Tasked with the installation	Set-up	<ul style="list-style-type: none"> <li>Professional training and experience operating pressure equipment and systems</li> <li>Knowledge of the relevant standards and regulations</li> <li>Ability to identify and avoid dangers autonomously</li> </ul>

Personnel	Responsibilities	Required qualification
Mechanical maintenance personnel	Involving mechanical parts: <ul style="list-style-type: none"> <li>▪ Fault finding</li> <li>▪ Maintenance</li> <li>▪ Repairs</li> </ul>	<ul style="list-style-type: none"> <li>▪ Professional training and experience operating pressure equipment and systems</li> <li>▪ Knowledge of the relevant standards and regulations</li> <li>▪ Ability to identify and avoid dangers autonomously</li> </ul>
Inspector	Safety check	Qualified inspector with adequate knowledge of gas pressure regulators
Tasked with the disposal	Disposal of the device	<ul style="list-style-type: none"> <li>▪ Professional training and experience with the disposal of pressure equipment and systems</li> <li>▪ Knowledge of the relevant standards and regulations</li> <li>▪ Ability to identify and avoid dangers autonomously</li> </ul>

### 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
Start-up, operation (including partial), cleaning, maintenance, search and remedy of errors	<ul style="list-style-type: none"> <li>▪ Industrial protective helmet</li> <li>▪ Protective clothing</li> <li>▪ Safety harness</li> <li>▪ Ear protection</li> <li>▪ Safety boots with protection for electrostatic discharge (ESD)</li> <li>▪ Safety goggles</li> <li>▪ Safety gloves</li> </ul>

### 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
<ul style="list-style-type: none"> <li>▪ Installation</li> <li>▪ Start-up</li> <li>▪ Set-up</li> <li>▪ Maintenance, repairs</li> <li>▪ Decommissioning</li> </ul>	All around the device, depending on the task

# 4    Transport and installation

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## 4.1 Transporting the actuator assembly

### Heavy transport units

#### **⚠ WARNING**

**Risk of serious injury posed by heavy loads when using cranes for transportation**

Transporting heavy devices or components with a crane may result in serious impact and crush injuries if the loads start moving in an uncontrolled manner.

- ⇒ Loads may only be transported with a crane by a duly qualified person.
- ⇒ Markings and information about the center of gravity of the load (if applicable) must be observed.
- ⇒ Loads may only be moved under supervision.

### Suspended loads

#### **⚠ WARNING**

**Risk of serious injury in the event that load handling attachments break while holding a suspended load**

Heavy loads picked up or transported with hoisting and slinging gear may result in serious impact and crush injuries if the load handling attachments fail.

- ⇒ Only fasten the device at the positions intended for the transport.
- ⇒ The load-bearing capacity of the appropriate hoisting equipment must correspond at least to the weight of the load to be transported.
- ⇒ Always stand clear of suspended loads.
- ⇒ Ensure that no person is within the danger zone.

### Selecting the hoisting equipment and slings

A mobile workshop crane is suitable for use as hoisting equipment.

The following are adequate for use as slings:

- Ropes
- Belts
- Chains

The hoisting equipment and slings must meet the following criteria:

- The load-bearing capacity is adequate for the weight of the HON R100NG.
- The hoisting height is adequate for the mounting position at the installation site.

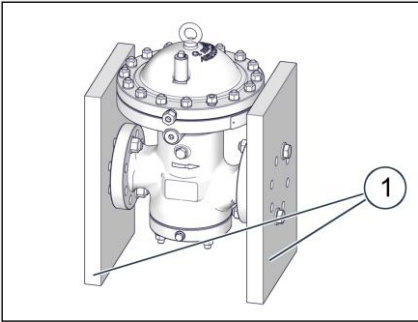
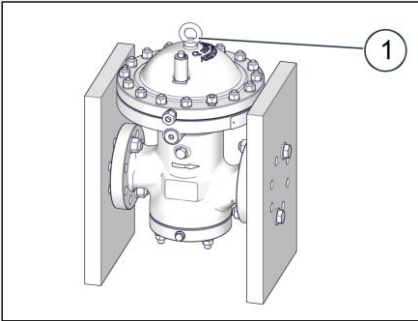
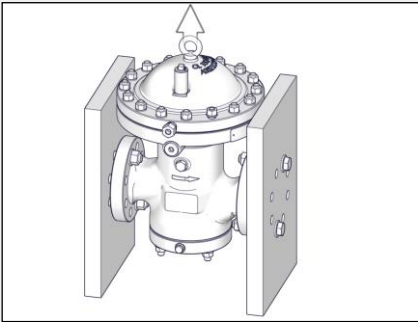
### Preparing for transportation

Make sure that the following requirements are met before transportation:

- You have seen and taken into account all instructions on the packaging regarding the orientation of the packed device, the center of gravity, and attachment points.
- The transport route is clear of obstacles and other barriers, and there is enough space available for the dimensions of the packed device and the handling equipment. Make sure to measure all of the package's dimensions!
- The transport route will be able to handle the load exerted by the total weight of the handling equipment and the load being transported.
- There is enough space for unpacking and installing the device at the installation location.

Transporting the actuator assembly

Proceed as follows:

Figure	Step	Description
	1	Leave the transport panels (1) on the HON R100NG during transport.
	2	Rig the sling to the eye bolt (1).
	3	Lift the HON R100NG. Slowly and carefully transport the HON R100NG to the location where it will be installed.

## 4.2 Mounting the actuator assembly

### Preparing the materials

Prepare the following materials:

- Flange gaskets
- Threaded bolts
- Washers
- Nuts

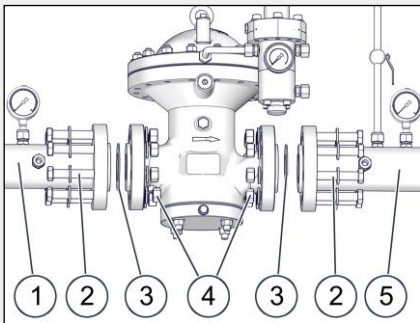
The quantity and size are dependent on the following criteria:

- Design and size of the flange

### Assessing the situation

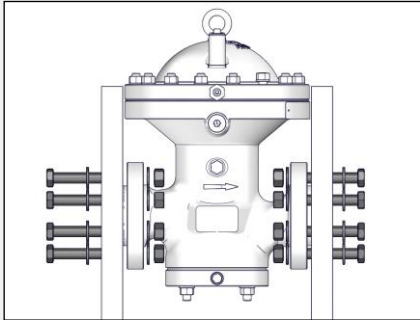
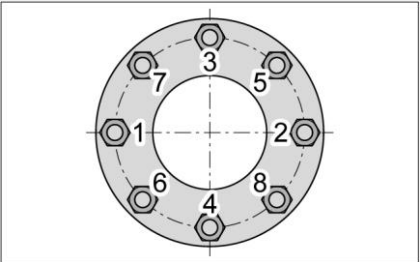
Assess the installation situation.

