

HON 640a / HON 642a Pilot

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	<p>This component documentation applies to the HON 640a and HON 642a pilot series.</p> <p>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">▪ Maintenance and servicing▪ Storage and disposal <hr/>
Target group	<p>This component documentation is intended for anyone who requires the following information concerning the product:</p> <ul style="list-style-type: none">▪ Intended use▪ Device models▪ Technical specifications▪ How it works▪ Maintenance manual▪ Spare parts drawings and spare parts lists <hr/>
Illustration	<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/>
 Safety	<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">▪ the chapter entitled Safety▪ the chapters that describe the work to be done <hr/>
Copyright notice	<p>Unless explicitly permitted, the disclosure as well as duplication of this document, the exploitation and communication of its contents are prohibited. Any breach or infringement will result in liability for damages. All rights reserved in the event of patent, utility model or registered design registration.</p> <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.

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: <ul style="list-style-type: none"> ▪ 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	  
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 pilots in the **HON 640a** series are used to **regulate the outlet pressure** of a gas pressure regulator in a gas regulating line.

The pilots in the **HON 642a** series are used to **regulate the inlet pressure** of a gas pressure regulator in a gas regulating line.

The pilots in both series are used for actuator assemblies that are designed as diaphragm valves and conform to DIN EN 334. Accordingly, these pilots are considered an integral part of the gas pressure regulator in which they are used. The pilots are controlled pneumatically and 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.

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

Designs and versions in the HON 640a and HON 642a pilot series

The following table shows which designs and versions are available:

Series	Design	System of measurement	Setpoint range [bar]	Standard components	Versions / optional components
640a	Diaphragm measuring unit	Imperial	1 - 40	Integrated filter	None
	Metal bellows measuring unit	Imperial	20 - 90	Integrated filter	None
	Diaphragm measuring unit	Metric	1 - 40	<ul style="list-style-type: none"> ▪ Integrated filter ▪ Inlet pressure gauge 	<ul style="list-style-type: none"> ▪ Outlet pressure gauge ▪ Protection against overpressure
642a	Diaphragm measuring unit	Imperial	1 - 40	Integrated filter	None

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, as well as the spare parts lists and spare parts drawings in the appendix, describe all the designs and versions in the HON 640a and HON 642a pilot series.

The "Maintenance" section uses examples to describe the various pilot series designs and versions. In other words, 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



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 (see page 14)

Locating the type plate of the pilot

The nameplate can be found in the location shown below:

Figure	No.	Description
	1	Front of the pilot

Interpreting the type plate of the pilot

The details on the type plate have the following meaning:

Figure	No.	Meaning
	1	Name of the device
	2	Serial number
	3	Maximum allowable pressure
	4	Controlled variable
	5	Specific set range
	6	Setpoint

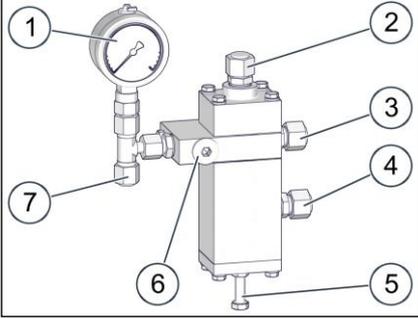
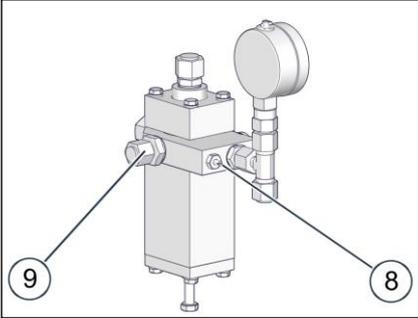
Labels on connection lines

Small labels must be used to color-code and explicitly name the pilot's connection lines based on what the lines are intended for.

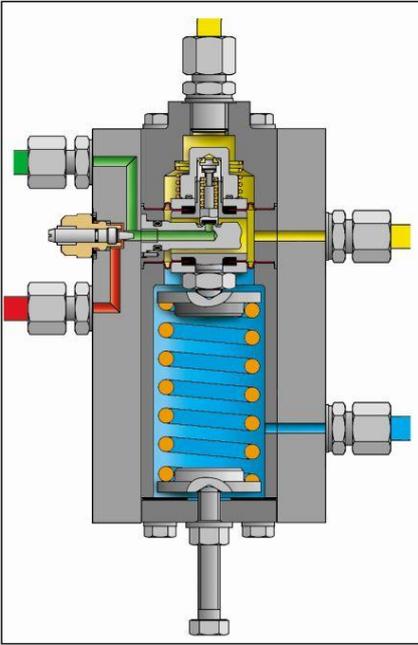
2.4 Layout and operation

HON 640a configuration

The pilots in the HON 640a series are made up of the following individual components and feature the ports indicated below:

Figure	No.	Description
	1	Inlet pressure gauge (only on metric HON 640a)
	2	Port for outlet pressure sensing line
	3	Port for outlet pressure process line
	4	Breather line fitting (ambient pressure compensation)
	5	Spring adjuster
	6	Integrated filter
	7	Port for inlet pressure line
	8	Amplifying valve
	9	Port for motorization line

Pressure sections in HON 640a pilot series

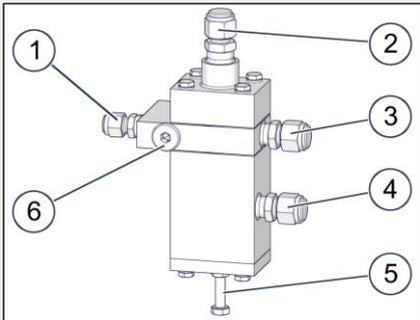
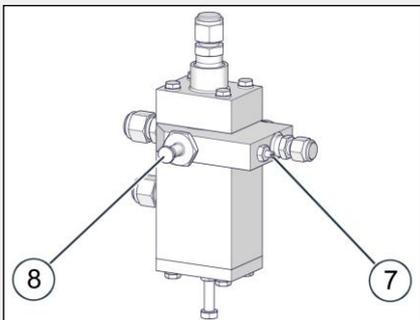
Figure	Color	Meaning
		Inlet pressure
		Motorization pressure
		Outlet pressure
		Atmospheric pressure

How the HON 640a pilot works

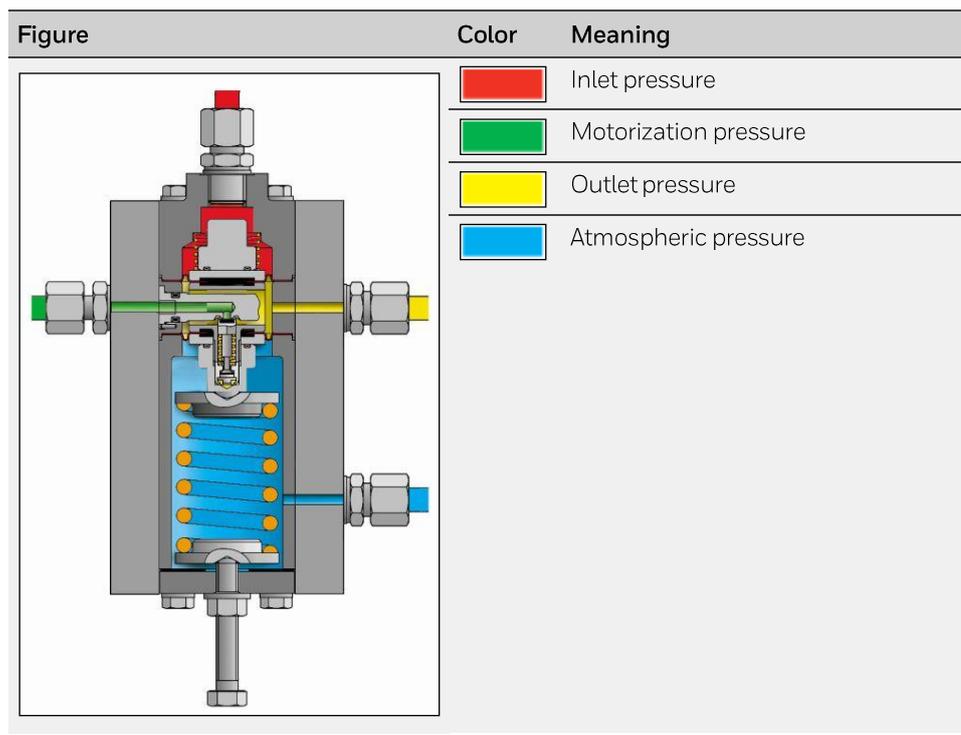
- The inlet pressure is conveyed into the pilot through the filter.
- The outlet pressure is conveyed into the pilot from the other side and produces a force component that acts on the double diaphragm system from above.
- The pilot's set screw is used to tighten the pilot spring, producing a force component that acts on the double diaphragm system from below.
- The force components being exerted on the double diaphragm system are used by the system in order to compare the setpoint and the process value. Depending on the gas pressure and on the set setpoint, the double diaphragm system's position inside the pilot will vary slightly. This position change will result in a small/large gap between the stationary nozzle and the deflector plate being cleared inside the double diaphragm system. The dynamically regulated gap between the nozzle and the deflector plate is used to build up the motorization pressure inside the double diaphragm system.
- The motorization pressure causes the gas pressure regulator being operated to open and close as appropriate.
- The pilot's amplifying valve is used to set the speed of the motorization pressure changes.

HON 642a configuration

The pilots in the HON 642a series are made up of the following individual components and feature the ports indicated below:

Figure	No.	Description
	1	Port for outlet pressure line
	2	Port for inlet pressure line
	3	Port for outlet pressure process line
	4	Breather line fitting (ambient pressure compensation)
	5	Spring adjuster
	6	Integrated filter
	7	Amplifying valve
	8	Port for motorization line

Pressure sections in HON 642a pilot series



How the HON 642a pilot works

- The outlet pressure is conveyed into the pilot through the filter.
- The inlet pressure is conveyed into the pilot from above and produces a force component that acts on the double diaphragm system from above.
- The pilot's set screw is used to tighten the pilot spring, producing a force component that acts on the double diaphragm system from below.
- The force components being exerted on the double diaphragm system are used by the system in order to compare the setpoint and the process value. Depending on the gas pressure and on the set setpoint, the double diaphragm system's position inside the pilot will vary slightly. This position change will result in a small/large gap between the stationary nozzle and the deflector plate being cleared inside the double diaphragm system. The dynamically regulated gap between the nozzle and the deflector plate is used to build up the motorization pressure inside the double diaphragm system.
- The motorization pressure causes the gas pressure regulator being operated to open and close as appropriate.
- The pilot's amplifying valve is used to set the speed of the motorization pressure changes.

2.5 Technical specifications

Characteristic device values and materials

The following characteristic values apply to all setpoint ranges:

	Value
Max. inlet pressure p_{umax}	100 bar (1450 psi)
Temperature range for imperial HON 640a and imperial HON 642a	-40 to +80 °C (-40 to +176 °F)
Temperature range for metric HON 640a	-20 to +60 °C (-4 to +140 °F)
Materials	Case: Aluminum alloy Internal parts: Aluminum alloy/steel Diaphragms: NBR Gaskets: NBR

Pilot springs

Specific set range W_{ds}	Pilot spring		
	No.	Color	Wire diameter [mm]
0.5 – 2 bar (7 – 29 psi)	1	blue	3.6
1 – 5 bar (14.5 – 72.5 psi)	2	black	4.5
2 – 10 bar (29 – 145 psi)	3	grey	5
5 – 20 bar (72.5 – 290 psi)	4	brown	6.3
10 – 40 bar (145 – 580 psi)	5	red	7.0
10 – 50 bar (145 – 725 psi)	6	Green	8/7*
20 – 90 bar (290 – 1305 psi)	7	White	9

*Spring with rectangular cross section

Accuracy class AC and look-up pressure class SG for imperial and metric HON 640a and imperial HON 642a

Outlet pressure range p_{a} range [bar]	Accuracy class AC	Look-up pressure class SG
0.3 – 1	20*/30	30*/50
> 1 – 3	20	30
> 2.5 – 5	10	20
> 5 – 10	5	10
> 10 – 40	2.5	10
> 40 – 90**	1	5

*This (better) accuracy class and this (also better) look-up pressure class apply when the inlet pressure fluctuations are < 8 bar (applies to imperial and metric HON 640a).

