

MOUNTING AND OPERATING INSTRUCTIONS

SAMSON

EB 8006-GR EN

Translation of original instructions



SMS HG-1 Pneumatic Control Valve:
Type 261GR Valve with Type 3271 Actuator

Type 261GR Valve · ANSI version

In combination with an actuator, e.g. a Type 3271 or Type 3277 Pneumatic Actuator

CE

Note on these mounting and operating instructions

These mounting and operating instructions (EB) assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices. The images shown in this document are for illustration purposes only. The actual product may vary.

- ⇒ For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- ⇒ If you have any additional questions not related to the contents of this document, contact SAMSON's After-sales Service (aftersaleservice@samsongroup.com).



Documents relating to the device, such as the mounting and operating instructions, are available on our website:

▶ <https://www.samsongroup.com/en/downloads/documentation>

Definition of signal words

⚠ DANGER

Hazardous situations which, if not avoided, will result in death or serious injury

⚠ WARNING

Hazardous situations which, if not avoided, could result in death or serious injury

ⓘ NOTICE

Property damage message or malfunction

ℹ Note

Additional information

💡 Tip

Recommended action

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1 Safety instructions and measures

Intended use

The valve with its actuator is designed to operate under exactly defined conditions (e.g. operating pressure, process medium, temperature). Therefore, operators must ensure that the control valve is only used in operating conditions that meet the specifications used for sizing the valve at the ordering stage. In case operators intend to use the control valve in applications or conditions other than those specified, contact SAMSON. SAMSON does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

⇒ Refer to the technical data and nameplate for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse

The control valve is not suitable for the following applications:

- Use outside the limits defined during sizing and by the technical data
- Use outside the limits defined by the valve accessories connected to the control valve

Furthermore, the following activities do not comply with the intended use:

- Use of non-original spare parts
- Performing service and repair work not described

Qualifications of operating personnel

The control valve must be mounted, started up, serviced and repaired by fully trained and qualified personnel only; the accepted industry codes and practices must be observed. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.

Welding operations are to be performed only by personnel who has the necessary qualification to perform the applied welding procedure and handle the materials used.

Explosion-protected versions of this device are to be operated only by personnel who has undergone special training or instructions or who is au-

thorized to work on explosion-protected devices in hazardous areas.

Personal protective equipment

SAMSON recommends checking the hazards posed by the process medium being used (e.g. ► GESTIS hazardous substances database).

Depending on the process medium and/or the activity, the protective equipment required includes:

- Protective clothing, gloves, eye protection and respiratory protection in applications with hot, cold and/or corrosive media
- Wear hearing protection when working near the valve
- Hard hat
- Safety harness, e.g. when working at height
- Safety footwear, if applicable ESD (electrostatic discharge) footwear

⇒ Check with the plant operator for details on further protective equipment.

Revisions and other modifications

Revisions, conversions or other modifications of the product are not authorized by SAMSON. They are performed at the user's own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use.

Safety features

The fail-safe position of the control valve upon air supply or control signal failure depends on the actuator used (see associated actuator documentation). When the valve is combined with a SAMSON Type 3271 or Type 3277 Pneumatic Actuator, the control valve moves to a certain fail-safe position upon supply air or control signal failure (see Chapter 3.1). The fail-safe action of the actuator is the same as its direction of action and is specified on the nameplate of SAMSON actuators.

Warning against residual hazards

To avoid personal injury or property damage, plant operators and operating personnel must prevent hazards that could be caused in the control valve by the process medium, the operating pressure, the signal pressure or by moving parts by taking appropriate precautions. Plant operators and operating personnel must observe all hazard statements, warning and caution notes in these mounting and operating instructions.

Hazards resulting from the special working conditions at the installation site of the valve must

Safety instructions and measures

be identified in a risk assessment and prevented through the corresponding standard operating procedures drawn up by the operator.

Responsibilities of the operator

Operators are responsible for proper use and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions as well as the referenced documents to the operating personnel and to instruct them in proper operation. Furthermore, operators must ensure that operating personnel or third parties are not exposed to any danger.

Operators are additionally responsible for ensuring that the limits for the product defined in the technical data are observed. This also applies to the start-up and shutdown procedures. Start-up and shutdown procedures fall within the scope of the operator's duties and, as such, are not part of these mounting and operating instructions. SAMSON is unable to make any statements about these procedures since the operative details (e.g. differential pressures and temperatures) vary in each individual case and are only known to the operator.

Responsibilities of operating personnel

Operating personnel must read and understand these mounting and operating instructions as well as the referenced documents and observe the specified hazard statements, warnings and caution notes. Furthermore, operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards, directives and regulations

The control valves comply with the requirements of the European Pressure Equipment Directive 2014/68/EU and the European Machinery Directive 2006/42/EC. Valves with a CE marking have a declaration of conformity, which includes information about the applied conformity assessment procedure. Chapter 14 contains this declaration of conformity.

Non-electric valve versions whose bodies are not lined with an insulating material coating do not have their own potential ignition source according to the risk assessment stipulated in Clause 5.2 of DIN EN ISO 80079-36, even in the rare incident of an operating fault. Therefore, such valve versions do not fall within the scope of ATEX Directive 2014/34/EU.

⇒ For connection to the equipotential bonding system, observe the requirements specified in Clause 6.4 of DIN EN 60079-14 (VDE 0165-1).