The numbers have the following meaning:

Figure	No.	Meaning
	1	Gas regulating line inlet
	2	Studs and washers
	3	Flange gasket
	4	Nuts and washers
	5	Gas regulating line outlet

### Mounting the actuator assembly

Proceed as follows:

Figure	Step	Description
	1	Remove the flange protective plates.
	2	Transport the device to the location where it will be installed. <ul style="list-style-type: none"><li>▪ The device needs to be installed in the piping in a horizontal and level position. If you want to use a different installation position, consult with the manufacturer first.</li><li>▪ Pay attention to the direction of flow for the gaseous fluid as marked on the body.</li></ul>
	3	Secure and support the device's position in such a way that the device can be installed in the piping without any stress and that the piping's weight will be supported as well.
	4	Install the flange gaskets.
	5	Screw down the flange crosswise in the specified order. When doing so, make sure to observe the torques specified by the flange gaskets' manufacturer.



**Final inspection**

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

- All screwed connections on the device and supply lines are securely fastened.

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.

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## 5 Maintenance

### Contents

Topic	Page
Maintenance schedule	27
Preparing for the maintenance	28
Maintaining the HON R100NG actuator assembly	30
Completing the maintenance	42

## 5.1 Maintenance schedule

Meaning	<p>The maintenance schedule provides an overview of the periodically required maintenance and repairs and makes reference to the appropriate instructions.</p> <p><b>Note:</b> The maintenance intervals specified below are recommendations only. Since the intervals for maintenance work depend heavily on the system's operating conditions and on the gas' properties, the maintenance intervals specified below may have to be adjusted as necessary.</p>				
Maintenance schedule	Perform the following maintenance and repairs within the specified time intervals:				
Task		Interval			
See section		as needed	every 3 months	every year	every 4 years
Maintaining the actuator assembly	Maintaining the actuator assembly (see page 30)			●	

## 5.2 Preparing for the maintenance

### Preparation work for pilot maintenance

Proceed as follows:

Step	Description	Explanation
1	Preparing maintenance and spare parts	<ul style="list-style-type: none"> <li>▪ The spare parts that are always required for the actuator assembly's maintenance are listed in the spare parts kits in the <i>appendix</i> (see page 46).</li> <li>▪ 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. If parts are damaged or are not working properly or at all due to heavy soiling that cannot be removed, contact the manufacturer in order to clarify the situation before putting the device back into operation. After clarifying the situation, you can order the relevant servicing parts from the manufacturer.</li> <li>▪ Please refer to <i>Additional information regarding spare parts</i> (see page 47) to find out which spare parts correspond your specific actuator assembly and have the corresponding maintenance parts and servicing parts ready to go before maintenance.</li> </ul>
2	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 <i>Lubricants and threadlockers</i> (see page 51).
3	Removal and disassembly	<p><b>WARNING!</b> 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:</p> <ul style="list-style-type: none"> <li>▪ Close all connections leading to the gas-carrying line.</li> <li>▪ Establish a depressurized status. Residual amounts of energy must be depressurized as well.</li> </ul> <p>If there is a pilot installed on the actuator assembly, the pilot must be removed from the gas regulating line and from the actuator assembly being used to operate it before starting with the maintenance work. For instructions on how to remove the pilot, 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 pilot) and purge all gas-conveying lines with nitrogen before removal.</p> <p>To determine whether the actuator assembly can be left in the gas regulating line during maintenance, please refer to the following table.</p>

If ...	then ...
You are performing maintenance on an actuator assembly with a nominal diameter of up to 3",	the actuator assembly can remain in the line during maintenance.
You are performing maintenance on an actuator assembly with a nominal diameter of 4" or more,	the actuator assembly must be removed from the line and disassembled for maintenance, as the individual components are heavy starting from this size.

**Sample maintenance instructions**

The maintenance instructions below are provided as examples for the various actuator assembly designs and versions. In other words, it does not explicitly describe every single version and design. Use the bills of materials to make sure that you replace all the maintenance parts relevant to your specific device model during maintenance.

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

## 5.3 Maintaining the HON R100NG actuator assembly

### 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.

### Moving heavy weights

#### WARNING

**Risk of injury due to improper lifting**

When lifting and handling device components, the weight of the components and assemblies can result in injury, especially in the torso area.

- ⇒ Make sure to always have enough people lifting heavy device components (guideline using metric units: 15 - max. 55 kg / guideline using imperial units: 30 - max. 120 lbs, depending on age and gender). Comply with all the occupational health and safety regulations and instructions that apply at the installation location!
- ⇒ Use suitable hoisting equipment and slings in order to handle heavy device components. Make sure to take into account the device components' center of gravity and to attach the slings only to the secure device component locations intended for this purpose.
- ⇒ Wear the required personal protective equipment.

### Requirements

Make sure that the following requirements are met:

- The system is depressurized; see *Preparing for maintenance* (see page 28).  
**WARNING!** Mortal danger associated with pressurized components.

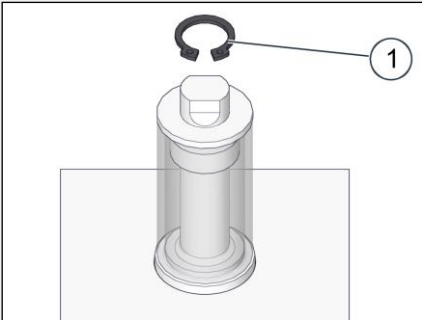
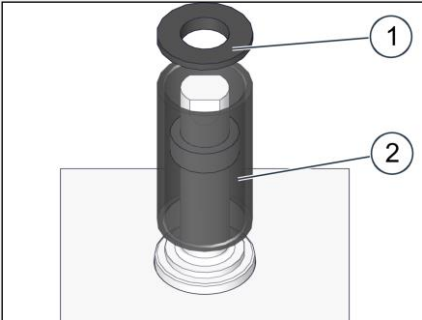
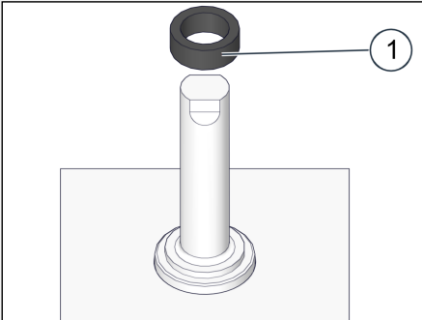
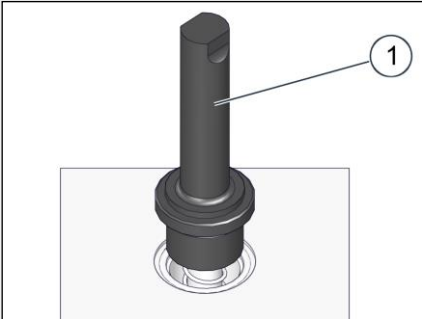
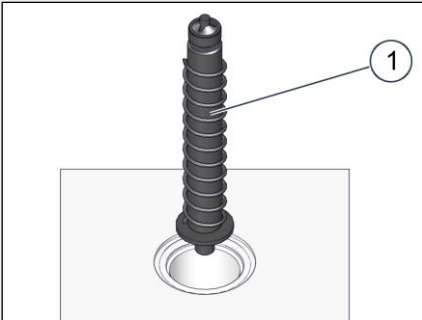
### Cleaning

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 position indicator

Proceed as follows:

Figure	Step	Description
	1	Remove the visual position indicator's retaining ring (1).
	2	Remove the cover ring (1) and the sight glass (2).
	3	Remove the magnetic ring (1).
	4	Use an open-end wrench to unscrew the position indicator's housing (1).
	5	Remove the indicator pin, including the spring (1).