**Applies to metal bellows measuring unit only

Pilot dimensions and weights

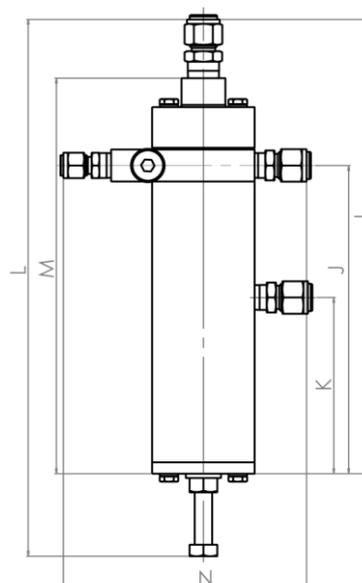
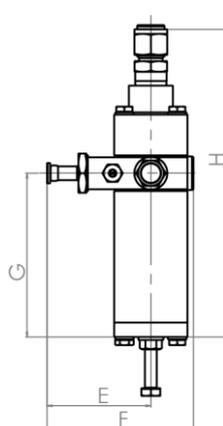
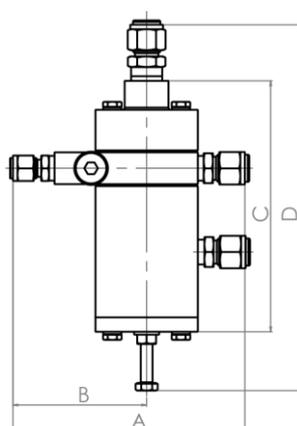
Imperial **HON 640a**

Diaphragm measuring unit

$W_d = 1 - 40$ bar

Metal bellows measuring unit

$W_d = 40 - 90$ bar

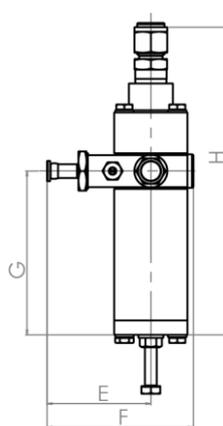
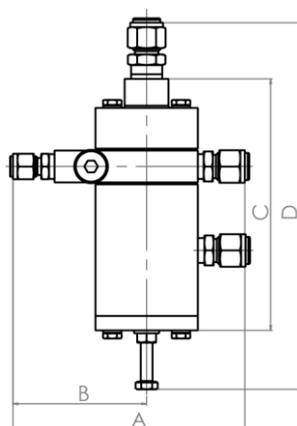


Weight [lbs]	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]
Diaphragm measuring unit: 4.2							
Metal bellows measuring unit: 7.3	6.3	3.6	6.8	9.9	2.8	3.9	4.4
	H [in]	I [in]	J [in]	K [in]	L [in]	M [in]	N [in]
	8.3	12,3	8.3	4.8	14,6	10,7	6.5

Imperial **HON 642a**

Diaphragm measuring unit

$W_d = 1 - 40$ bar

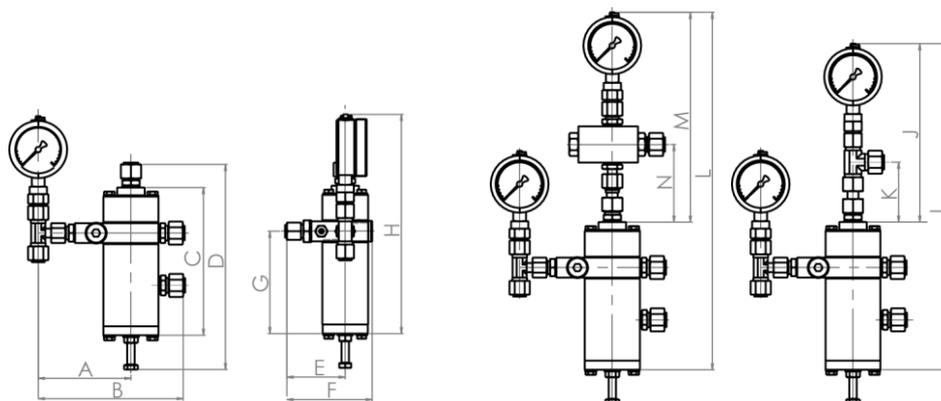


Weight [lbs]	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]	H [in]
4.2	6.3	3.6	6.8	9.9	2.8	3.9	4.4	8.3

Metric **HON 640a**

Without pressure gauge for outlet pressure

With outlet pressure gauge

 $W_d = 1 - 40$ bar $W_d = 1 - 20$ bar $W_d = 10 - 40$ bar

Weight	A	B	C	D	E	F	G
[kg]	[mm]						
2.6	100	158	162	226	64	93	112
	H	I	J	K	L	M	N
	[mm]						
	241	359	197	66	394	231	86

Gas properties

The properties of the gas conveyed through the devices 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

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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	<p>Observe the following rules:</p> <ul style="list-style-type: none"> ▪ 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	<p>Observe the following rules:</p> <ul style="list-style-type: none"> ▪ 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	<p>Personnel must meet the following requirements:</p> <ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ Mechanical removal and installation ▪ Maintenance and servicing 	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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
<ul style="list-style-type: none"> ▪ 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 pilot maintenance

Proceed as follows:

Step	Description	Explanation
1	Have the maintenance and servicing parts ready	<p>Please refer to <i>Additional information regarding spare parts</i> (see page 57) to find out which spare parts drawing is associated with your specific pilot model and have the corresponding maintenance parts and servicing parts ready to go before maintenance.</p> <ul style="list-style-type: none"> ▪ The spare parts that are always required for the pilot's maintenance are listed in the spare parts kits for the pilot. ▪ Spare part drawings and bills of materials are listed in the <i>appendix</i> (see page 56). <p>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, and they must be replaced if necessary. Because of this, it is recommended to have the following servicing parts ready for maintenance in order to avoid downtimes:</p> <ul style="list-style-type: none"> ▪ Compression spring(s) and, if applicable, spring plates ▪ Pressure gauge(s) ▪ Filter insert ▪ Nozzle ▪ Locking ring
2	Preparing special tools	<ul style="list-style-type: none"> ▪ In addition to standard tools, have the special tools required for your specific pilot model ready to go before maintenance. Please refer to the <i>Special tools</i> section in <i>Lubricants, threadlockers, and special tools</i> (see page 65). ▪ You will also need a ballpoint pen or felt tip marker to perform maintenance on the pilot.
3	Preparing lubricants	For specifications concerning the lubricants and threadlockers that must be used, please refer to the sections of the same name under <i>Lubricants, threadlockers, and special tools</i> (see page 65).
4	Removing the pilot from the actuator assembly	<p>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:</p> <ul style="list-style-type: none"> ▪ Close all connections leading to the gas-carrying line. ▪ Establish a depressurized status. Residual amounts of energy must be depressurized as well. <p>Before starting with the maintenance work, the pilot must be removed from the actuator assembly being used to operate it. 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>

Sample maintenance instructions

The maintenance instructions below are provided as examples for the various pilot series designs and versions. 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 Maintenance for imperial HON 640a / metric HON 640a with diaphragm measuring unit

Falling components



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 fasteners (screws, washers, etc.) 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
Closing cap	20 Nm (15 ft lbs)	29
Hex nut	12 Nm (9 ft lbs)	31
Hex bolt	12 Nm (9 ft lbs)	40
Hex bolt	12 Nm (9 ft lbs)	44

Maintaining the pilot

Proceed as follows:

Figure	Step	Description
	1	Remove the locking screw (1) by unscrewing it.
	2	Remove the O-ring (2) and replace it with a new one.
	3	Check the filter cartridge for damage and replace it with a new one if necessary.
	4	Lubricate the thread surfaces. Re-install the filter insert.
	5	Unscrew the spacer nut (1) on the spindle (2) out from the body.

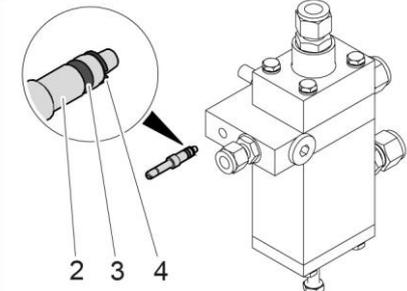
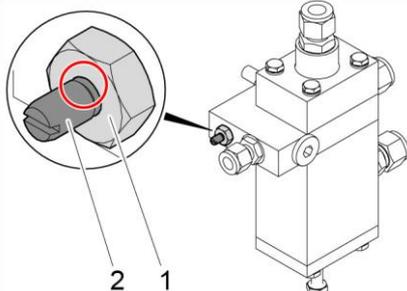
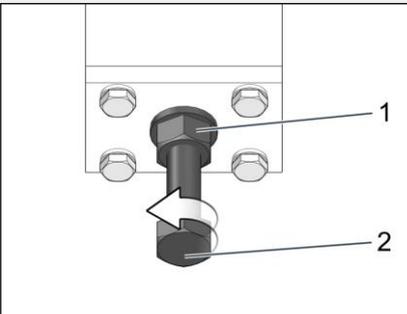
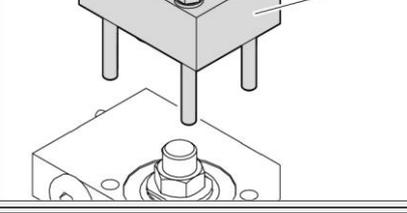
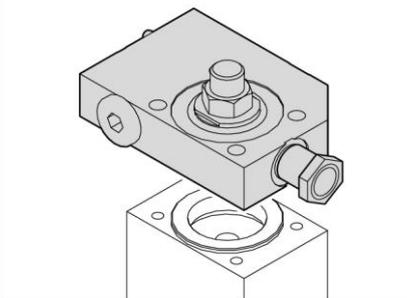
Figure	Step	Description
	6	Remove the spindle (2) by unscrewing it. Remove the O-ring (3) and the locking ring (4).
	7	Replace the O-ring (3) with a new, greased O-ring. Reinstall the locking ring (4).
	8	Lubricate the thread surfaces. First screw the spindle (2) back into the body. Then slide the locknut (1) over the spindle and tighten the locknut (1).
	9	Check that the spindle is in the right position and adjust it if necessary: The spindle's groove must be flush with the locknut's surface.
	10	Release the tension on the pilot spring by loosening the hex flange nut (1) and unscrewing the spring adjuster (2) a few turns.
	11	Loosen the screws (1) and lift off the upper lid (2). Remove the spring (not shown) from the cap.
	12	Remove the valve body by lifting it off.

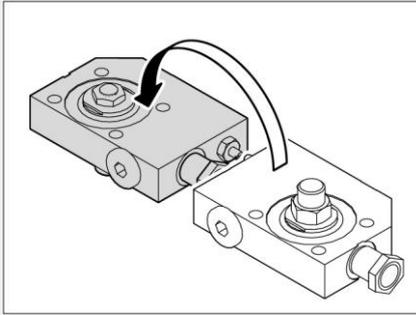
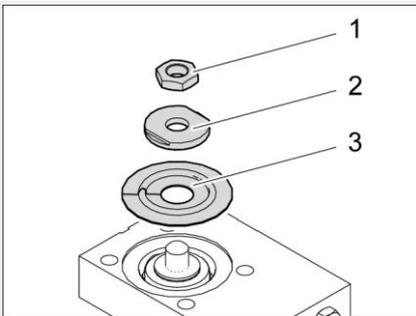
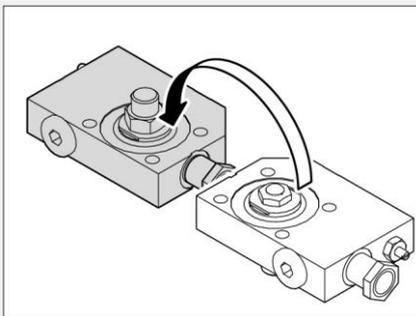
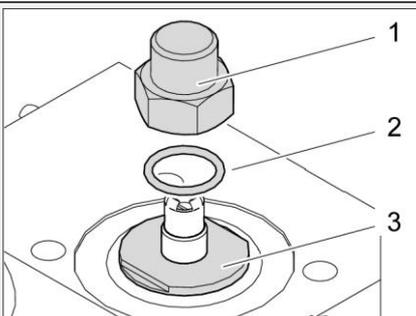
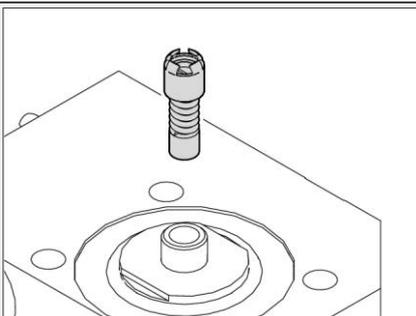
Figure	Step	Description
	13	Flip the valve body over.
	14	Unscrew the nut (1) while using an open-end wrench to hold the diaphragm plate (2) in place so as to prevent the components from turning. Remove the diaphragm plate (2) and the diaphragm (3).
	15	Flip the valve body over.
	16	Unscrew the cap (1) while using an open-end wrench to hold the diaphragm plate (3) in place so as to prevent the components from turning.
	17	Replace the O-ring (2) with a new, greased O-ring.
	18	Remove the pistons from the connecting piece.

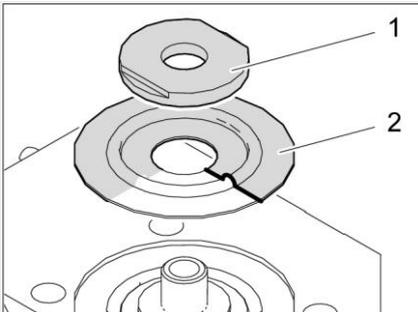
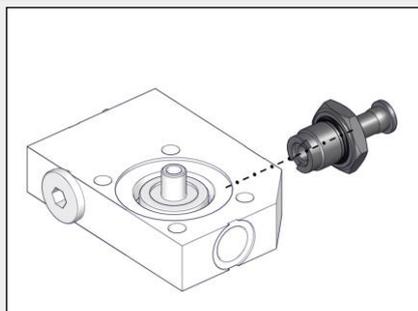
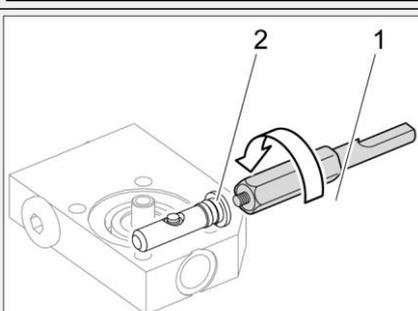
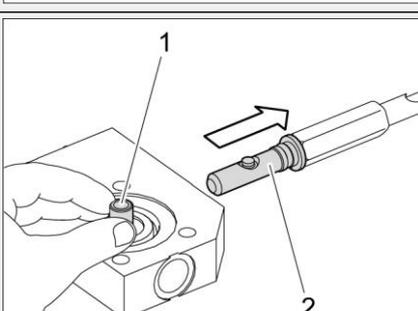
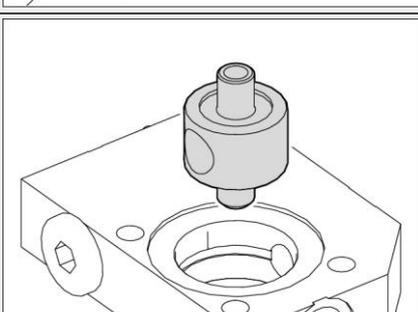
Figure	Step	Description
	19	Remove the diaphragm plate (1) and the diaphragm (2).
	20	Unscrew the screw-in fitting for the motorization line.
	21	Screw the assembly aid (1) into the nozzle (2).
	22	Hold the connecting piece in place (1) and pull the nozzle (2) out.
	23	Remove the connecting piece.