Referenced documents

The following documents apply in addition to these mounting and operating instructions:

- Mounting and operating instructions for mounted valve accessories (positioner, solenoid valve etc.)
- Mounting and operating instructions for the mounted actuator, for example:
 - ► EB 8310-X for Type 3271 and Type 3277 Pneumatic Actuators
- Manual ► H 02: Appropriate Machinery Components for SAMSON Pneumatic Control Valves with a Declaration of Conformity of Final Machinery
- If a device contains a substance listed as a substance of very high concern (SVHC) on the candidate list of the REACH regulation, the document "Additional Information on Your Inquiry/Order" is added to the SAMSON order documents. This document includes the SCIP number assigned to the devices concerned. This number can be entered into the database on the European Chemicals Agency (ECHA) website (► <https://www.echa.europa.eu/scip-database>) to find out more information on the SVHC contained in the device.
More information on material compliance at SAMSON can be found at ► www.samsongroup.com > About SAMSON > Environment, Social & Governance > Material Compliance

1.1 Notes on possible severe personal injury

DANGER

Risk of bursting in pressure equipment.

Control valves and pipelines are pressure equipment. Excessive pressurization or improper opening can lead to valve components bursting.

- ⇒ Observe the maximum permissible pressure for valve and plant.
- ⇒ Before starting any work on pressure-bearing or pressure-retaining parts belonging to the valve assembly, depressurize all plant sections affected as well as the valve.
- ⇒ Drain the process medium from the plant sections affected as well as from the valve.

1.2 Notes on possible personal injury

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipelines.

Depending on the process medium, valve components and pipelines may get very hot or cold during operation and cause burn injuries.

- ⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ Allow components and pipelines to cool down or warm up to the ambient temperature.
- ⇒ Wear protective clothing and safety gloves.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions. Additionally, a loud noise may briefly occur through the sudden venting of the pneumatic actuator or pneumatic valve accessories not fitted with noise-reducing elements. Both can damage hearing.

- ⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ Wear hearing protection when working near the valve.

⚠ WARNING

Risk of personal injury due to exhaust air being vented or compressed air escaping from pneumatically operated components.

When the valve is operated with a pneumatic actuator or pneumatic valve accessories, exhaust air is vented from the actuator, for example, while the valve is operating and when the valve opens or closes.

- ⇒ Install the control valve in such a way that vent openings are not located at eye level and the actuator does not vent at eye level in the work position.
- ⇒ Use suitable mufflers and vent plugs.
- ⇒ Wear eye protection when working in close proximity to pneumatic fittings and in the danger zone of the vent openings.

⚠ WARNING

Crush hazard arising from moving parts.

The control valve contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- ⇒ Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- ⇒ Before working on the pneumatic control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- ⇒ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.
- ⇒ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

⚠ WARNING

Risk of personal injury due to preloaded springs in pneumatic actuators.

Valves in combination with pneumatic actuators with preloaded springs are under tension. These control valves with SAMSON Type 3271 or Type 3277 Pneumatic Actuators can be identified

Safety instructions and measures

by the long bolts protruding from the bottom of the actuator.

- ⇒ Before starting any work on the actuator, which requires the actuator to be opened, or when the actuator stem has become blocked, relieve the compression from the preloaded springs (see associated actuator documentation).

⚠ WARNING

Risk of personal injury due to incorrect removal of the anti-rotation fixture under tension.

Once the actuator has been mounted on the valve and the assembly is ready for use, the clamps of the anti-rotation fixture on the plug stem are under tension.

- ⇒ Follow the instructions in this document during mounting or removal.
- ⇒ Remove the actuator from the valve or otherwise ensure that it cannot transmit any forces to the actuator stem before removing the anti-rotation fixture from the plug stem.

⚠ WARNING

Risk of personal injury due to residual process medium in the valve.

While working on the valve, residual medium can flow out of the valve and, depending on its properties, cause personal injury, e.g. (chemical) burns.

- ⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ If possible, drain the process medium from the plant sections affected and from the valve.
- ⇒ Wear protective clothing, safety gloves, respiratory protection and eye protection.

⚠ WARNING

Risk of personal injury due to incorrect operation, use or installation as a result of information on the control valve being illegible.

Over time, markings, labels and nameplates on the control valve may become covered with dirt or become illegible in some other way. As a result, hazards may go unnoticed and the necessary instructions not followed. There is a risk of personal injury.

- ⇒ Keep all relevant markings and inscriptions on the device in a constantly legible state.
- ⇒ Immediately renew damaged, missing or incorrect nameplates or labels.

⚠ WARNING

Exposure to hazardous substances poses a serious risk to health.

Certain lubricants and cleaning agents are classified as hazardous substances. These substances have a special label and a material safety data sheet (MSDS) issued by the manufacturer.

- ⇒ Make sure that an MSDS is available for any hazardous substance used. If necessary, contact the manufacturer to obtain an MSDS.
- ⇒ Inform yourself about the hazardous substances and their correct handling.

1.3 Notes on possible property damage

ⓘ NOTICE

Risk of valve damage due to contamination (e.g. solid particles) in the pipeline.

The plant operator is responsible for cleaning the pipelines in the plant.

- ⇒ Flush the pipelines before start-up.

ⓘ NOTICE

Risk of valve damage due to unsuitable medium properties.

The valve is designed for a process medium with defined properties.

- ⇒ Only use the process medium specified for sizing the equipment.

ⓘ NOTICE

Risk of leakage and valve damage due to over- or under-torquing.

Observe the specified torques when tightening control valve components. Over-torquing leads to parts wearing out more quickly. Under-torquing may cause leakage.

- ⇒ Observe tightening torques.

NOTICE

Risk of valve damage due to the use of unsuitable tools.

Certain tools are required to work on the valve.

- ⇒ Only use tools approved by SAMSON.

NOTICE

Risk of valve damage due to the use of unsuitable lubricants.

The lubricants to be used depend on the valve material. Unsuitable lubricants may corrode and damage surfaces.

- ⇒ Only use lubricants approved by SAMSON.

NOTICE

Risk of the process medium being contaminated through the use of unsuitable lubricants and/or contaminated tools and components.

- ⇒ If necessary (e.g. for oxygen service), keep the valve and the tools used free from solvents and grease.
- ⇒ Make sure that only suitable lubricants are used.