## Tightening torques

When screwing the actuator assembly's lower and upper covers, make sure to observe the following tightening torques:

Nominal size	Step	Screw specifications	Qty	Tightening torque
1"	38	UNC 3/8 - 16 x 2	4	30 Nm (22 ft lbs)
	39	UNC 1/2 - 11 x 2 1/2	12	120 Nm (89 ft lbs)
2"	38	UNC 1/2 - 13 x 2 3/4	4	120 Nm (89 ft lbs)
	39	UNC 1/2 - 13 x 2 1/4	16	120 Nm (89 ft lbs)
3"	38	UNC 5/8 - 11 x 3	6	230 Nm (170 ft lbs)
	39	UNC 5/8 - 11 x 3 1/4	16	230 Nm (170 ft lbs)
4"	38	UNC 3/4 - 10 x 4	6	400 Nm (295 ft lbs)
	39	UNC 3/4 - 10 x 3 3/4	16	400 Nm (295 ft lbs)
6"	38	UNC 3/4 - 9 x 4 1/2	8	1400 Nm (1033 ft lbs)
	39	UN 1 1/8 - 8 x 5 1/2	16	400 Nm (295 ft lbs)
8"	38	UNC 3/4 - 10 x 4 1/2	10	1400 Nm (1033 ft lbs)
	39	UN 1 1/8 - 8 x 5 1/2	16	400 Nm (295 ft lbs)

## Maintaining the actuator assembly

Proceed as follows:

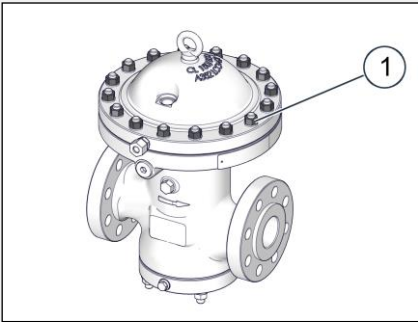
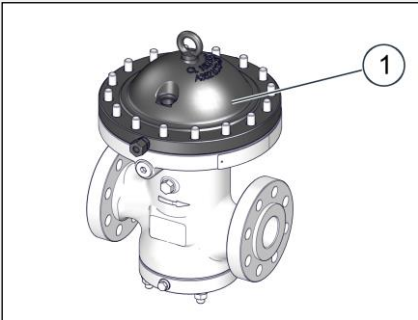
Figure	Step	Description
	1	Unscrew the upper cover's nuts (1). <b>Caution!</b> The lid is spring-loaded. Risk of injury due to bouncing up when the nuts are unscrewed. Hold the cover down when unscrewing the nuts.
	2	Remove the cover (1).



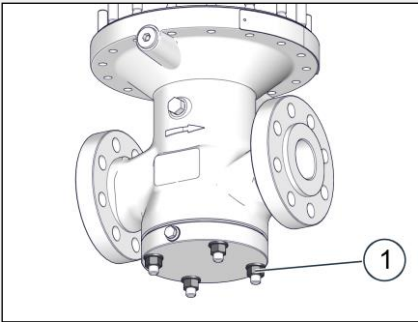
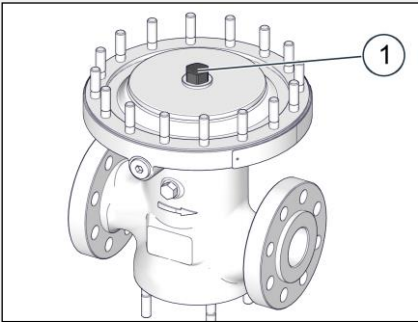
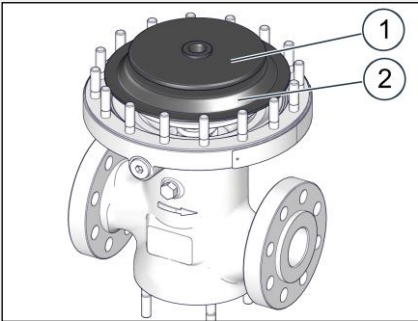
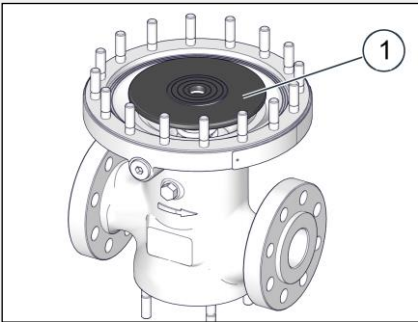
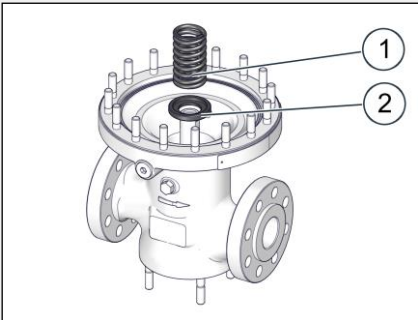
Figure	Step	Description
	3	Unscrew the lower cover's nuts (1). Remove the cover. <b>Caution!</b> Parts from the inside may fall out.
	4	Unscrew the screw (1) used to secure the diaphragm. While doing so, secure the valve rod from below.
	5	Remove the upper diaphragm disc (1) and the diaphragm (2).
	6	Remove the lower diaphragm disc (1).
	7	Remove the compression spring (1) and the spring collar (2).