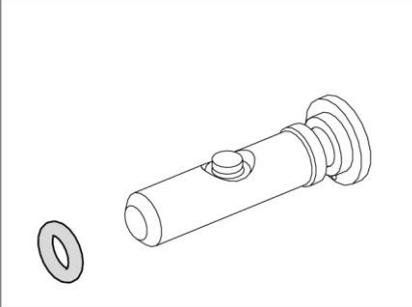
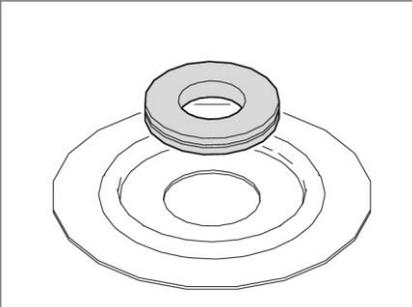
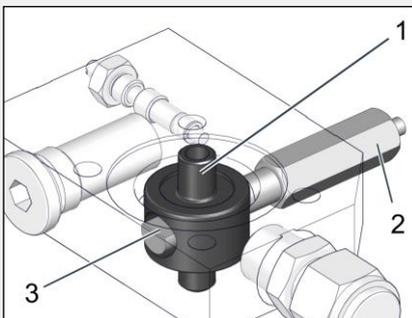
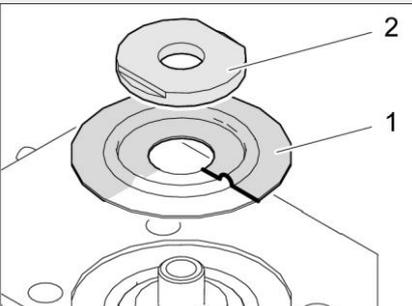
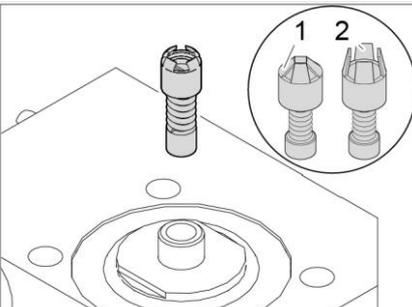
Figure	Step	Description
	24	Take the nozzle. Replace the O-ring with a new, greased O-ring.
	25	Replace the stem seals and the diaphragms on the top and bottom with new ones. Insert the stem seals into the diaphragms.
	26	Align the valve body as shown. Align the connecting piece (1) as shown and hold it in position. Insert the assembly aid (2), with the milled surface (3) facing upward towards the piston opening, into the valve body.
	27	Install the new diaphragm, including the stem seal and the diaphragm plate. Make sure that the diaphragm is aligned correctly: The side of the diaphragm that has a depression at the center should be facing upward.
	28	<p>Insert the new piston.</p> <p>Risk of confusion! Please observe the characterizing difference between the old and the new piston:</p> <ul style="list-style-type: none"> ▪ Old piston (1): Castellated nut closed ▪ New piston (2): Castellated nut open

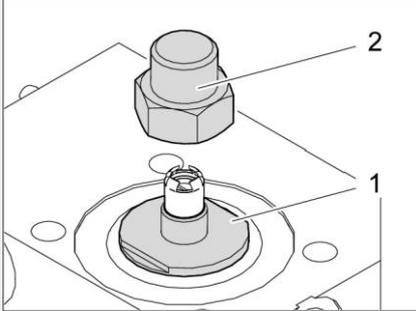
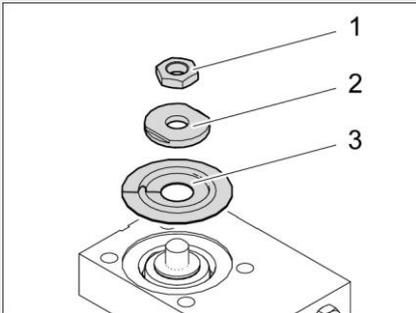
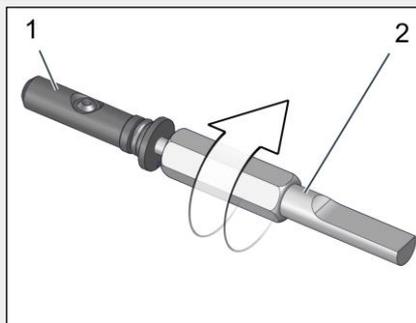
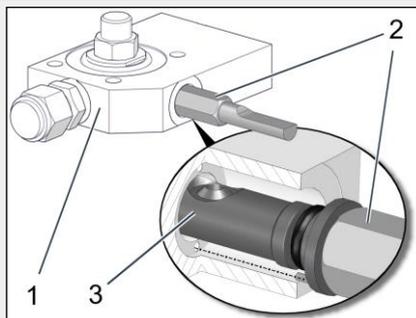
Figure	Step	Description
	<p>29</p>	<p>Lightly coat the thread surfaces with threadlocker. Put the cap (2) in place. Tighten the cap while using an open-end wrench to hold the diaphragm plate (1) in place so as to prevent the components from turning. Observe the tightening torque information provided at the beginning of this section.</p>
	<p>30</p>	<p>Flip the valve body over. Install the new diaphragm (3), including the stem seal. Make sure that the diaphragm is aligned correctly: The side of the diaphragm that has a depression at the center should be facing upward.</p>
	<p>31</p>	<p>Lightly coat the thread surfaces with threadlocker. Install the diaphragm plate (2) and the nut (1). Tighten the nut while using an open-end wrench to hold the diaphragm plate (2) in place so as to prevent the components from turning. Observe the tightening torque information provided at the beginning of this section.</p>
	<p>32</p>	<p>Remove the assembly aid from the valve body. Screw the assembly aid (2) into the nozzle (1).</p>
	<p>33</p>	<p>Align the valve body (1) as shown. Turn the nozzle (3) in such a way that, as shown in the sectional view, the dowel pin is coaxially aligned with the lower hole and the nozzle opening is facing upward. Insert the nozzle (3) with the assembly aid (2) all the way into the connecting piece.</p>

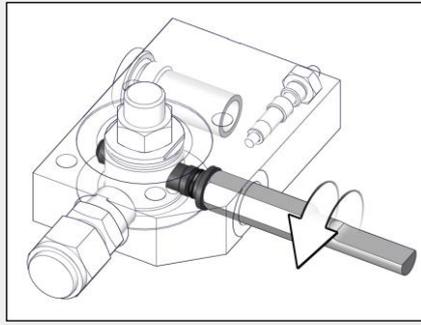
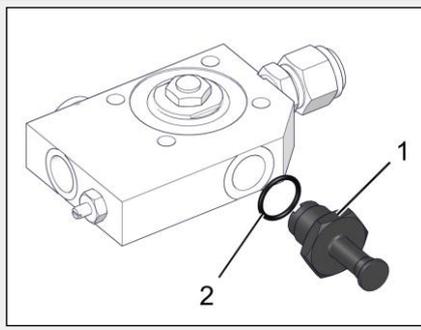
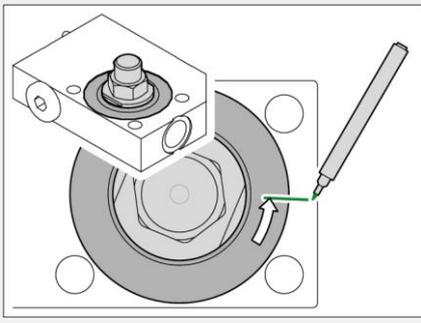
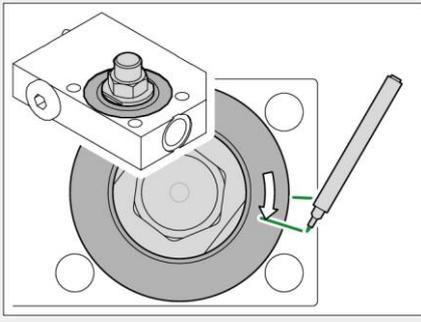
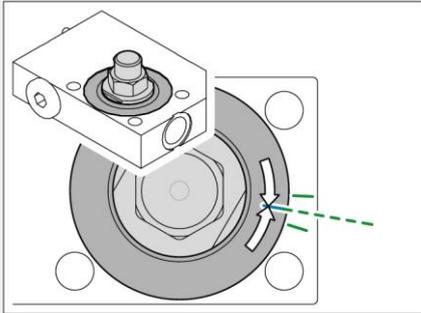
Figure	Step	Description
	34	Remove the assembly aid.
	35	<p>Take the screw-in fitting (1) for the motorization line.</p> <ul style="list-style-type: none"> ▪ Imperial HON 640a only: Replace the O-ring (2) with a new, greased O-ring. <p>Lubricate the thread surfaces. Screw the screw-in fitting back in.</p>
	36	<p>To align the cross hole of the connecting piece correctly with the nozzle:</p> <p>Use the cap to turn the diaphragm by hand counterclockwise until it will not rotate any further. Use a marker or pen to mark the position on the body and on the convoluted diaphragm.</p>
	37	Use the cap to turn the diaphragm by hand clockwise until it will not rotate any further. Use a marker or pen to mark the position on the body.
	38	Use the cap to turn the diaphragm by hand so that the marking on the diaphragm is right between the two markings on the body.

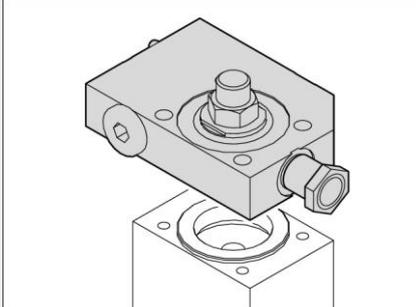
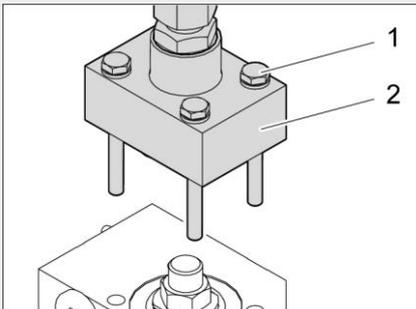
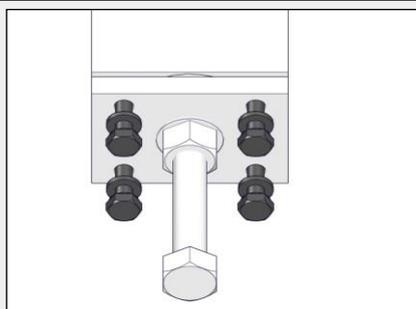
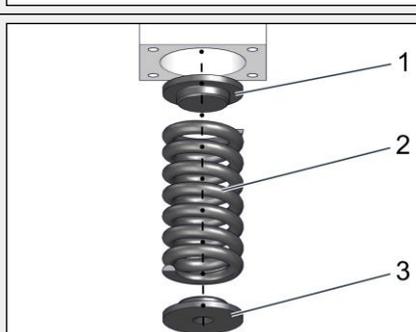
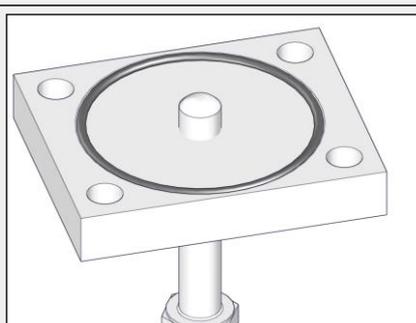
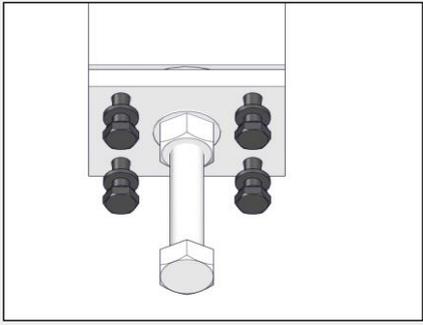
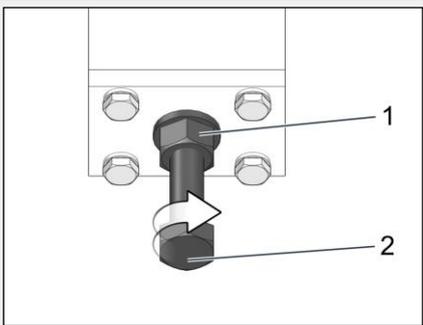
Figure	Step	Description
	39	Place the valve body on the spring housing. Place the spring (not show) back on the cap.
	40	Lubricate the thread surfaces. Check to make sure that the diaphragm marking is still in the center position (see step 36). Put the upper cover (2) back in place. Tighten the screws (1) in a criss-cross sequence. Refer to the additional tightening torque information at the beginning of this topic.
	41	Loosen the screws and slowly and carefully remove the lower cover. Important! While removing the cover, parts on the inside may fall out from the spring housing by accident!
	42	Remove the lower spring plate (3), the compression spring (2), and the upper spring plate (1) from the spring housing. Lubricate the spring plates' depressions and reinsert the parts into the spring housing in the right order and alignment.
	43	Replace the O-ring with a new, greased O-ring.