NOTICE

Risk of valve damage due to work being carried out by personnel not qualified for such tasks.

The plant operator or specialist company performing the welding is responsible for the selection of the welding procedure and the actual welding operations on the valve. This also applies to any required heat treatment to be performed on the valve.

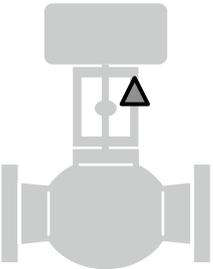
- ⇒ Only allow qualified welding personnel to carry out welding operations.
- ⇒ Before welding painted valves into the pipeline and/or subject them to heat in any way, observe the temperature resistance of the paint coating system. The number of the coating system used can be found in the order documentation. The temperature resistance of all of our coating systems is specified in the Brochure ► WA 268.

1.4 Notes on the use of an RFID tag

The RFID tag is subject to certain restrictions due to its application range (technical specifications).

- ⇒ Observe the explosion protection certificates of the RFID tag when it is to be used on valves installed in potentially explosive atmospheres.
- ⇒ Do not expose the RFID tag to strong electric fields.
- ⇒ Avoid electrostatic charging.
- ⇒ Observe the application range (technical specifications) of the RFID tag.

1.5 Warnings on the device

Warning symbols	Location on the device
	
Meaning of the warning	
<p>Warning against moving parts There is a risk of injury to hands or fingers due to the stroking movement of the actuator and plug stem if they are inserted into the yoke while the air supply is connected to the actuator.</p>	

2 Markings on the device

2.1 Valve nameplate

The nameplate shown was up to date at the time of publication of this document. The nameplate on the device may differ from the one shown.

The nameplate is affixed to the yoke of the valve.

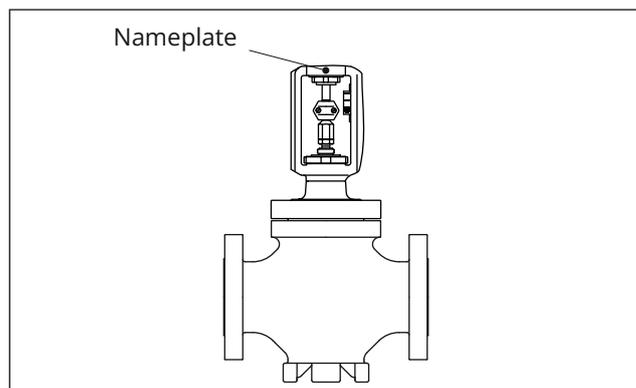


Fig. 1: Valve nameplate (example shown)

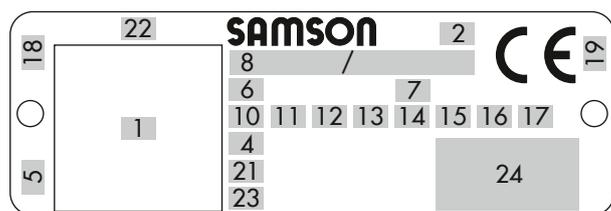


Fig. 2: Inscriptions on the valve nameplate

Item	Inscription meaning
1	Identification code (scannable)
2	Type designation
4	Material
5	Month and year of manufacture
6	Nominal size: DIN: DN · ANSI: NPS · JIS: DN
7	Pressure rating: DIN: PN · ANSI: CL · JIS: K
8	Order number/item
10	Flow coefficient: DIN: KV · ANSI/JIS: CV
11	Characteristic: % : Equal percentage LIN : Linear mod-lin : Modified linear NO/NC : On/off service

Item	Inscription meaning
12	Seat-plug seal: ME : Metal HA : Carbide metal ST : Metal base material with Stellite® facing KE : Ceramic PT : PTFE soft seal PK : PEEK soft seal
13	Seat code (trim material): On request
14	Pressure balancing: D : DIN · B : ANSI/JIS Version: M : Mixing valve V : Diverting valve
15	Noise reduction: 1 : Flow divider (ST) 1 2 : ST 2 3 : ST 3 1/PSA : ST 1 standard and integrated in seat for PSA valve AC-1/AC-2/AC-3/AC-5 : Anti-cavitation trim, versions 1 to 5 LK : Perforated plug LK1/LK2/LK3 : Perforated plug with flow divider ST 1 to 3 MHC1 : Multi-Hole Cage CC1 : Combi Cage ZT1 : Zero Travel LDB : Low dB CDST : Multi-stage trim (cavitation dirty service trim)
16	PSA version: PSA
17	Cage/seat style: RT : Seat with retainer CG : Guided cage TH : Screwed-in seat SF : Suspended cage, flanged seat
18	Country of origin
19	ID of the notified body (EU), for example: – 0062 for Bureau Veritas Services SAS, 8 Cours du Triangle, 92800 PUTEAUX – LA DEFENSE
21	PED : Pressure Equipment Directive G1/G2 : Gases and vapors Fluid group 1 = Hazardous Fluid group 2 = Other L1 : Liquids Fluid group 1 = Hazardous Fluid group 2 = Other I/II/III : Category 1 to 3
22	Serial number
23	NE 53 (NAMUR Recommendation)
24	Other marks of conformity

i Note

Fig. 2 and the inscription table list all possible characteristics and options that may appear on a valve nameplate. Only the inscriptions relevant to the ordered Type 261GR Valve actually appear on the nameplate.

💡 Tip

SAMSON recommends to include the device's serial number (item 22 on the nameplate) and/or its material number (as specified in the order confirmation) in the plant documentation for the associated tag number.

The serial number enables you to view the device's current technical data as configured by SAMSON. The material number enables you to view the device's technical data as configured by SAMSON upon delivery of the device. To view these data, go to our website at:

▶ www.samsongroup.com > Products > Electronic nameplate

For example, you can also use the associated information to order a new nameplate from our after-sales service, if required.