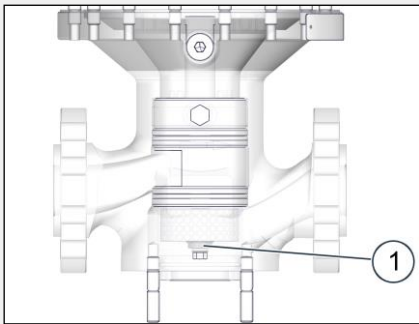
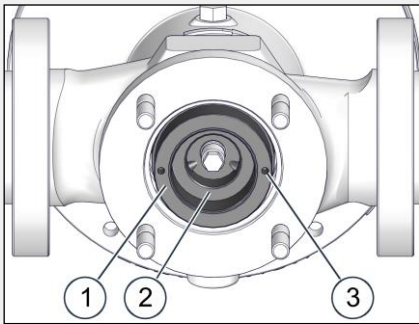
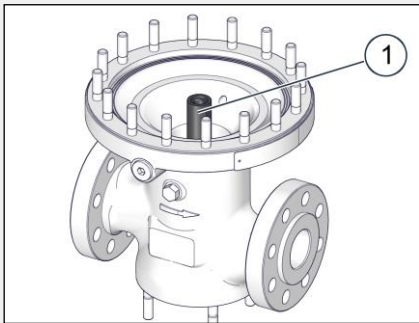
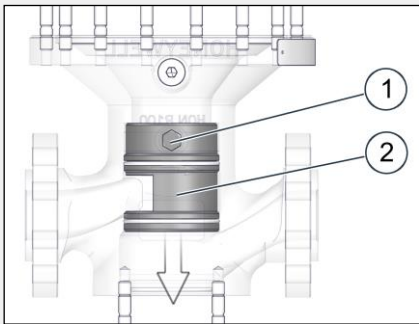
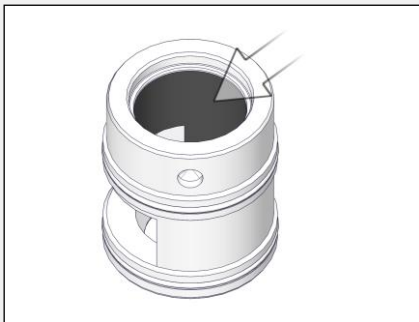
Figure	Step	Description
	8	Unscrew the valve disc's locknut (1) from below. While doing so, secure the valve rod from above.
	9	From below, remove the expansion sleeve (1) and the valve disc (2). To do so, use the holes in the expansion sleeve (3). <b>Important!</b> Both components feature sealing edges that must not be damaged!
	10	Pull out the valve rod, including the compensating disc, upward.
	11	Hold the sliding bushing (2) in place from below. Unscrew the stud (1). Remove the sliding bushing. Use a rubber mallet if necessary. <b>Important!</b> Make sure not to damage the sliding bushing – especially the sealing edges.
	12	Check the sliding bushing's sealing face (1) for damage. The sealing face must not have any scratches or dents. If necessary, replace the sliding bushing with a new one.

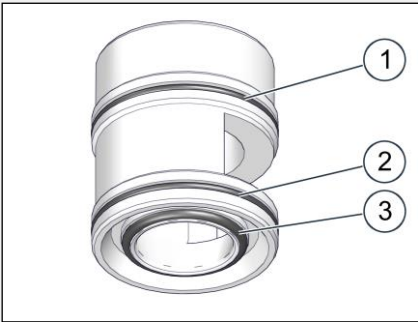
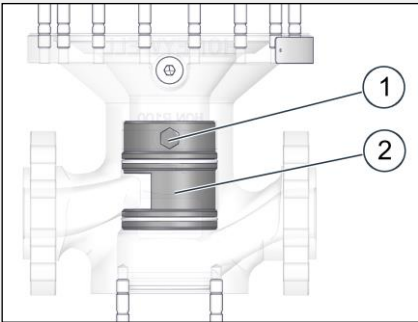
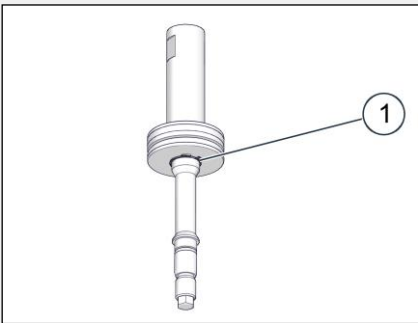
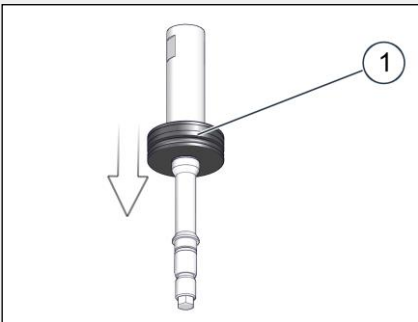
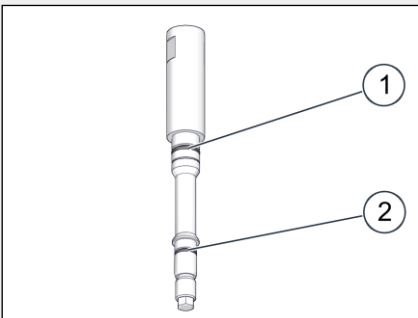
Figure	Step	Description
	13	Take the sliding bushing. Replace the O-rings (1, 2, 3) with new, lubricated O-rings.
	14	Insert the sliding bushing (2) back into the body. Make sure it is in its correct installation position. The opening on the side must point towards the gas inlet side. Make sure not to damage the O-rings when inserting the sliding bushing.
	15	Secure the sliding bushing (2) with the stud (1). The stud needs to be screwed in all the way without fail. If you are unable to screw the stud in all the way, correct the sliding bushing's position until you are able to screw the stud in all the way.
	16	Take the valve rod. Remove the retaining ring (1) below the compensating disc.
	17	Pull the compensating disc (1) down and off.
	18	Replace the O-rings (1, 2) on the valve rod with new, lubricated O-rings.

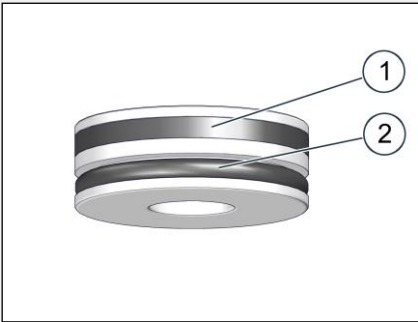
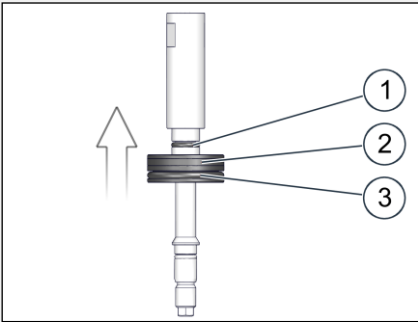
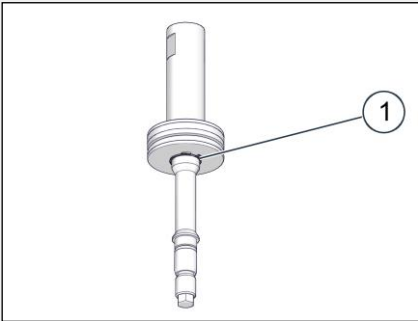
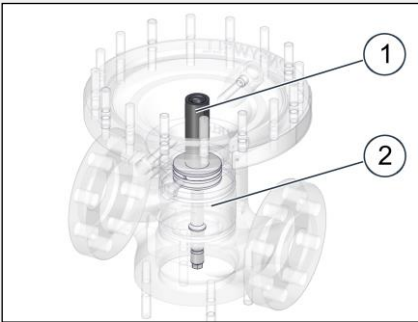
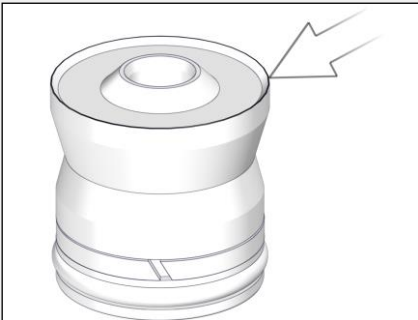
Figure	Step	Description
	19	Take the compensating disc. Replace the O-ring (2) with a new, greased O-ring. Check the sliding ring (1) for damage. Replace it if necessary.
	20	Slide the compensating disc onto the valve rod all the way to the stop. <b>Important!</b> Make sure not to damage the O-ring (1) or change its position. Make sure that the compensating disc is positioned correctly. The sliding ring (2) should be on top and the O-ring (3) underneath it.
	21	Secure the compensating disc with a new retaining ring (1).
	22	Insert the valve rod (1) back into the actuator assembly from above. The compensating disc should sit tightly inside the upper part of the sliding bushing (2).
	23	Take the valve disc. Check the sealing edge for damage. The sealing edge must not have any scratches or dents. If necessary, replace the valve disc with a new one.