Figure	Step	Description
	44	Lubricate the thread surfaces. Put the lower cover back in place. Tighten the screws in a criss-cross sequence. Refer to the additional tightening torque information at the beginning of this topic.
	45	Tighten the hex flange nut (1). Screw the spring adjuster (2) back in a bit. The correct setpoint adjustment cannot be carried out until before commissioning with the pilot installed.

Next task

Proceed as follows:

Completing the maintenance (see page 52)

4.4 Maintenance for imperial HON 640a 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 fasteners (screws, washers, etc.) 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
Closing cap	20 Nm (15 ft lbs)	31
Cylinder screws	6 Nm (5 ft lbs)	43
Hex bolt	12 Nm (9 ft lbs)	47
Hex bolt	12 Nm (9 ft lbs)	49

Maintaining the pilot

Proceed as follows:

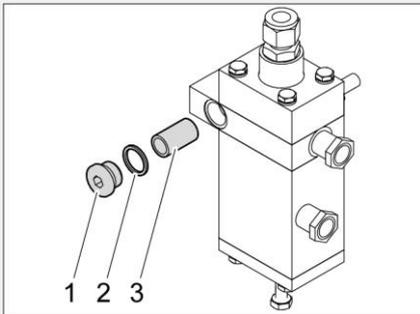
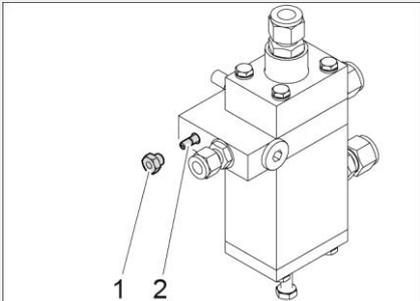
Figure	Step	Description
	1	Remove the locking screw (1) by unscrewing it.
	2	Remove the O-ring (2) and replace it with a new one.
	3	Check the filter cartridge for damage and replace it with a new one if necessary.
	4	Lubricate the thread surfaces. Re-install the filter insert.
	5	Unscrew the spacer nut (1) on the spindle (2) out from the body.

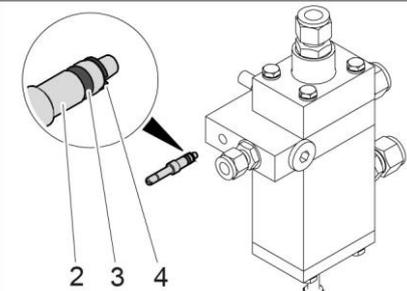
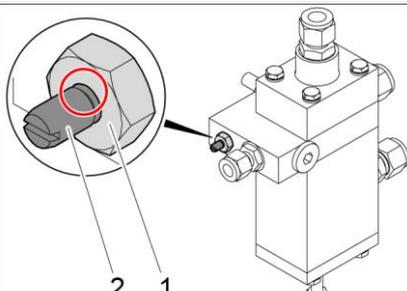
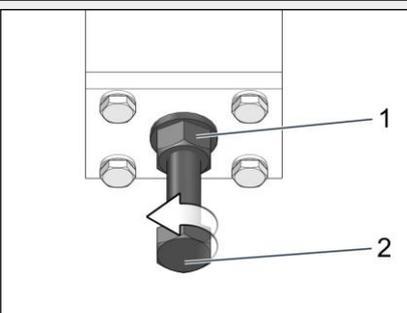
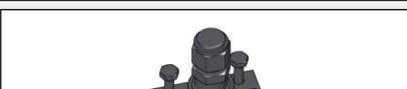
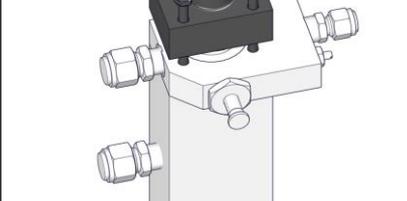
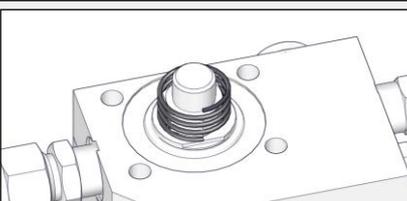
Figure	Step	Description
	6	Remove the spindle (2) by unscrewing it. Remove the O-ring (3) and the locking ring (4).
	7	Replace the O-ring (3) with a new, greased O-ring. Put the locking ring (4) back in place.
	8	Lubricate the thread surfaces. First screw the spindle (2) back into the body. Then slide the locknut (1) over the spindle and tighten the locknut (1).
	9	Check that the spindle is in the right position and adjust it if necessary: The spindle's groove must be flush with the locknut's surface.
	10	Release the tension on the pilot spring by loosening the hex flange nut (1) and unscrewing the spring adjuster (2) a few turns.
	11	Turn the spring housing. Loosen the screws and lift off the upper cover.
	12	Remove the spring from the cap.

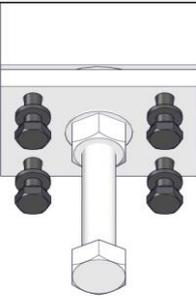
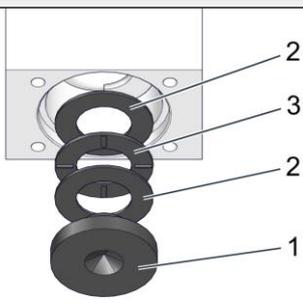
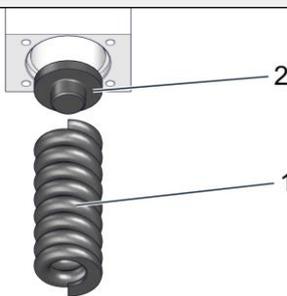
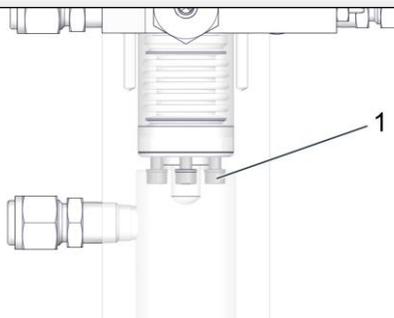
Figure	Step	Description
	13	<p>Loosen the screws and slowly and carefully remove the lower cover. Important! While removing the cover, parts on the inside may fall out from the spring housing by accident!</p>
	14	<p>Remove the lower spring plate (1), the axial washers (2), and the axial needle roller bearing (3) from the spring housing.</p>
	15	<p>Remove the compression spring (1) and the upper spring plate (2) from the spring housing.</p>
	16	<p>Unscrew the metal bellows' internal screws (1) from the lower section of the spring housing.</p>
	17	<p>Remove the screws and the corresponding washers from the lower section of the spring housing.</p>

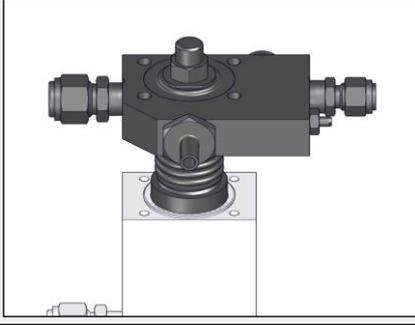
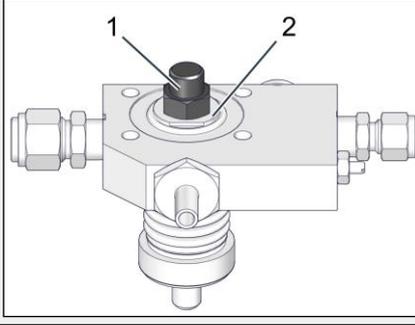
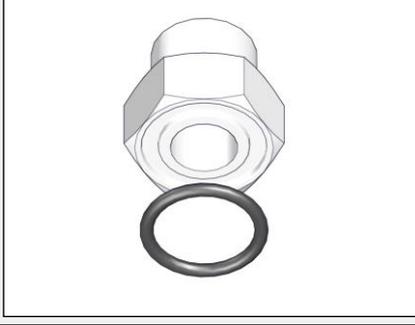
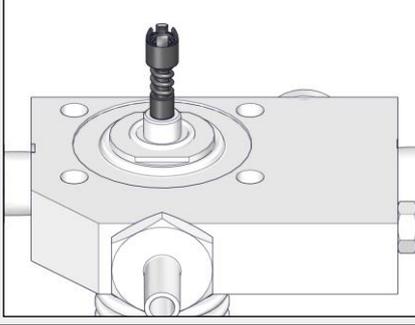
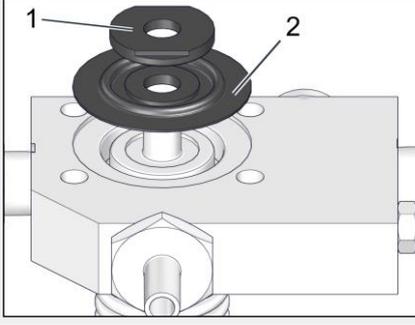
Figure	Step	Description
	<p>18</p>	<p>Pull the valve body, including the metal bellows, upwards in order to remove it as a complete unit from the spring housing.</p>
	<p>19</p>	<p>Unscrew the cap (1) while using an open-end wrench to hold the diaphragm plate (2) in place so as to prevent the components from turning.</p>
	<p>20</p>	<p>Replace the O-ring (1) with a new, greased O-ring.</p>
	<p>21</p>	<p>Remove the pistons from the connecting piece.</p>
	<p>22</p>	<p>Remove the diaphragm plate (1) and the diaphragm (2).</p>

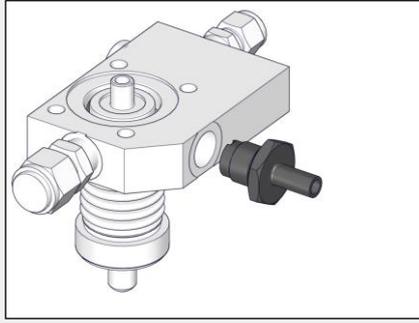
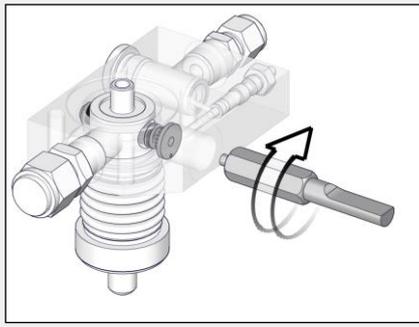
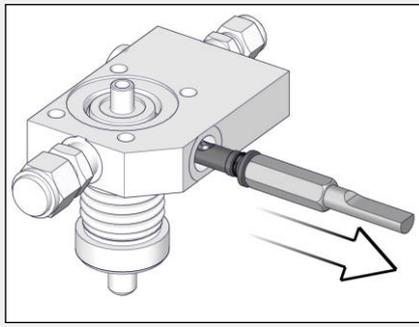
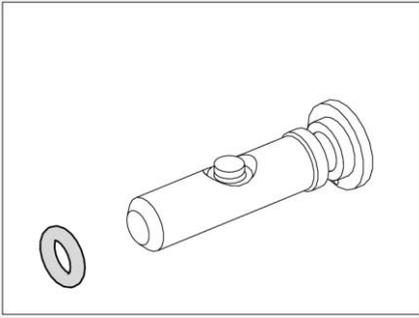
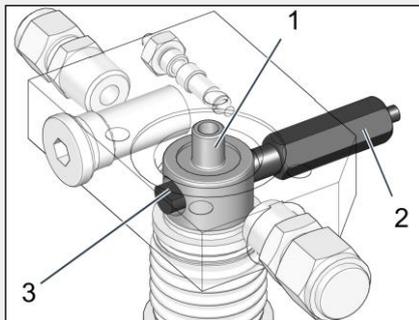
Figure	Step	Description
	23	Unscrew the screw-in fitting for the motorization line.
	24	Screw the assembly aid into the nozzle.
	25	Pull the nozzle out.
	26	Take the nozzle. Replace the O-ring with a new, greased O-ring.
	27	Align the valve body as shown. Align the connecting piece (1) as shown and hold it in position. Insert the assembly aid (2), with the milled surface (3) facing upward towards the piston opening, into the valve body.