2.5 Optional RFID tag

The RFID tag is located directly next to the nameplate on valves ordered with the RFID tag option. It contains the same data as the identification code on the electronic nameplate. It can be read using a smartphone, tablet or RFID reader. Application range according to the technical data (see Chapter 3.5).

2.2 Actuator nameplate

See associated actuator documentation.

2.3 Material numbers

The seat and plug of the valves have an item number written on them. You can contact us stating this item number to find out which material is used. Additionally, a seat code is used to identify the trim material. This seat code is specified on the nameplate.

2.4 Label when an adjustable packing is installed

An instructional label is affixed to the valve when an adjustable packing is installed (see Fig. 3).



Fig. 3: Label when an adjustable packing is installed

3 Design and principle of operation

The Type 261GR Globe Valve is preferably combined with a SAMSON Type 3271 or Type 3277 Pneumatic Actuator.

A clamped-in seat and multi-stage CDST plug are installed in the valve body. Depending on the CDST plug version, an intermediate piece is installed between the valve body and bonnet. The plug stem is connected to the actuator stem by the stem connector clamps and is sealed by a packing.

The springs in the pneumatic actuator are located either above or below the diaphragm depending on the selected fail-safe action (see Chapter 3.1). A change in the signal pressure acting on the diaphragm causes the plug/piston to move. The actuator size is determined by the diaphragm area.

The medium flows through the valve in the direction indicated by the arrow. A rise in signal pressure causes the force acting on the diaphragm in the actuator to increase. The springs are compressed. Depending on the selected direction of action, the actuator stem retracts or extends. As a result, the plug position in the seat changes and determines the flow rate through the valve and the pressure p_2 as well.

Tip

SAMSON recommends the use of positioners with integrated diagnostic firmware (see Chapter 3.4) for control valves used for on/off service. The partial stroke test included in this software helps prevent a shut-off valve normally in its end position from seizing up or getting jammed.

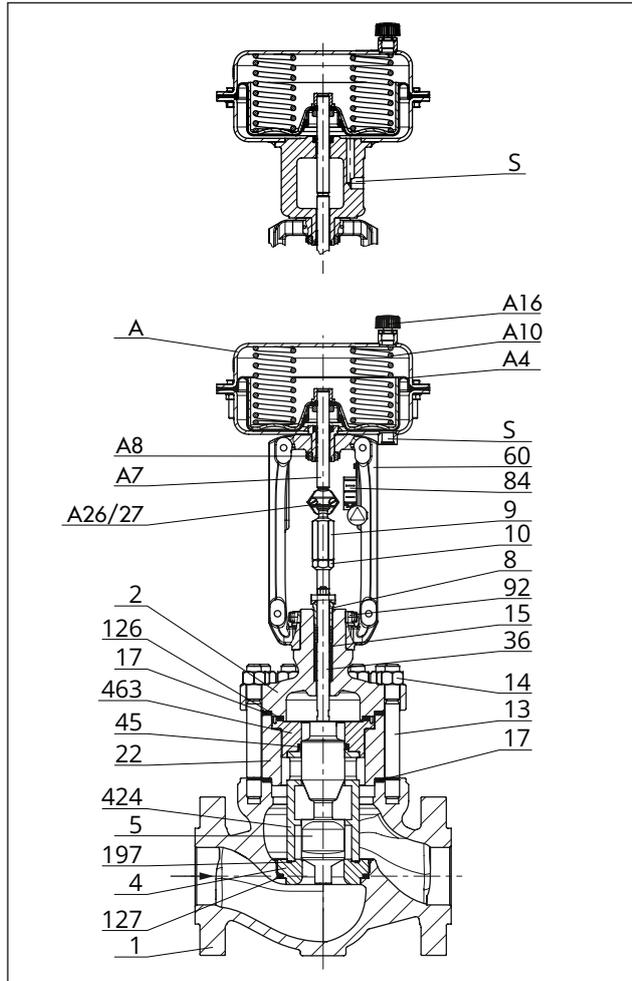


Fig. 4: Type 261GR Valve with Type 3271 (below) or Type 3277 (top) Pneumatic Actuator

1	Valve body	84	Travel indicator scale
2	Standard bonnet	92	Castellated nut
4	Seat	126	Spiral wound gasket
5	Plug (CDST)	127	Spiral wound gasket
8	Threaded bushing/packing follower	197	Flat gasket
		424	Liner
9	Stem connector nut	463	Cylinder
10	Lock nut	A	Actuator
13	Stud	A4	Actuator diaphragm
14	Hex nut	A7	Actuator stem
15	Packing set	A8	Ring nut
17	Spiral wound gasket	A10	Spring
22	Intermediate piece	A16	Vent plug
36	Plug stem	A26/	Stem connector clamps
45	Seal (pressure balancing)	27	
	(version with pressure balancing only)	S	Signal pressure connection
60	Yoke		