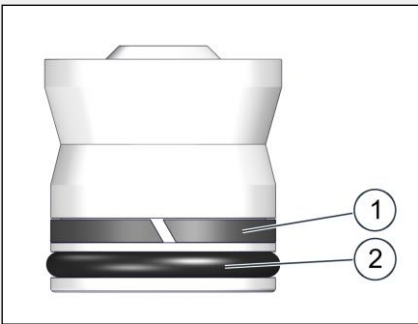
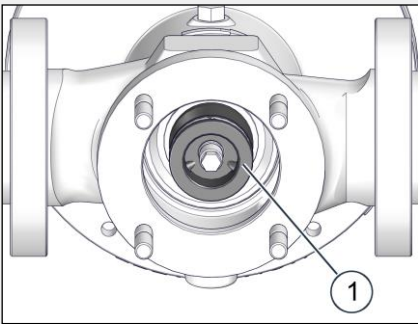
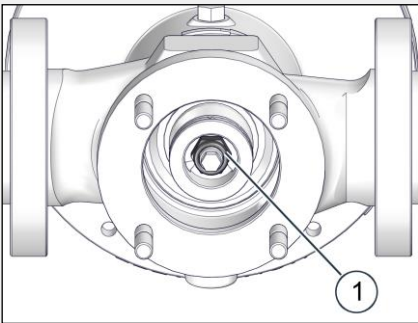
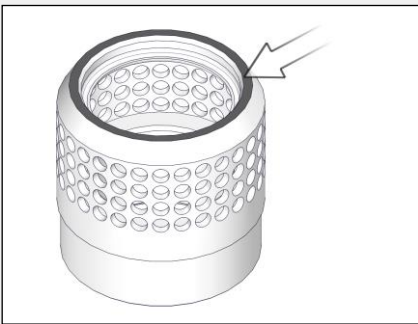
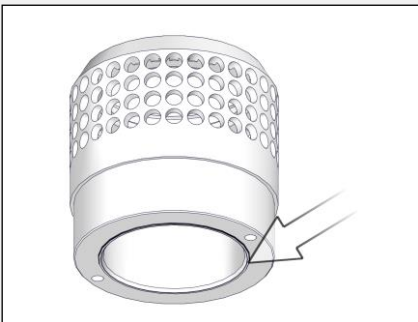
Figure	Step	Description
	24	Check the sliding ring (1) for damage. Replace it with a new one if necessary. Replace the O-ring (2) with a new one.
	25	Slide the valve disc (1) onto the valve rod all the way to the stop. <b>Important!</b> Make sure not to damage the O-ring on the valve rod or change its position.
	26	Screw the locknut (1) all the way onto the valve rod. While doing so, secure the valve rod from above.
	27	Take the expansion sleeve. Check the expansion sleeve for damage. The upper sealing edge must not have any scratches or dents. If necessary, replace the expansion sleeve with a new one.
	28	Check the lower sealing lip for damage. The lower sealing lip must not have any scratches or dents. If necessary, replace the expansion sleeve with a new one.

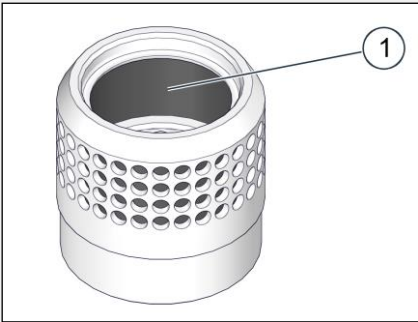
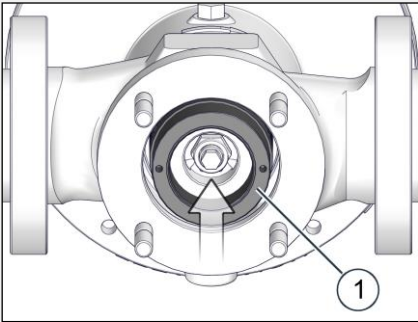
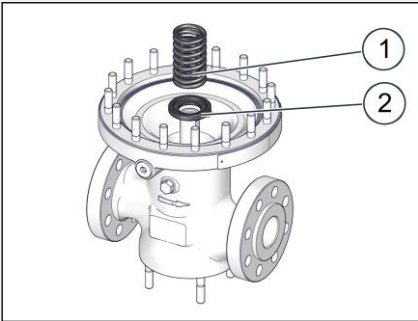
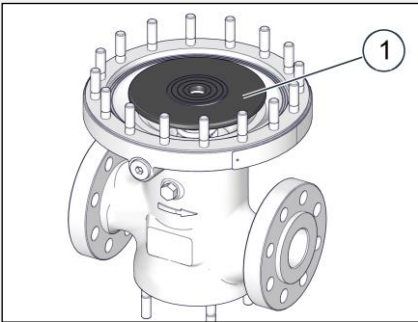
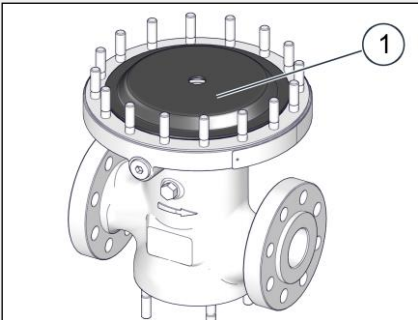
Figure	Step	Description
	29	Check the metal foam insert (1) on the inside for damage and soiling. Replace it with a new one if necessary.
	30	Insert the expansion sleeve (1), including the metal foam insert, back into the body from below.
	31	Insert the spring collar (2) back into the sliding bushing from above, making sure that the collar opens upwards. Insert the compression spring (1).
	32	Insert the lower diaphragm disc (1).
	33	Insert a new diaphragm. Glue the surfaces to the diaphragm disc and to the body's contact surfaces. Make sure that the bulge points upwards.