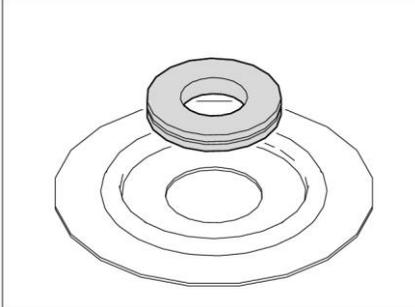
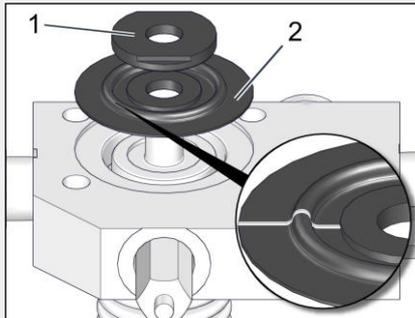
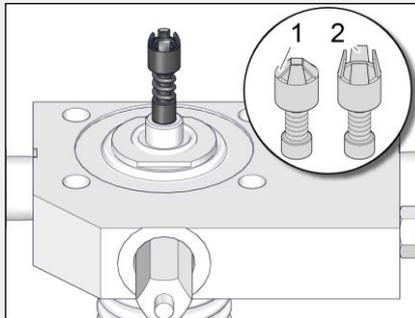
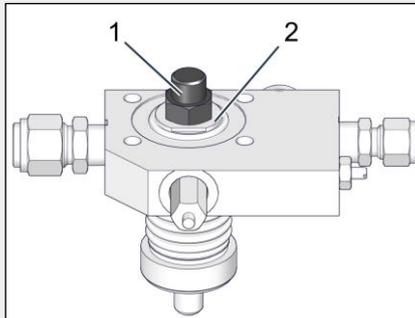
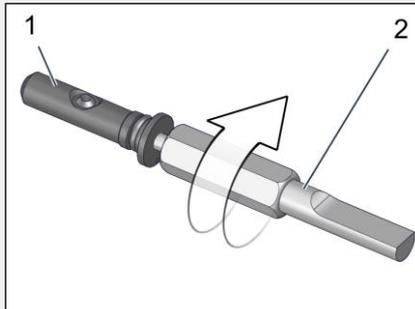
Figure	Step	Description
	<p>28</p>	<p>Replace the stem seal and the diaphragm with new ones. Insert the stem seal into the diaphragm.</p>
	<p>29</p>	<p>Install the new diaphragm (2), including the stem seal and the diaphragm plate (1). Make sure that the diaphragm is aligned correctly: The side of the diaphragm that has a depression at the center should be facing upward.</p>
	<p>30</p>	<p>Insert the new piston. Risk of confusion! Please observe the characterizing difference between the old and the new piston:</p> <ul style="list-style-type: none"> ▪ Old piston (1): Castellated nut closed ▪ New piston (2): Castellated nut open
	<p>31</p>	<p>Lightly coat the thread surfaces with threadlocker. Put the cap (1) in place. Tighten the cap (1) while using an open-end wrench to hold the diaphragm plate (2) in place so as to prevent the components from turning. Observe the tightening torque information provided at the beginning of this section.</p>
	<p>32</p>	<p>Remove the assembly aid from the valve body. Screw the assembly aid (2) into the nozzle (1).</p>

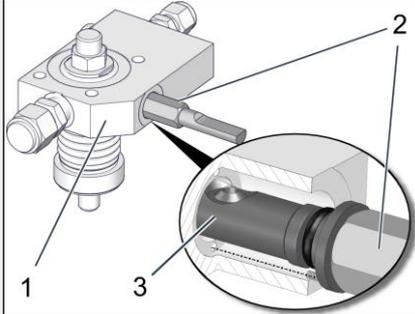
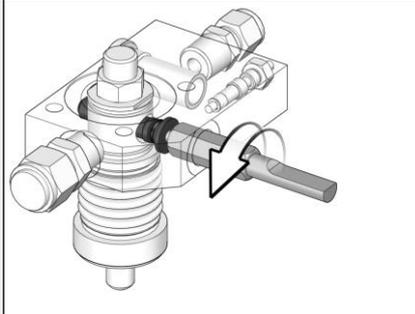
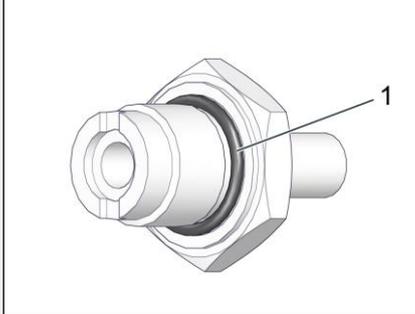
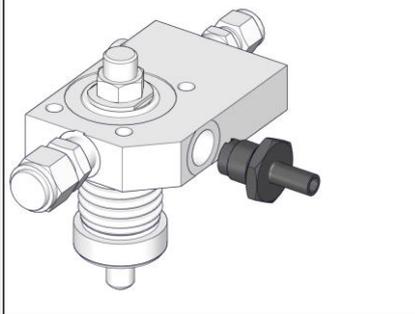
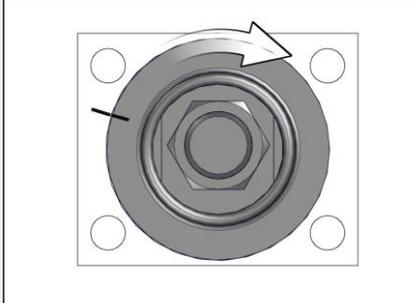
Figure	Step	Description
	<p>33</p>	<p>Align the valve body (1) as shown. Turn the nozzle (3) in such a way that, as shown in the sectional view, the dowel pin is coaxially aligned with the lower hole and the nozzle opening is facing upward. Insert the nozzle (3) with the assembly aid (2) all the way into the connecting piece.</p>
	<p>34</p>	<p>Remove the assembly aid.</p>
	<p>35</p>	<p>Take the screw-in fitting for the motorization line. Replace the O-ring (1) with a new, greased O-ring.</p>
	<p>36</p>	<p>Lubricate the thread surfaces. Screw the screw-in fitting back in.</p>
	<p>37</p>	<p>To align the cross hole of the connecting piece correctly with the nozzle: Use the cap to turn the diaphragm by hand clockwise until it will not rotate any further. Use a marker or pen to mark the position on the body and on the convoluted diaphragm.</p>

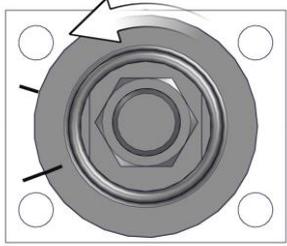
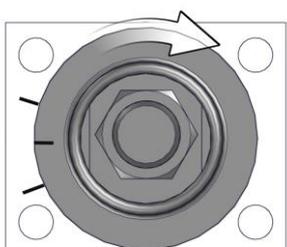
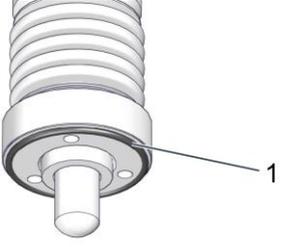
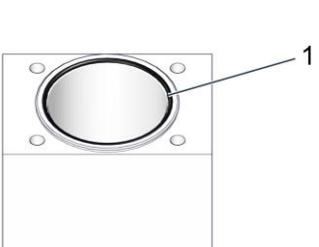
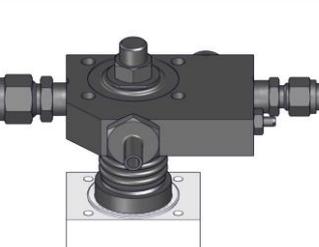
Figure	Step	Description
	38	Use the cap to turn the diaphragm by hand counterclockwise until it will not rotate any further. Use a marker or pen to mark the position on the body.
	39	Use the cap to turn the diaphragm by hand so that the marking on the diaphragm is right between the two markings on the body.
	40	Replace the O-ring (1) with a new, greased O-ring.
	41	Take the spring housing. Replace the O-ring (1) at the top of the spring housing with a new, greased O-ring.
	42	Insert the unit consisting of the valve body and the metal bellows back into the spring housing.

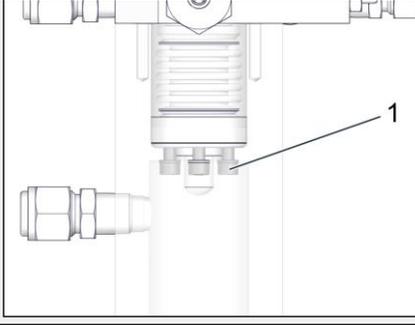
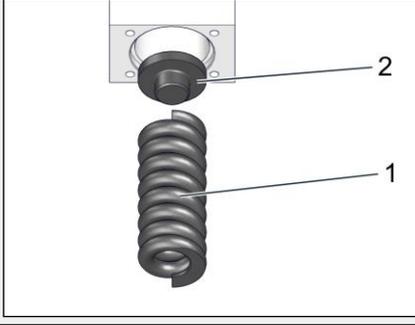
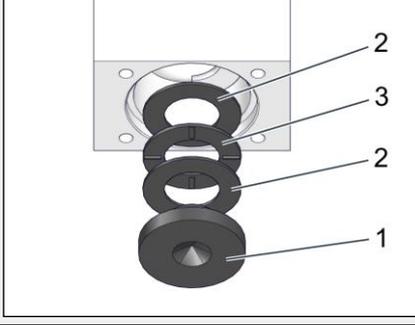
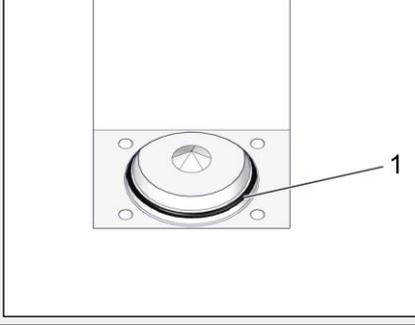
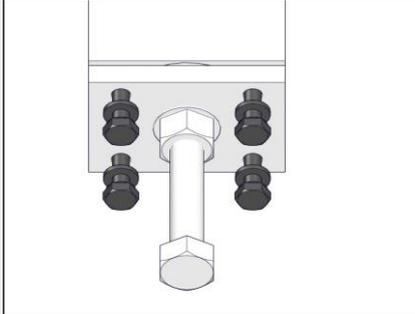
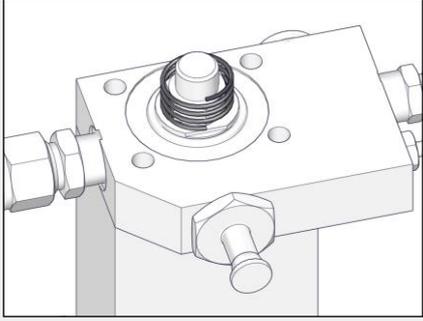
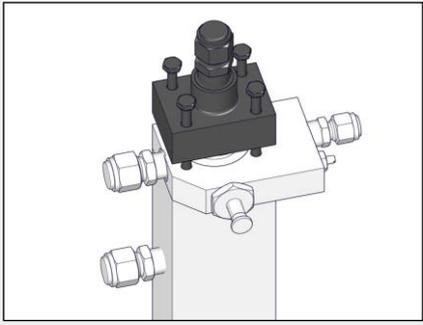
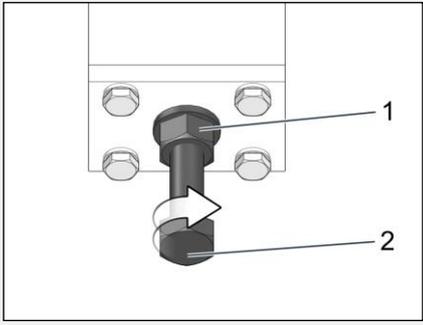
Figure	Step	Description
	<p>43</p>	<p>Lubricate the thread surfaces. Tighten the screws (1), including the corresponding washers, from the underside of the spring housing. Refer to the additional tightening torque information at the beginning of this topic.</p>
	<p>44</p>	<p>Lubricate the upper spring plate's depressions (2). Reinsert the upper spring plate (2) and the compression spring (1) into the spring housing in the right order and alignment.</p>
	<p>45</p>	<p>Lubricate the lower spring plate's depressions (1). Reinsert the axial needle roller bearing (3), the axial washers (2), and the lower spring plate (1) into the spring housing from the bottom in the right order and alignment.</p>
	<p>46</p>	<p>Replace the O-ring (1) at the bottom of the spring housing with a new, greased O-ring.</p>
	<p>47</p>	<p>Lubricate the thread surfaces. Put the lower cover back in place. Tighten the screws in a criss-cross sequence. Refer to the additional tightening torque information at the beginning of this topic.</p>

Figure	Step	Description
	48	Turn the spring housing. Place the spring back on the cap.
	49	Lubricate the thread surfaces. Check to make sure that the diaphragm marking is still in the center position (see step 38). Place the upper cover back in place. Tighten the screws in a criss-cross sequence. Refer to the additional tightening torque information at the beginning of this topic.
	50	Tighten the hex flange nut (1). Screw the spring adjuster (2) back in a bit. The correct setpoint adjustment cannot be carried out until before commissioning with the pilot installed.

Next task

Proceed as follows:

Completing the maintenance (see page 52)

4.5 Maintenance for imperial HON 642a with diaphragm measuring unit

Falling components



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 fasteners (screws, washers, etc.) 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
Closing cap	20 Nm (15 ft lbs)	26
Hex nut	12 Nm (9 ft lbs)	28
Hex bolt	12 Nm (9 ft lbs)	38
Hex bolt	12 Nm (9 ft lbs)	42

Maintaining the pilot

Proceed as follows:

Figure	Step	Description
	1	Remove the locking screw (1) by unscrewing it.
	2	Remove the O-ring (2) and replace it with a new one.
	3	Check the filter cartridge for damage and replace it with a new one if necessary.
	4	Lubricate the thread surfaces. Re-install the filter insert.
	5	Unscrew the spacer nut (1) on the spindle (2) out from the body.