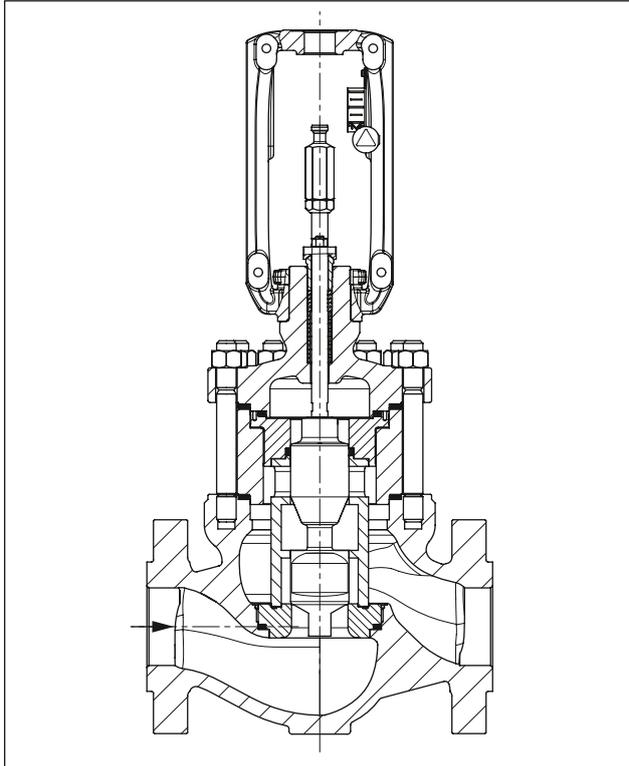


Fig. 5: Type 261GR Globe Valve with 3-stage CDST plug

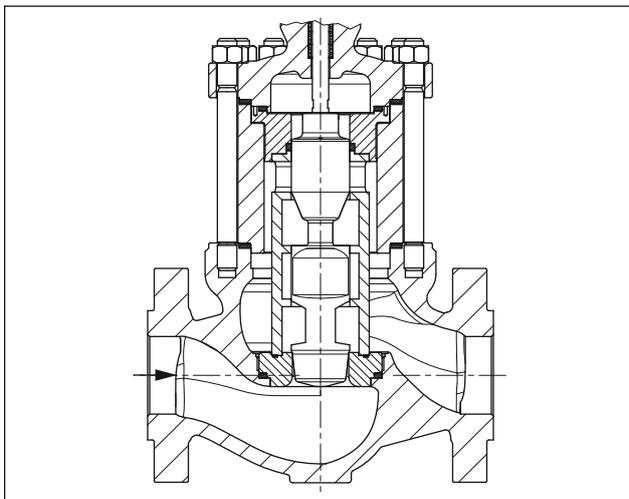


Fig. 6: Type 261GR Globe Valve with 4-stage CDST plug

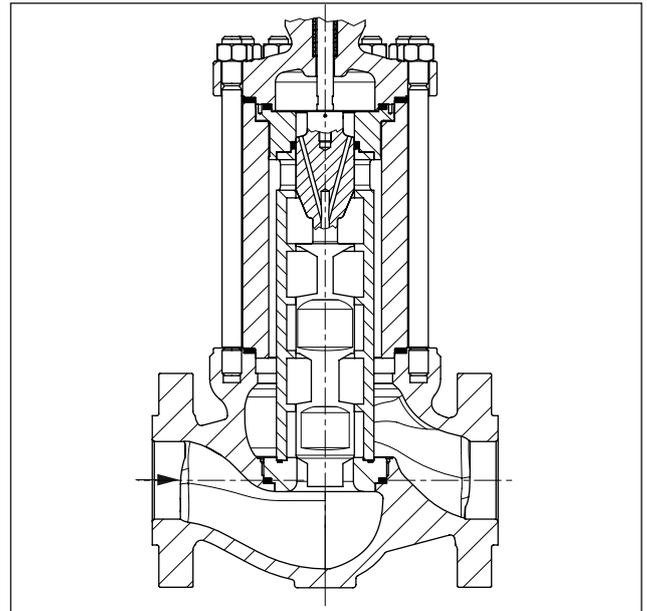


Fig. 7: Type 261GR Globe Valve with 6-stage CDST plug and pressure balancing

3.1 Fail-safe positions

The fail-safe position of the control valve upon air supply or control signal failure depends on the actuator used (see associated actuator documentation).

Depending on how the compression springs are arranged in the SAMSON Type 3271 and Type 3277 Pneumatic Actuator, the control valve has one of two different fail-safe positions:

- **Actuator stem extends (FA)**
When the signal pressure is reduced or the air supply fails, the springs move the actuator stem downward and close the valve. The valve opens when the signal pressure is increased enough to overcome the force exerted by the springs.
- **Actuator stem retracts (FE)**
When the signal pressure is reduced or the air supply fails, the springs move the actuator stem upward and open the valve. The valve closes when the signal pressure is increased enough to overcome the force exerted by the springs.

 **Tip**

The actuator's direction of action can be reversed, if required. Refer to the mounting and operating instructions of the pneumatic actuator: ► EB 8310-X for Type 3271 and Type 3277

3.2 Versions

Actuators

In these instructions, the preferable combination with a SAMSON Type 3271 or Type 3277 Pneumatic Actuator is described. The pneumatic actuator (with or without handwheel) can be replaced by another pneumatic actuator in a different size, but with the same travel.

- ⇒ Observe the maximum permissible actuator force.

i Note

If the travel range of the actuator is larger than the travel range of the valve, the spring assembly in the actuator must be preloaded so that the travel ranges match (see associated actuator documentation).

The basic pneumatic actuator can be replaced by a pneumatic actuator with additional handwheel or by an electric actuator (see Information Sheet ► T 8300).

3.3 Additional fittings

Strainer

SAMSON recommends installing a strainer with a defined filter mesh size upstream of the valve body, which meets the specifications used to size the valve and the process medium properties (size of any entrained particles). A strainer prevents entrained particles that are too large from damaging the control valve.

Bypass and shut-off valves

SAMSON recommends installing a shut-off valve both upstream of the strainer and downstream of the control valve and installing a bypass line. The bypass ensures that the plant does not need to be shut down for service and repair work on the valve.

Insulation

Control valves can be insulated to reduce heat energy transfer.

If applicable, read the instructions in Chapter 5.

Safety guard

For operating conditions that require increased safety (e.g. in cases where the control valve is freely accessible to untrained staff), a safety guard must be installed to rule out a crush hazard arising from moving parts (actuator and plug stem). Plant operators are responsible for deciding whether a guard is

to be used. The decision is based on the risk posed by the plant and its operating conditions.

3.4 Valve accessories

See Information Sheet ► T 8350

3.5 Technical data

The nameplates on the valve and actuator provide information on the control valve version (see Chapter 2).

i Note

More information on Type 261GR Valve is available in the following data sheets:

- ► T 8005-GR (DIN version)
- ► T 8006-GR (ANSI version)

Conformity

The Type 261GR Valve bears the CE mark of conformity.