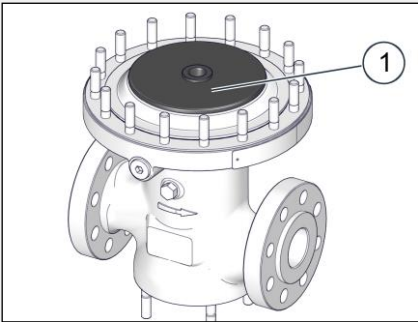
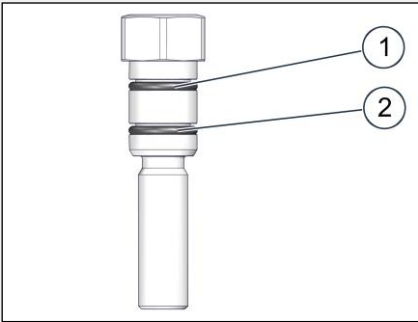
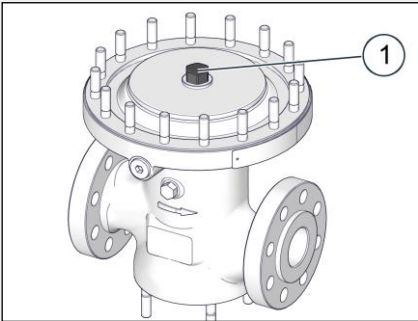
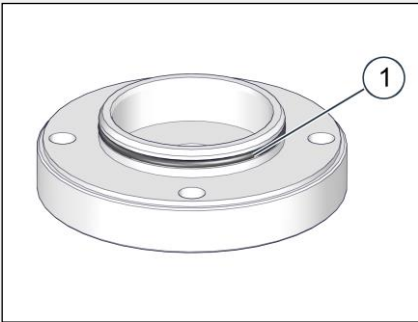
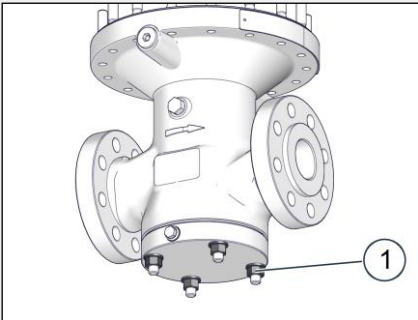
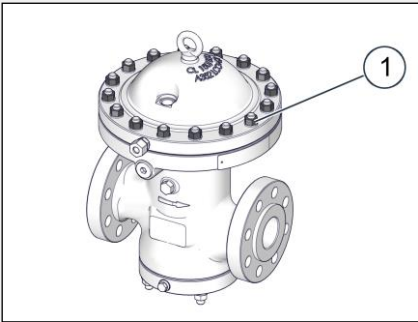
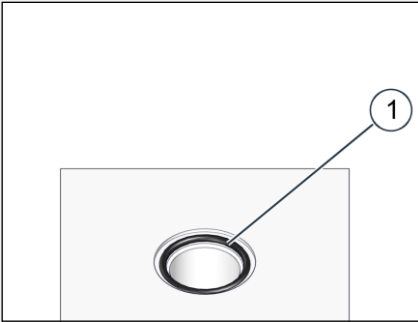
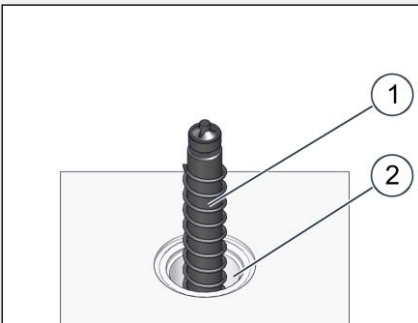
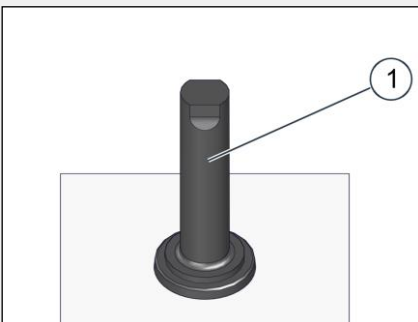
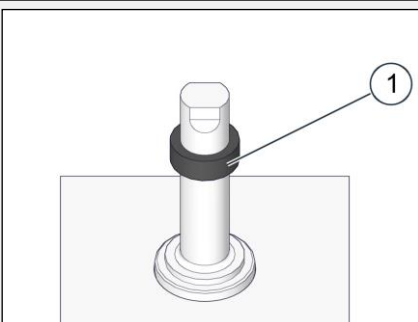
Figure	Step	Description
	34	Insert the upper diaphragm disc (1) and glue the diaphragm in place there as well.
	35	Take the screw used to secure the diaphragm. Replace the O-rings (1, 2) with new, lubricated O-rings.
	36	Secure the diaphragm unit by screwing in the screw (1) used to secure the diaphragm all the way into the valve rod. While doing so, secure the valve rod from below.
	37	Take the lower cover. Replace the O-ring (1) with a new, greased O-ring. Skip this step for devices with a nominal diameter of 1".
	38	Put the lower cover back in place. Tighten the nuts (1) in a criss-cross sequence. Observe the tightening torque information provided in the table before this section.



Figure	Step	Description
	39	Put the upper cover back in place. Tighten the nuts (1) in a criss-cross sequence. Observe the tightening torque information provided in the table before this section.

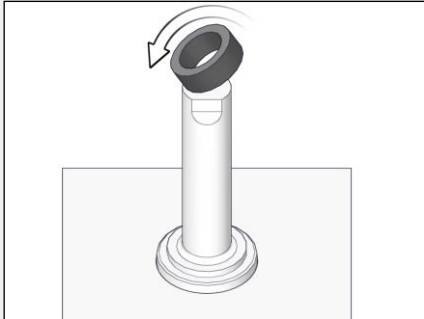
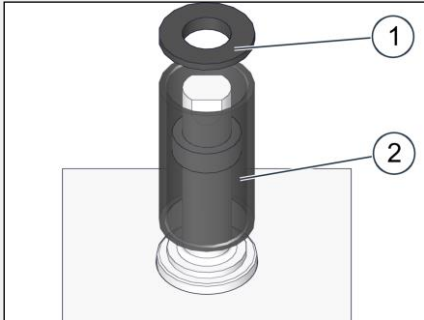
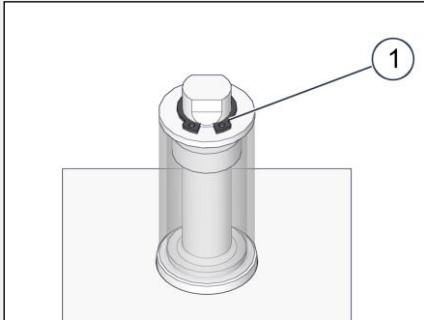
Maintaining and installing the position indicator

Proceed as follows:

Figure	Step	Description
	1	Replace the O-ring (1) in the body hole intended for the position indicator with a new, greased O-ring.
	2	Insert the inner pin, including the spring (1), back into the hole (2) for the position indicator.
	3	Use an open-end wrench to screw the position indicator's housing (1) back in place.
	4	Pull the magnetic ring (1) over the position indicator's housing. The magnetic ring position shown in the figure to the left shows the correct installation height.