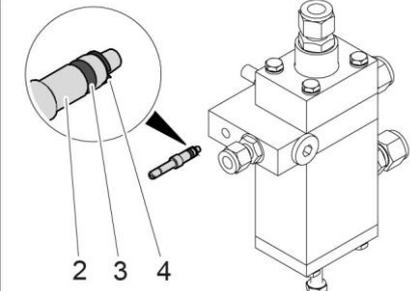
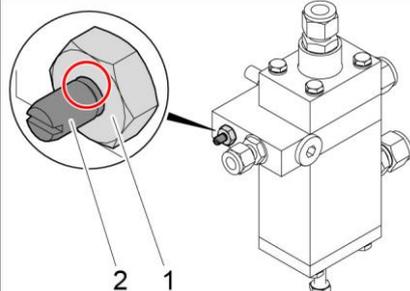
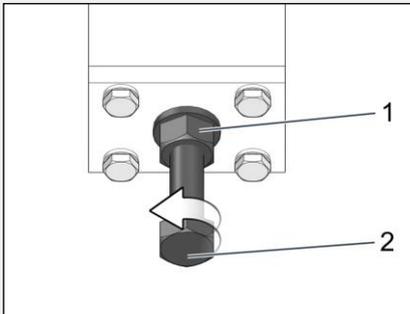
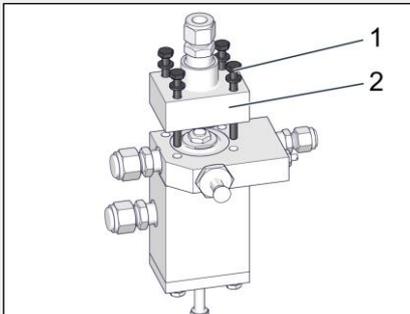
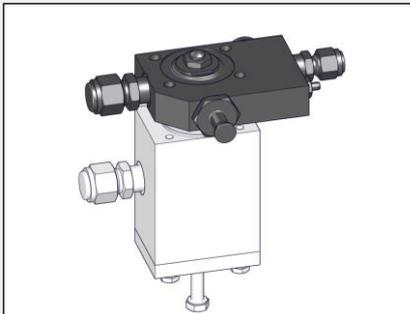
Figure	Step	Description
	6	Remove the spindle (2) by unscrewing it. Remove the O-ring (3) and the locking ring (4).
	8	Lubricate the thread surfaces. First screw the spindle (2) back into the body. Then slide the locknut (1) over the spindle and tighten the locknut (1).
	9	Check that the spindle is in the right position and adjust it if necessary: The spindle's groove must be flush with the locknut's surface.
	10	Release the tension on the pilot spring by loosening the hex flange nut (1) and unscrewing the spring adjuster (2) a few turns.
	11	Loosen the screws (1) and lift off the upper cover (2).
	12	Remove the valve body by lifting it off.

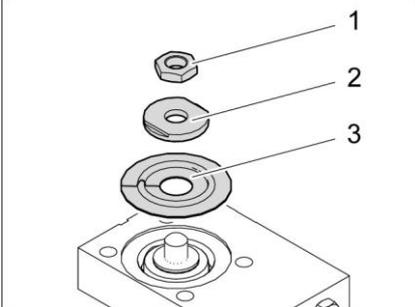
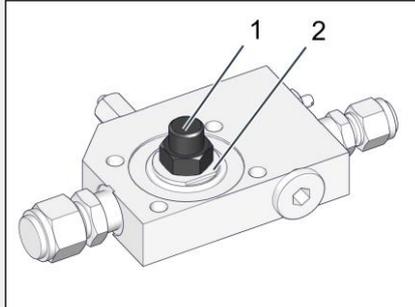
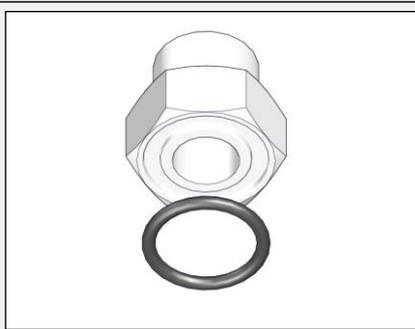
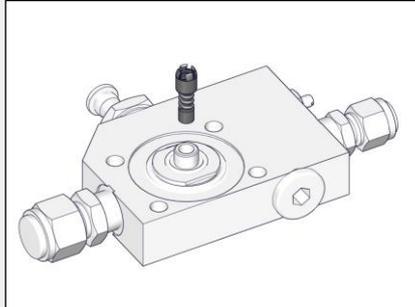
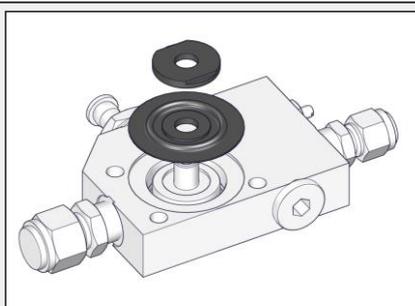
Figure	Step	Description
	<p>13</p>	<p>Unscrew the nut (1) while using an open-end wrench to hold the diaphragm plate (2) in place so as to prevent the components from turning. Remove the diaphragm plate (2) and the diaphragm (3).</p>
	<p>14</p>	<p>Flip the valve body over. Unscrew the cap (1) while using an open-end wrench to hold the diaphragm plate (2) in place so as to prevent the components from turning.</p>
	<p>15</p>	<p>Replace the O-ring with a new, greased O-ring.</p>
	<p>16</p>	<p>Remove the pistons from the connecting piece.</p>
	<p>17</p>	<p>Remove the diaphragm plate and the diaphragm.</p>

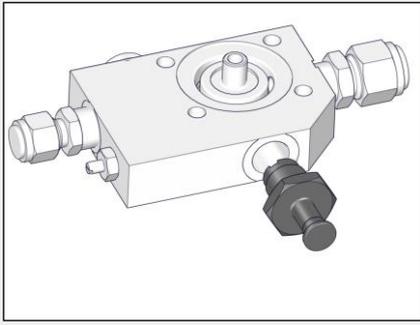
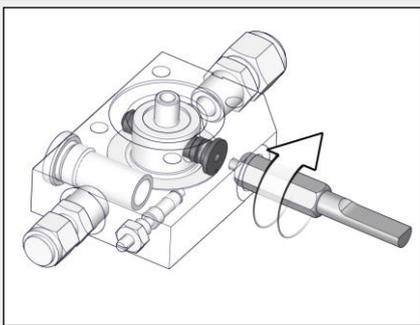
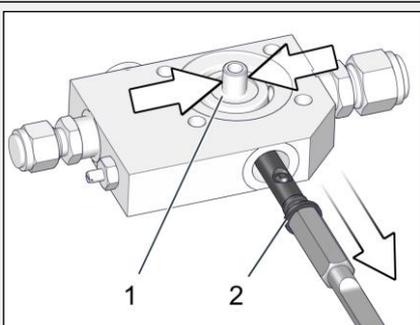
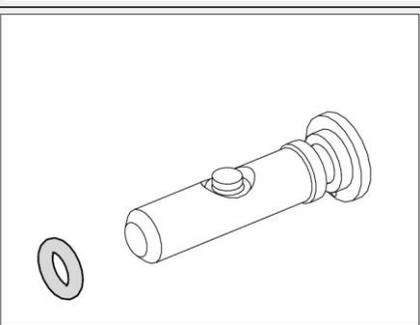
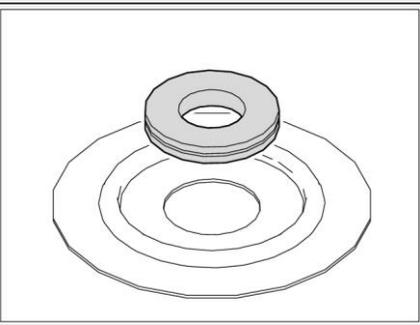
Figure	Step	Description
	18	Unscrew the screw-in fitting for the motorization line.
	19	Screw the assembly aid into the nozzle.
	20	Hold the connecting piece in place (1) and pull the nozzle (2) out. Remove the connecting piece (1).
	21	Take the nozzle. Replace the O-ring with a new, greased O-ring.
	22	Replace the stem seals and the diaphragms on the top and bottom with new ones. Insert the stem seals into the diaphragms.

Figure	Step	Description
	<p>23</p>	<p>Align the valve body (1) as shown. Align the connecting piece (2) as shown and hold it in position. Insert the assembly aid, with the milled surface (3) facing upward towards the piston opening, into the valve body.</p>
	<p>24</p>	<p>Install the new diaphragm, including the stem seal and the diaphragm plate. Make sure that the diaphragm is aligned correctly: The side of the diaphragm that has a depression at the center should be facing upward.</p>
	<p>25</p>	<p>Insert the new piston. Risk of confusion! Please observe the characterizing difference between the old and the new piston:</p> <ul style="list-style-type: none"> ▪ Old piston (1): Castellated nut closed ▪ New piston (2): Castellated nut open
	<p>26</p>	<p>Lightly coat the thread surfaces with threadlocker. Put the cap (1) in place. Tighten the cap while using an open-end wrench to hold the diaphragm plate (1) in place so as to prevent the components from turning. Observe the tightening torque information provided at the beginning of this section.</p>

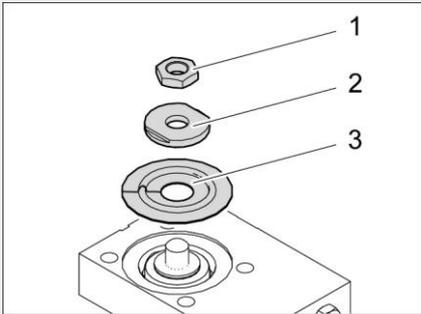
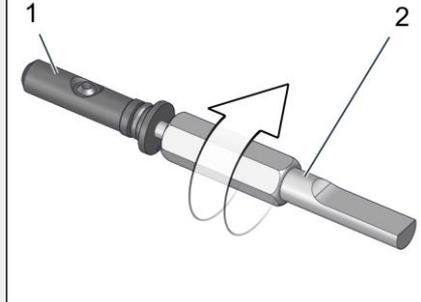
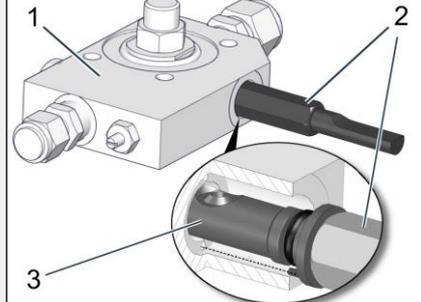
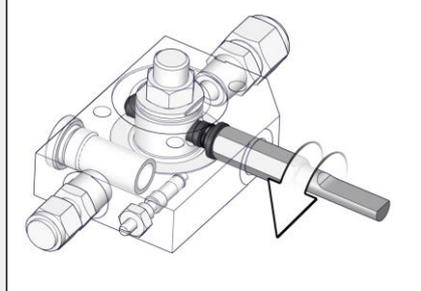
Figure	Step	Description
	<p>27</p>	<p>Flip the valve body over. Install the new diaphragm (3), including the stem seal. Make sure that the diaphragm is aligned correctly: The side of the diaphragm that has a depression at the center should be facing upward.</p>
	<p>28</p>	<p>Lightly coat the thread surfaces with threadlocker. Install the diaphragm plate (2) and the nut (1). Tighten the nut while using an open-end wrench to hold the diaphragm plate (2) in place so as to prevent the components from turning. Observe the tightening torque information provided at the beginning of this section.</p>
	<p>29</p>	<p>Remove the assembly aid from the valve body. Screw the assembly aid (2) into the nozzle (1).</p>
	<p>30</p>	<p>Align the valve body (1) as shown. Turn the nozzle (3) in such a way that, as shown in the sectional view, the dowel pin is coaxially aligned with the lower hole and the nozzle opening is facing upward. Insert the nozzle (3) with the assembly aid (2) all the way into the connecting piece.</p>
	<p>31</p>	<p>Remove the assembly aid.</p>

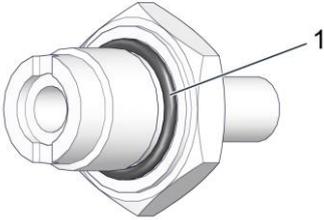
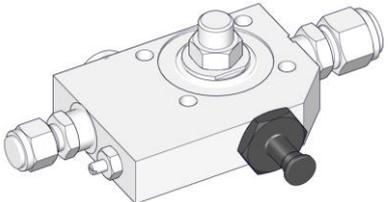
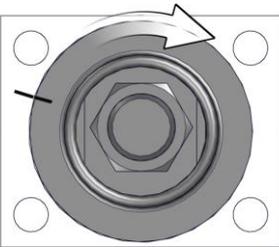
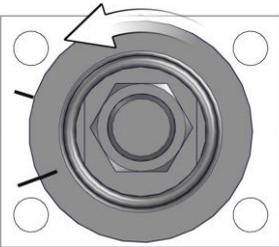
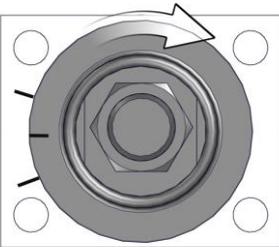
Figure	Step	Description
	32	Take the screw-in fitting for the motorization line. Replace the O-ring (1) with a new, greased O-ring.
	33	Lubricate the thread surfaces. Screw the screw-in fitting back in.
	34	To align the cross hole of the connecting piece correctly with the nozzle: Use the cap to turn the diaphragm by hand clockwise until it will not rotate any further. Use a marker or pen to mark the position on the body and on the convoluted diaphragm.
	35	Use the cap to turn the diaphragm by hand counterclockwise until it will not rotate any further. Use a marker or pen to mark the position on the body.
	36	Use the cap to turn the diaphragm by hand so that the marking on the diaphragm is right between the two markings on the body.