Noise emissions

SAMSON is unable to make general statements about noise emissions. The noise emissions depend on the valve version, plant facilities and process medium.

Optional RFID tag

Application range according to the technical specifications and the explosion protection certificates. These documents are available on our website:
► www.samsongroup.com > Products > Electronic nameplate

The permissible range for temperatures at the RFID tag is between -40 and +185 °F (-40 and +85 °C).

i Note

The associated actuator documentation applies to actuators, e.g. SAMSON pneumatic actuators:

- ► T 8310-1 for Type 3271 and Type 3277 Actuators up to 750 cm² actuator area
- ► T 8310-2 for Type 3271 Actuator with 1000 cm² actuator area and larger
- ► T 8310-3 for Type 3271 Actuator with 1400-60 cm² actuator area

Technical data

Table 1: Technical data for Type 261GR · ANSI version

Material		Cast steel A216 WCC	Cast stainless steel A351 CF8M
Nominal size and pressure rating		NPS 1 to 4 ³⁾ Class 300 to 900	
Type of end connections	Flanges	RF and RTJ according to ASME B16.5	
	Welding ends	According to ASME B16.25	
Seat-plug seal		Metal seal · High-performance metal seal	
Characteristic		Linear ²⁾	
Rangeability		On request (depending on nominal size, valve version and number of trim stages)	
Conformity			
Temperature ranges in °F (°C) · Permissible operating pressures according to pressure-temperature diagrams (see Information Sheet ► T 8000-2)			
Body with standard bonnet		14 to 482 (-10 to +250) with PTFE packing Up to +797 (+425) with graphite packing	-58 to +482 (-50 to +250) with PTFE packing Up to +797 (+425) with graphite packing
Trim ¹⁾	Metal seal	-58 to +797 (-50 to +425)	
	Balanced with PTFE	-58 to +482 (-50 to +250)	
Leakage class according to ANSI FCI 70-2			
Trim	Metal seal	Standard: IV · High-performance metal seal: V	
	Balanced, metal seal	With PTFE ring (standard): IV · High-performance metal seal: V	

¹⁾ Only in combination with suitable body material

²⁾ Other on request

³⁾ Only for version with cage trim

Materials

Table 2: Materials for Type 261GR · ANSI version

Body of standard version		Cast steel A216 WCC	Cast stainless steel A351 CF8M
Valve bonnet		A216 WCC	A351 CF8M
Intermediate piece		A105	316/316L
Plug stem		XM-19-H	
Seal ring for balanced plug		PTFE with carbon · Graphite	
Packing		PTFE packing loaded by internal or external springs or adjustable graphite packing	
Body gasket		Spiral wound gasket, graphite/316L	
Version with clamped-in seat and plug	Plug ³⁾	316/316L/440C ¹⁾	316/316L ⁴⁾
	Seat	316/316L/440C ¹⁾	316/316L ²⁾
	Liner	316/316L/440C ¹⁾	316/316L ³⁾
	Cylinder	316/316L/440C ¹⁾	316/316L ³⁾

¹⁾ Heat treated

²⁾ Also with Stellite®-faced facing and guide for media containing solid matter

³⁾ Kolsterized

⁴⁾ Kolsterized for media containing solid matter

Design and principle of operation

Dimensions

Table 3: Dimensions in inch and mm for SMS HG-1 and SMS HG-7 Control Valves

Valve		NPS	1	2	3	4
Length L (RF flanges)	CI 300	in	7.75	10.5	12.5	14.5
		mm	197	267	318	368
	CI 600	in	8.25	11.25	13.25	15.5
		mm	210	286	337	394
	CI 900	in	11.5	14.75	17.38	20.1
		mm	292	375	441	511
Length L (RTJ flanges)	CI 300	in	8.25	11.12	13.12	15.1
		mm	210	283	334	384
	CI 600	in	8.25	11.37	13.37	15.6
		mm	210	289	340	397
	CI 900	in	11.5	14.87	17.5	20.2
		mm	292	378	444	514
Height H4 (version with standard bonnet)	3-stage CDST	in	7.54	8.94	11.81	15.28
		mm	192	227	300	388
	4-stage CDST	in	8.56	10.31	13.88	18.5
		mm	218	262	353	470
	6-stage CDST	in	10.61	13.07	18.01	24.96
		mm	270	332	458	634
H8 for actuator	350 cm ²	in	11.26	11.26	11.26	11.26
		mm	286	286	286	286
	350v2 cm ²	in	11.26	11.26	11.26	11.26
		mm	286	286	286	286
	355v2 cm ²	in	11.26	11.26	11.26	11.26
		mm	286	286	286	286
	750 cm ²	in	11.26	11.26	11.26	11.26
		mm	286	286	286	286
	1000 cm ²	in	13.43	13.43	13.43	13.43
		mm	341	341	341	341
	1400-60 cm ²	in	13.43	13.43	13.43	13.43
		mm	341	341	341	341
H2 ¹⁾	CI 300 to 600	in	2.44	3.25	4.15	5.35
		mm	62	82.5	106	142
	CI 900	in	2.93	4.25	4.74	5.75
		mm	74.5	108	121	152

¹⁾ The H2 dimension is the distance from the middle of the flow channel to the bottom of the valve body. The dimension up to the bottom of the flange may differ. It may be lower or higher. Flange standards (see Table 1).