If ...	then ...
The magnetic ring is resting over the position indicator's housing in the position shown in step 4	proceed with step 6.
The magnetic ring is NOT resting over the position indicator's housing in the position shown in step 4, but is instead in a higher or lower position	proceed with step 5.

Figure	Step	Description
	5	Remove the magnetic ring from the position indicator's housing, turn it 180°, and place it back over the housing.
	6	Place the sight glass (2) and the cover ring (1) back on the position indicator's housing. Make sure that the magnetic ring stays in the required position.
	7	Install the retaining ring (1).

Next task

- Proceed as follows:
- *Completing the maintenance* (see page 42)

## 5.4 Completing the maintenance

### Installing the actuator assembly

For instructions on how to install the actuator assembly and the pilot that will be used to operate the gas pressure regulator, 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 44)
  - *Disposing of the device* (see page 45)
-

## 6 Storage, removal, and disposal

### Contents

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Disposing of the device	45

## 6.1 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: 32 °F to 77 °F (0 °C to 25 °C)
  - 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.
  - When storing the device for more than one year (e.g., as a backup device):  
Store the device in its original packaging and in the same condition it was 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.
-

## 6.2 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.
-

# 7 Appendix

## Contents

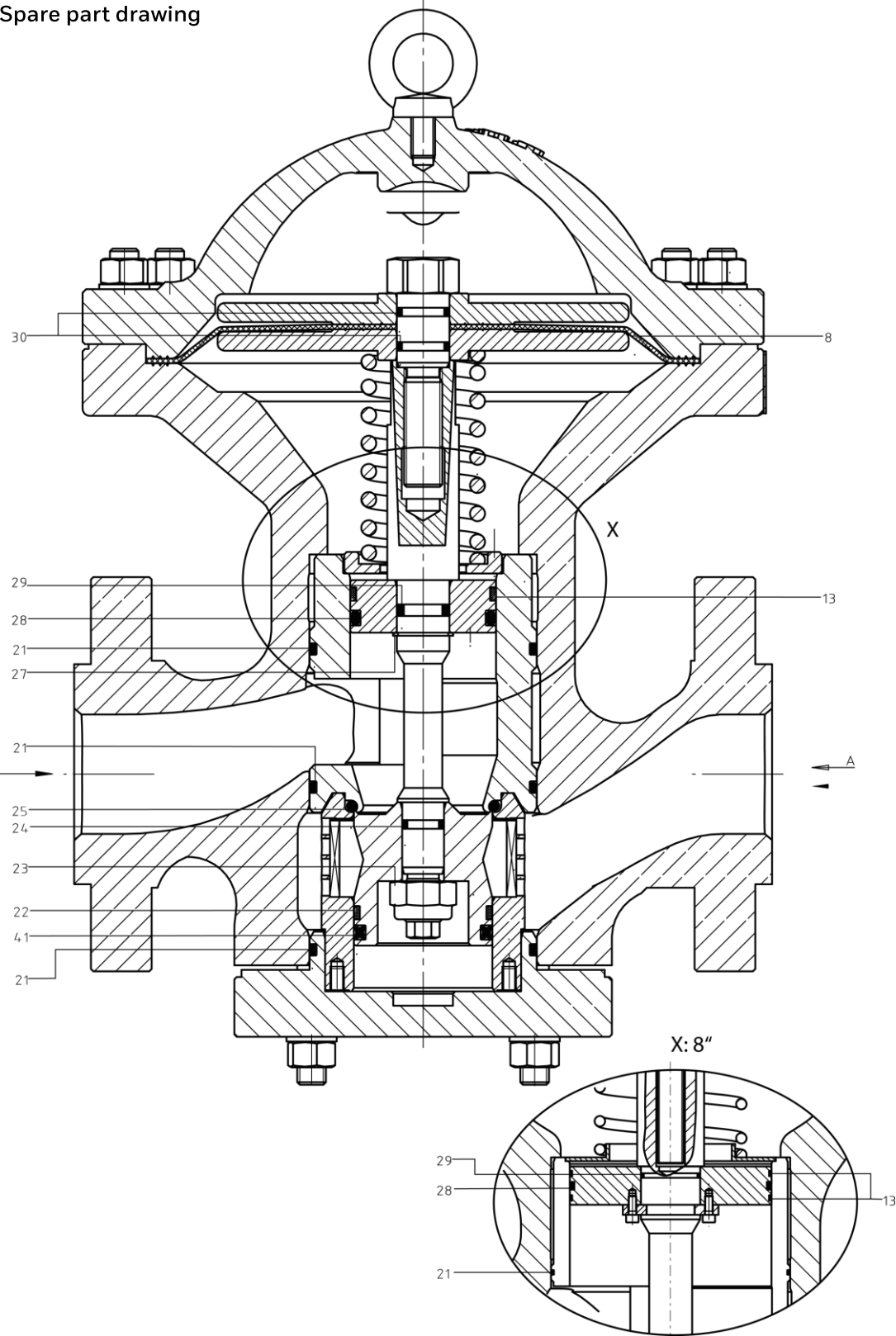
Topic	Page
Additional information regarding spare parts	47
Spare parts for HON R100NG	48
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# 7.1 Additional information regarding spare parts