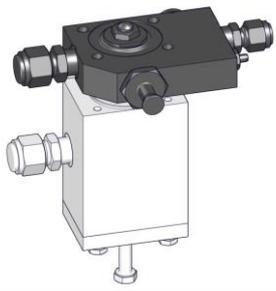
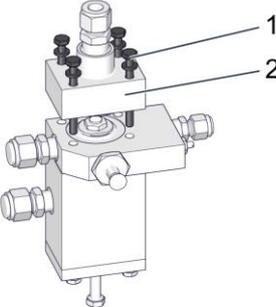
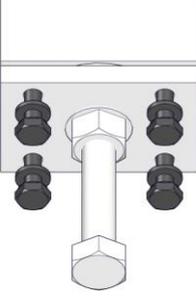
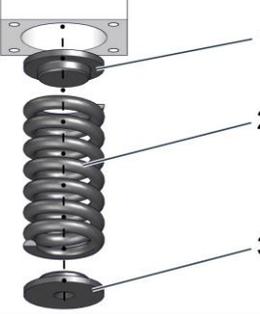
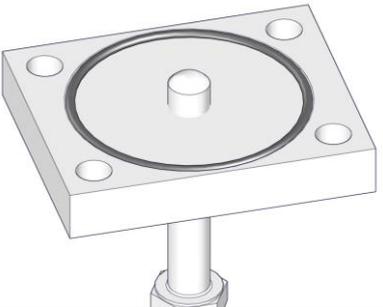
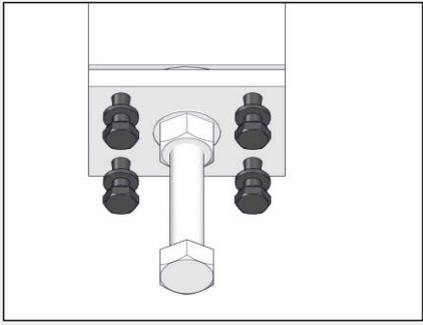
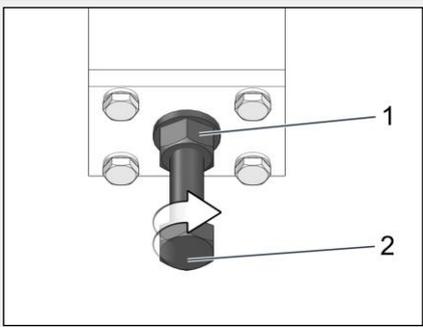
Figure	Step	Description
	37	Place the valve body on the spring housing.
	38	Lubricate the thread surfaces. Check to make sure that the diaphragm marking is still in the center position (see step 35). Put the upper cover (2) back in place. Tighten the screws (1) in a criss-cross sequence. Refer to the additional tightening torque information at the beginning of this topic.
	39	Loosen the screws and slowly and carefully remove the lower cover. Important! While removing the cover, parts on the inside may fall out from the spring housing by accident!
	40	Remove the lower spring plate (3), the compression spring (2), and the upper spring plate (1) from the spring housing. Lubricate the spring plates' depressions and reinsert the parts into the spring housing in the right order and alignment.
	41	Replace the O-ring with a new, greased O-ring.

Figure	Step	Description
	42	Lubricate the thread surfaces. Put the lower cover back in place. Tighten the screws in a criss-cross sequence. Refer to the additional tightening torque information at the beginning of this topic.
	43	Tighten the hex flange nut (1). Screw the spring adjuster (2) back in a bit. The correct setpoint adjustment cannot be carried out until before commissioning with the pilot installed.

Next task

Proceed as follows:

Completing the maintenance (see page 52)

4.6 Completing the maintenance

Installing the pilot on the actuator assembly

For instructions on how to install the pilot on the actuator assembly that will be used to operate it, 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 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 54)
 - *Disposing of the device* (see page 55)
-

5 Storage and disposal

Contents

Topic	Page
Storing the device	54
Disposing of the device	55

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.
 - 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.
-

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

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6.1 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 pilot

- The spare parts always required for the pilot's maintenance are grouped together into spare parts kits appropriate for the device in question. Each spare parts kit has its own part number.
- Individual servicing parts can be ordered by using the corresponding part number, which is specified in the bill of materials for the pilot. The required number of maintenance and/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.

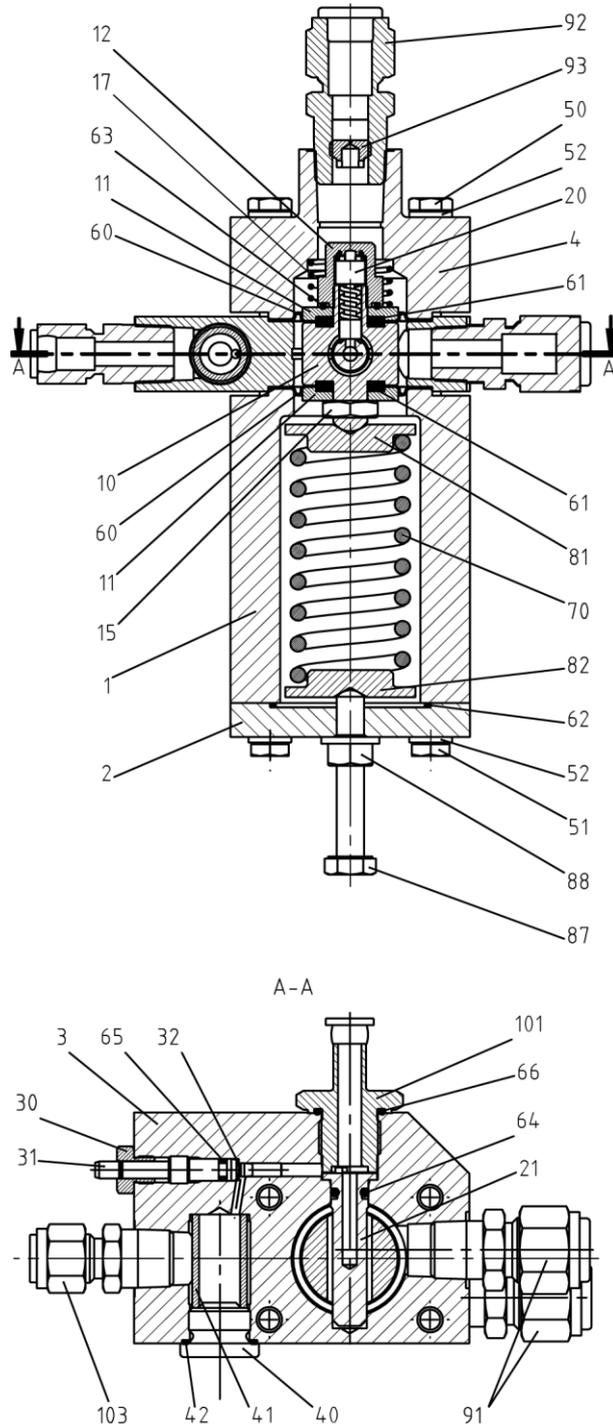
Overview of spare parts drawings

The spare parts drawings are subdivided as follows:

- Imperial HON 640a with diaphragm measuring unit
- Imperial HON 640a with metal bellows measuring unit
- Metric HON 640a with diaphragm measuring unit
- Imperial HON 642a with diaphragm measuring unit

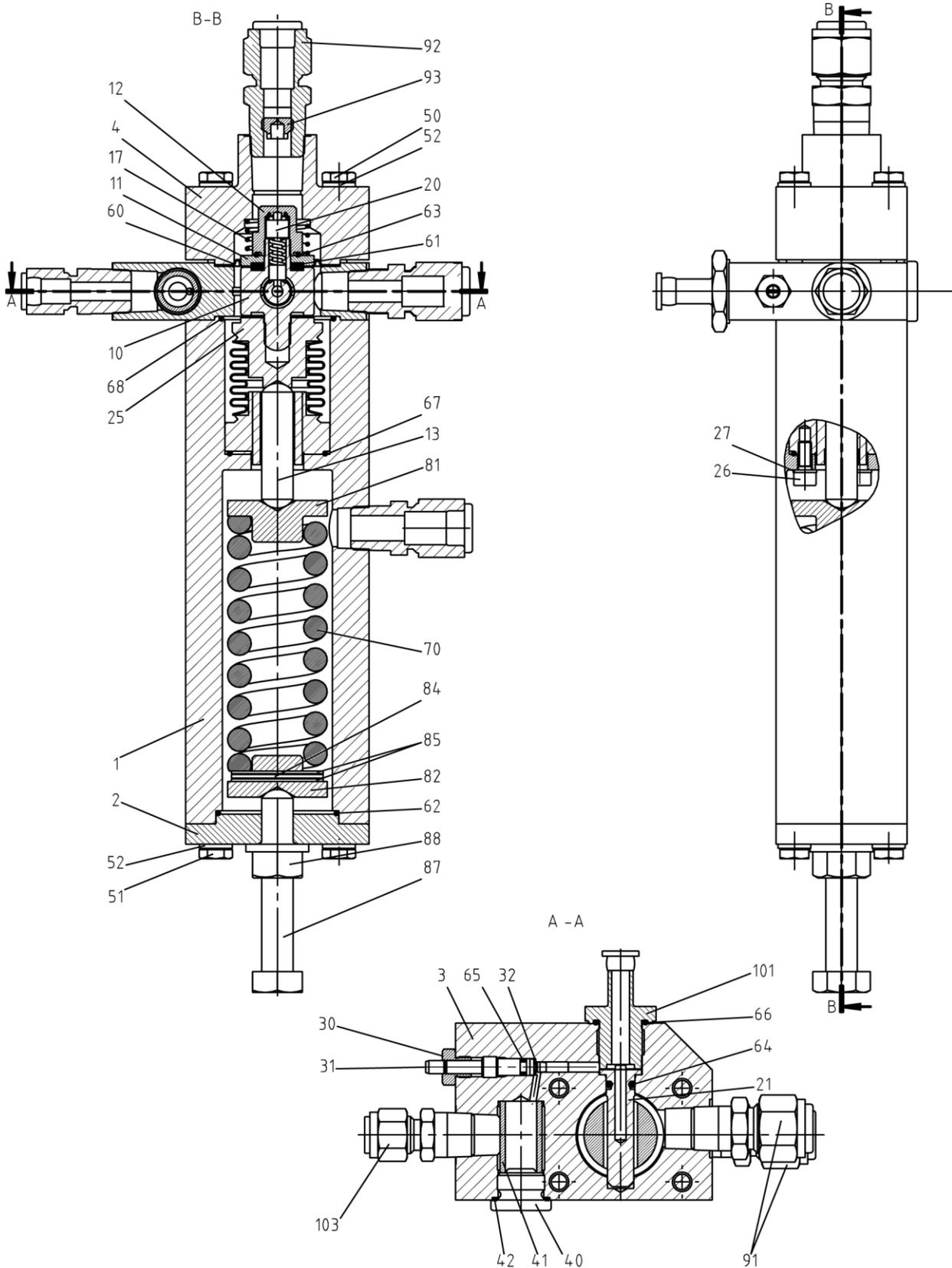
6.2 Spare parts drawing for imperial HON640a pilot with diaphragm measuring unit