Dimensional drawing

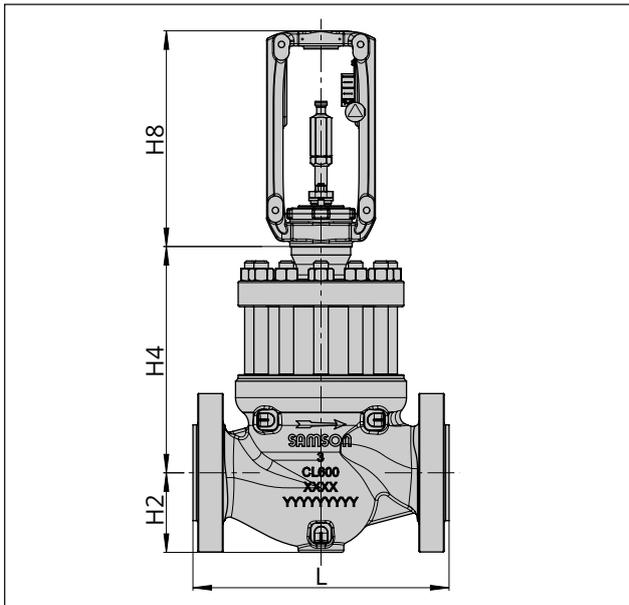


Fig. 8: Standard version of Type 261GR Valve

Design and principle of operation

Weights

Table 4: Weights in lbs and kg for Type 261GR Valve with RF flanges according to ASME B16.5

Valve		NPS		1	2	3	4
Version with standard bonnet							
Valve ¹⁾ with- out actuator	CI 300	3-stage CDST	lbs (ap- prox.)	44	106	180	319
			kg (ap- prox.)	20	48	82	145
		4-stage CDST	lbs (ap- prox.)	44	110	194	348
			kg (ap- prox.)	20	50	88	158
		6-stage CDST	lbs (ap- prox.)	48	121	220	409
			kg (ap- prox.)	22	55	100	186
	CI 600	3-stage CDST	lbs (ap- prox.)	57	106	194	354
			kg (ap- prox.)	26	48	88	161
		4-stage CDST	lbs (ap- prox.)	57	110	207	383
			kg (ap- prox.)	26	50	94	174
		6-stage CDST	lbs (ap- prox.)	62	123	233	444
			kg (ap- prox.)	28	56	106	202
	CI 900	3-stage CDST	lbs (ap- prox.)	68	143	251	418
			kg (ap- prox.)	31	65	114	190
		4-stage CDST	lbs (ap- prox.)	70	147	268	460
			kg (ap- prox.)	32	67	122	209
		6-stage CDST	lbs (ap- prox.)	75	161	304	541
			kg (ap- prox.)	34	73	138	246

¹⁾ The weights specified apply to a specific standard device configuration. Weights of other valve configurations may differ depending on the version (material, trim etc.).

Entrained dirt particles

SAMSON has calculated the maximum diameter of entrained dirt particles that can be flushed out of a fully open valve. Depending on how far the valve is opened during throttling service, even smaller sized particles may clog up the valve. It may be necessary to briefly move the valve to the fully open position to flush out the valve. How often the valve needs to be flushed out may vary due to the operating conditions and the individual case of use.

Table 5: Maximum permissible size of entrained dirt particles at 100 % travel for version with type A CDST plug

NPS	C _v coefficient	CDST stages	Max. perm. particle diameter
1	3.1	3	3.5 mm (0.137 in)
	1.5	4	0.4 mm (0.015 in)
	0.76	6	0.2 mm (0.007 in)
2	11.7	3	7.8 mm (0.307 in)
	5.7	4	1.0 mm (0.039 in)
	2.1	6	0.3 mm (0.011 in)
3	24.5	3	11.1 mm (0.437 in)
	19	4	2.8 mm (0.110 in)
	9.3	6	1.2 mm (0.047 in)
4	40.8	3	14.7 mm (0.578 in)
	19.4	4	3.7 mm (0.145 in)
	13.3	6	1.0 mm (0.039 in)

4 Shipment and on-site transport

The work described in this chapter is to be performed only by personnel appropriately qualified to carry out such tasks.

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Check that the specifications on the valve nameplate match the specifications in the delivery note. See Chapter 2 for more details on the nameplate.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).
3. Determine the weight and dimensions of the units to be lifted and transported in order to select the appropriate lifting equipment and lifting accessories. Refer to the transport documents and Chapter 3.5.

4.2 Removing the packaging from the valve

Observe the following sequence:

- ⇒ Do not open or remove the packaging until immediately before lifting the control valve to install it into the pipeline.
- ⇒ Leave the control valve in its transport container or on the pallet to transport it on site.
- ⇒ Do not remove the protective caps from the inlet and outlet until immediately before installing the valve into the pipeline. They prevent foreign particles from entering the valve.
- ⇒ Dispose and recycle the packaging in accordance with the local regulations.

4.3 Transporting and lifting the valve

⚠ DANGER

Danger due to suspended loads falling.

- ⇒ Stay clear of suspended or moving loads.
- ⇒ Close off and secure the transport paths.

⚠ WARNING

Risk of lifting equipment tipping over and risk of damage to lifting accessories due to exceeding the rated lifting capacity.

- ⇒ Only use approved lifting equipment and accessories whose minimum lifting capacity is higher than the weight of the valve (including actuator and packaging, if applicable).

⚠ WARNING

Risk of personal injury due to the control valve tipping over.

- ⇒ Observe the control valve's center of gravity.
- ⇒ Secure the control valve against tipping over or turning.

⚠ WARNING

Risk of injury due to incorrect lifting without the use of lifting equipment.

- Lifting the control valve without the use of lifting equipment may lead to injuries (back injuries in particular) depending on its weight.*
- ⇒ Observe the occupational health and safety regulations valid in the country of use.

ⓘ NOTICE

Risk of control valve damage due to incorrectly attached slings.

- The lifting eyelet/eyebolt on SAMSON actuators is only intended for mounting and removing the actuator as well as lifting the actuator without valve. Do not use this lashing point to lift the entire control valve assembly.*
- ⇒ When lifting the control valve, make sure that the slings attached to the valve body bear the entire load.
 - ⇒ Do not attach load-bearing slings to the actuator, handwheel or any other parts.
 - ⇒ Observe lifting instructions (see Chapter 4.3.2).