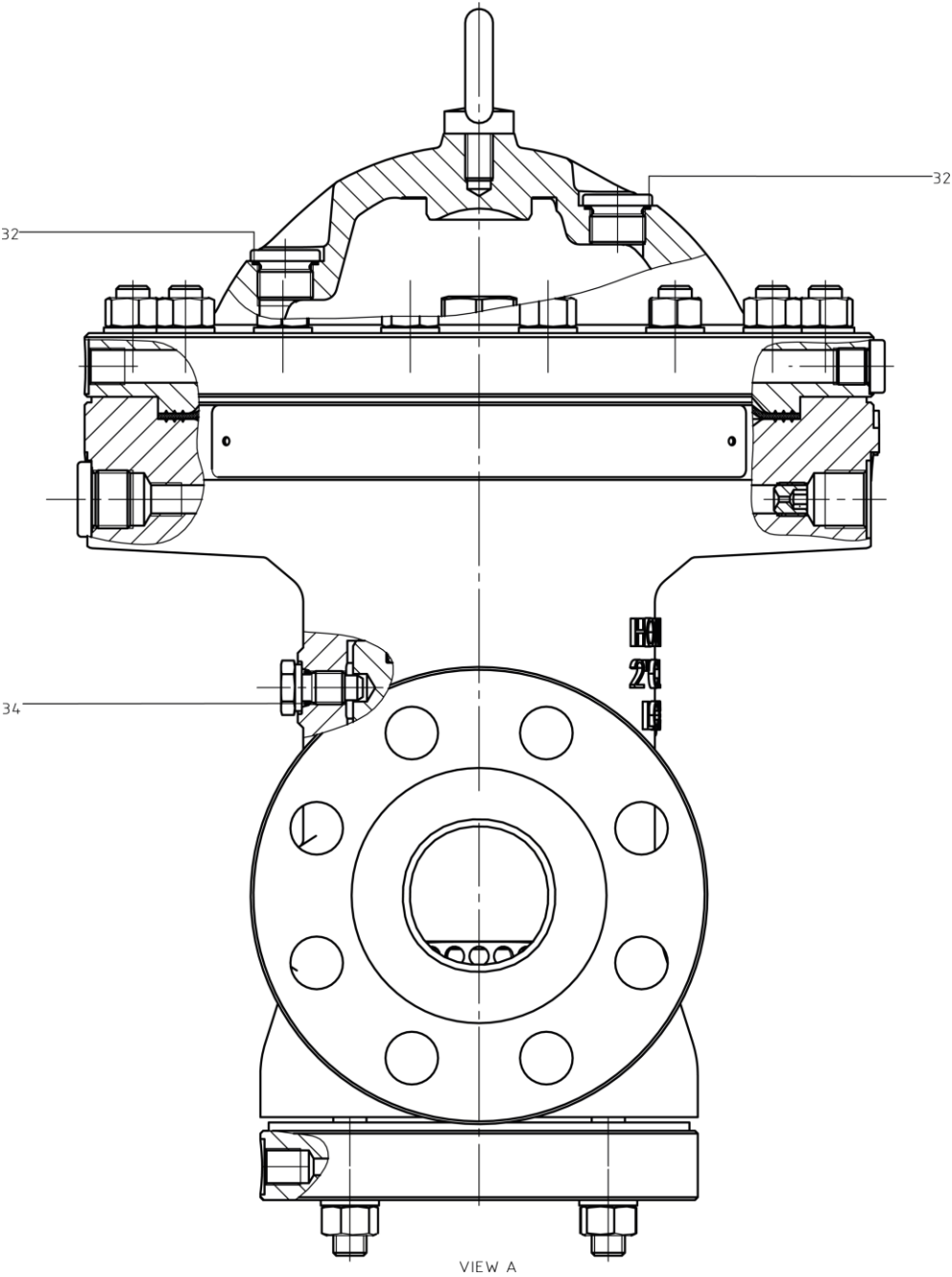
<b>Number of spare parts</b>	The required number of spare parts is indicated under the part number in the “Part No.” column. If no quantity is specified, this means that only one unit is required.
<b>Spare parts kits</b>	<p>The spare parts always required for maintenance are grouped together in the following spare parts kit:</p> <ul style="list-style-type: none"><li>▪ Spare parts kit</li></ul> <p>The spare parts kit has its own part number. Individual spare parts can be ordered by using the corresponding part number, provided that this number is specified in the bill of materials.</p>

7.2 Spare parts for HON R100NG

Spare part drawing







Spare parts kits

Name	Part no.
HON R100NG-1" kit	KR100NG-001
HON R100NG-2" kit	KR100NG-002
HON R100NG-3" kit	KR100NG-003
HON R100NG-4" kit	KR100NG-004
HON R100NG-6" kit	KR100NG-006
HON R100NG-8" kit	KR100NG-008

Bill of materials  
HON R100NG 1" – 3"

No.	Name	1" Part no.	2" Part no.	3" Part no.
8	Diaphragm	9301004124240	8304000215410	8304000215420
21	O-ring	8401050502136 (3 units)	8401088503238 (3 units)	8401117103247 (3 units)
22	Sliding ring	8312021368830 (2 units)	8312021368840 (2 units)	8312020123180 (2 units)
24	O-ring	8401009301012	8401012402112	8401015602114
25	O-ring	8401029703217	8401053304330	8401081904339
27	Locking ring	8236000017001	8236000022001	8236000028001
28	O-ring	8401028302122	8401050204329	8401078704338
29	O-ring	8401012402112	8401015503208	8401021803212
30	O-ring	8401014001015 (2 units)	8401017102115 (2 units)	8401017102115 (2 units)
32	O-ring	8401020401019 (2 units)	8401020401019 (2 units)	8401020401019 (2 units)
34	O-ring	8401009330000	8401009330000	8401009330000
41	O-ring	8401025102120	8409043804327	8401075604337

HON R100NG 4" – 8"

No.	Name	4" Part no.	6" Part no.	8" Part no.
8	Diaphragm	8304000215430	8304000215440	8304000215440
13	Sliding ring	-	-	8312020121410
21	O-ring	8401136103253 (3 units)	8401183703263 (3 units)	8401240903272 (3 units)
22	Sliding ring	8312020123230 (2 units)	8312020121330 (2 units)	8312020121400
24	O-ring	8401023502119	8401031303218	8401037703222
25	O-ring	8401104104346	8401151804361	8401202604369
27	Locking ring	8236000035001	8236000045001	-
28	Gasket	8450097704344	8450145405435	8450196205444
29	O-ring	8401028203216	8401037803222	8401053603227
30	O-ring	8401021902118 (2 units)	8401029902123 (2 units)	8401029802123 (2 units)
32	O-ring	8401020401019 (2 units)	8401020401019 (2 units)	8401020401019 (2 units)
34	O-ring	8401013330000	8401013330000	8401013330000
41	Gasket	8450094604343	8450142205434	8450189805443

## 7.3 Lubricants and threadlockers

### Lubricants

**Important!** All parts must be slightly greased.

Use the following lubricants:

Application	Remark	Lubricant	Part no.
O-rings Stationary and moving		<b>Standard model:</b>	
Flat gaskets		Silicone grease (jar)	27079
Diaphragms	Grease the diaphragm grip body on all sides	Silicone grease (tube)	27081
	Do NOT grease the flat grip		
Valve rod sliding surfaces		<b>Low-temperature model:</b>	
Sliding guides		Silicone grease (jar)	27993
Guide bushings			
Moving parts in SAV controlgear and switchgear	Grease film only	<b>High-temperature model:</b>	
Switch jacks and locking sleeves		PFPE grease	102389
Control balls and control rollers			
Ball bearing			
Valve sleeves and valve sleeve gaskets in gas pressure regulators		Silicone grease	27052
Setpoint set screws Power screws			
Thread material combination: Al/Al		Assembly paste	27091
Screw-in fittings and fastening screws			
Spring plate depressions (pilot)			
Devices for oxygen			
<b>Important!</b> Oil-free and grease-free installation; only antiseize agents are permissible	Upper oxygen pressure limit: 260 bar at 60 °C	Antiseize agent	28211
Devices for ammonia		Antiseize agent	28211

### Threadlocker

Application	Remark	Threadlocker	Part no.
Maintenance (see page 26) section	Diaphragm units	LOCTITE	26688

*Subject to change without notice*



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