Drawing



6.3 Spare parts drawing for imperial HON640a pilot with metal bellow measuring unit

Drawing

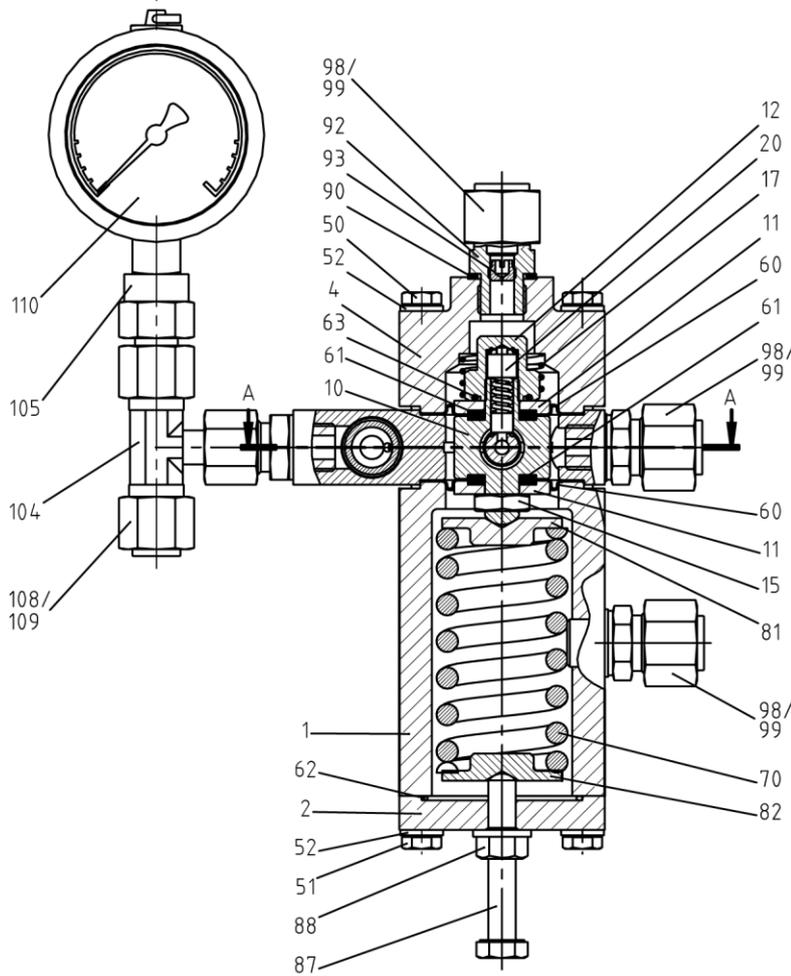


6.4 Spare parts drawing for metric HON640a with diaphragm measuring unit

Drawing

Without pressure gauge for outlet pressure

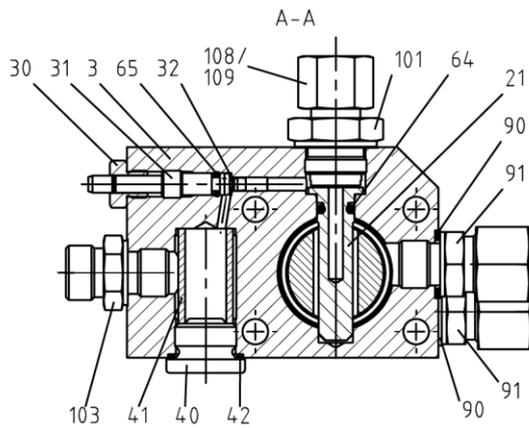
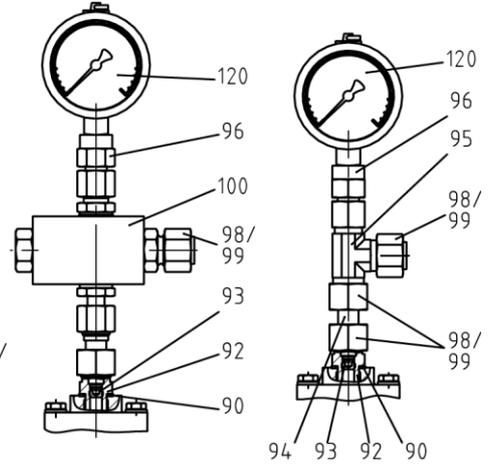
$W_d = 1 - 40$ bar



With pressure gauge for outlet pressure

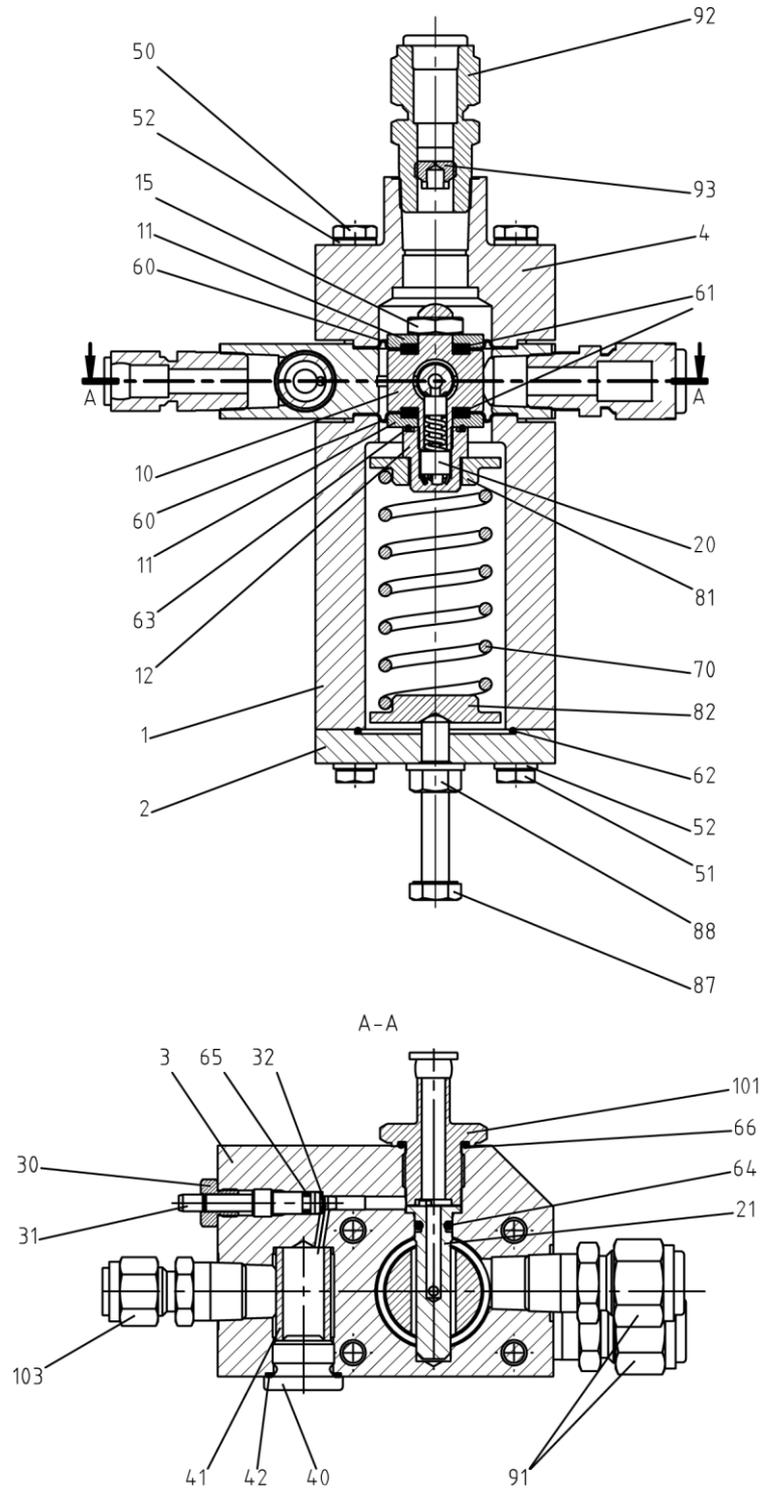
$W_d = 1 - 20$ bar

$W_d = 1 - 40$ bar



6.5 Spare parts drawing for imperial HON642a pilot with diaphragm measuring unit

Drawing



6.6 Bill of materials and spare parts for pilots

Spare parts kits

Imperial HON 640a with diaphragm measuring unit

Name	Description	Part no.
Imperial spare parts kit for 640a with diaphragm measuring unit	Consisting of: <ul style="list-style-type: none"> ▪ One each of Nos. 20, 42, 62, 63, 64, 65, 66 ▪ Two each of Nos. 60, 61 	K640-004

Imperial HON 640a with metal bellows measuring unit

Name	Description	Part no.
Imperial spare parts kit for 640a with metal bellows measuring unit	Consisting of: <ul style="list-style-type: none"> ▪ One each of Nos. 20, 42, 60, 61, 62, 63, 64, 65, 66, 67, 68 	K640-005

Metric HON 640a with diaphragm measuring unit

Name	Description	Part no.
Metric spare parts kit for 640a with diaphragm measuring unit	Consisting of: <ul style="list-style-type: none"> ▪ One each of Nos. 20, 42, 62, 63, 64, 65 ▪ Two each of Nos. 60, 61 	K640-003

Imperial HON 642a with diaphragm measuring unit

Name	Description	Part no.
Imperial spare parts kit for 642a with diaphragm measuring unit	Consisting of: <ul style="list-style-type: none"> ▪ One each of Nos. 20, 42, 62, 63, 64, 65, 66 ▪ Two each of Nos. 60, 61 	K642-001

Maintenance and servicing parts for pilot

No.	Name	Part no.			
		Imperial HON 640a with diaphragm measuring unit	Imperial HON 640a with metal bellows measuring unit	Metric HON 640a with diaphragm measuring unit	Imperial HON 642a with diaphragm measuring unit
20	PISTON PRE-ASSEMBLED	18356625	18356625	10000186	18356625
21	NOZZLE, 3.0	10000061	10000061	10000061	10000061
32	Locking ring	19186	19186	19186	19186
41	FILTER INSERT	28418	28418	28418	28418
42	O-RING A 18 X 22	18688	18688	18688	18688
60	Diaphragm, convoluted	10000191 (2 units)	10000191	10000191 (2 units)	10000191 (2 units)
61	STEM SEAL	10000066 (2 units)	10000066	10000066 (2 units)	10000066 (2 units)
62	O-RING W1.78 D 44.17	100331-RMK	100331-RMK	20293-RMK	100331-RMK
63	O-RING W1.78 D 14.00	100992-RMK	100992-RMK	20332-RMK	100992-RMK

No.	Name	Part no.			
		Imperial HON 640a with diaphragm measuring unit	Imperial HON 640a with metal bellows measuring unit	Metric HON 640a with diaphragm measuring unit	Imperial HON 642a with diaphragm measuring unit
64	O-RING, W2.40 D 6.30	100444-RMK	100444-RMK	20225-RMK	100444-RMK
65	O-RING W1.78 D 3.68	100990-RMK	100990-RMK	20283-RMK	100990-RMK
66	O-RING W1.78 D 17.17	101464-RMK	101464-RMK	-	101464-RMK
67	O-RING W1.78 D 34.65	-	100449-RMK	-	-
68	O-RING W1.78 D 41.00	-	101299	-	-
70	Compression spring for the following specific setpoint ranges:				
	▪ W _{ds} = 0.5 - 2 bar	10000156	-	10000156	10000156
	▪ W _{ds} = 1 - 5 bar	10009671	-	10009671	10009671
	▪ W _{ds} = 2 - 10 bar	10000139	-	10000139	10000139
	▪ W _{ds} = 5 - 20 bar	10000115	-	10000115	10000115
	▪ W _{ds} = 10 - 40 bar	10000064-RM K	-	10000064-RMK	10000064-RMK
	▪ W _{ds} = 10 - 50 bar	-	10000149	-	-
	▪ W _{ds} = 20 - 90 bar	-	10010444	-	-
81	SPRING PLATE, upper, for the following setpoint ranges:				
	▪ 0.5 to 20 bar	10000114	-	10000114	10000096
	▪ 10 to 40 bar	10000148	-	10000148	10000097
	▪ 10 to 50 bar	-	10011774	-	-
	▪ 20 to 90 bar	-	10011774	-	-
82	Spring plate, lower, for the following setpoint ranges:				
	▪ 0.5 to 20 bar	10000114	-	10000114	10000114
	▪ 10 to 40 bar	10000148	-	10000148	10000148
	▪ 10 to 50 bar	-	19084000	-	-
	▪ 20 to 90 bar	-	10011774	-	-
100	Protection against overpressure for setpoint ranges with a limit of up to 20 bar:				
	▪ For W _d = 1 - 5 bar	-	-	10023336	-
	▪ For W _d = 2 - 10 bar	-	-	10023337	-
	▪ For W _d = 5 - 20 bar	-	-	10023338	-
110	PRESSURE GAUGE, inlet:				
	▪ 0-16 bar	-	-	26890	-
	▪ 0-25 bar	-	-	100418-RMK	-
	▪ 0-40 bar	-	-	26282	-
	▪ 0-60 bar	-	-	26283	-
	▪ 0-100 bar	-	-	26285	-

No.	Name	Imperial HON 640a with diaphragm measuring unit	Imperial HON 640a with metal bellows measuring unit	Metric HON 640a with diaphragm measuring unit	Imperial HON 642a with diaphragm measuring unit
120	PRESSURE GAUGE, outlet:				
	▪ 0-6 bar	-	-	26891	-
	▪ 0-16 bar	-	-	26890	-
	▪ 0-25 bar	-	-	100418-RMK	-
	▪ 0-40 bar	-	-	26282	-

6.7 Lubricants, threadlockers, and special tools

Lubricants

Important! All parts must be slightly greased.

Use the following lubricants:

Application	Remark	Lubricant	Part no.
O-rings Stationary and moving		Standard model:	
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		Low-temperature model:	
Sliding guides		Silicone grease (jar)	27993
Guide bushings	Grease film only		
Control balls and control rollers		High-temperature model:	
Ball bearing		PFPE grease	102389
Setpoint set screws Power screws			
Thread material combination: Al/Al		Assembly paste	27091
Screw-in fittings and fastening screws			

Threadlocker

Important! All parts must be coated slightly.

Use the following threadlockers:

Application	Threadlocker	Part no.
<ul style="list-style-type: none"> ▪ Cap threads ▪ Hex nut threads ▪ Connecting piece threads 	LOCTITE	26 688

Special tools

You will need the following special tools for maintenance purposes:

Application	Special tools	Part no.
Topic: <ul style="list-style-type: none"> ▪ Maintenance for imperial HON 640a / metric HON 640a with diaphragm measuring unit (see page 24) ▪ Maintenance for imperial HON 640a with metal bellows measuring unit (see page 33) ▪ Maintenance for imperial HON 642a with diaphragm measuring unit (see page 43) 	Assembly aid	19 083 319

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