Tip

A swivel hoist can be screwed into SAMSON actuators with a female thread on the top diaphragm case in place of the eyebolt (see associated actuator documentation).

In contrast to the lifting eyelet/eyebolt, the swivel hoist is designed for setting a control valve assembly upright. The sling between the swivel hoist and rigging equipment (hook, shackle etc.) must not bear any load when lifting a control valve assembly. The sling only protects the control valve from tilting while being lifted.

Tip

Our after-sales service can provide more detailed transport and lifting instructions on request.

4.3.1 Transporting the valve

The control valve can be transported using lifting equipment (e.g. crane or forklift).

- ⇒ Leave the control valve in its transport container or on the pallet to transport it.
- ⇒ Observe the transport instructions.

Transport instructions

- Protect the control valve against external influences (e.g. impact).
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the piping and any mounted valve accessories against damage.
- Protect the control valve against moisture and dirt.
- The permissible transportation temperature of standard control valves is -4 to +149 °F (-20 to +65 °C).

i Note

Contact our after-sales service for the transportation temperatures of other valve versions.

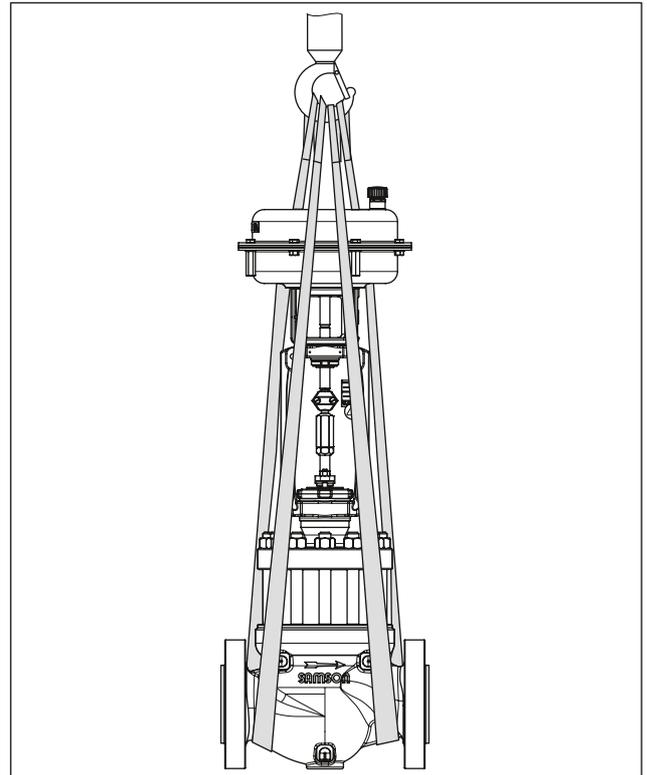


Fig. 9: Lifting points on the control valve without additional lashing point on the actuator

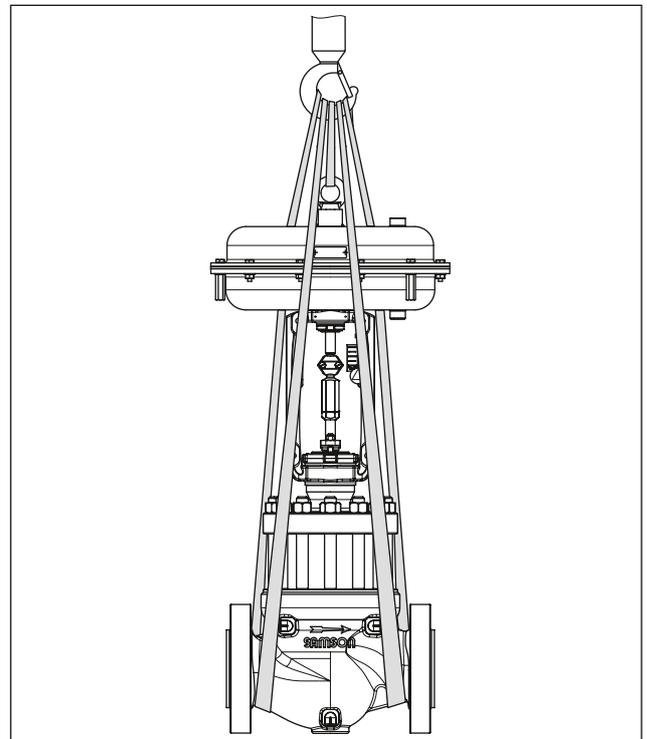


Fig. 10: Lifting points on the control valve with additional lashing point on the actuator

Shipment and on-site transport

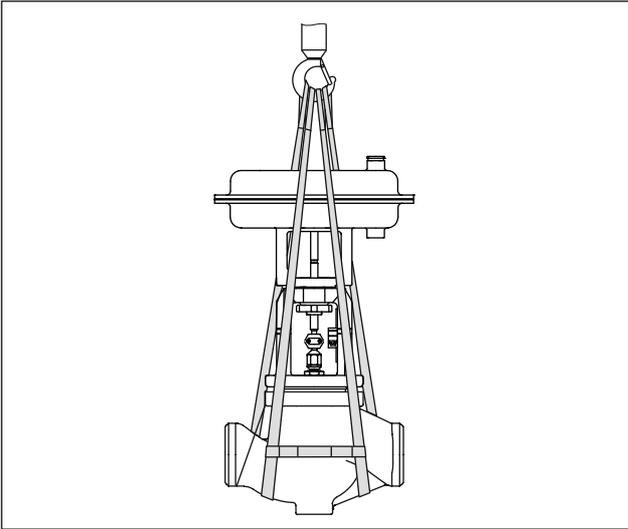


Fig. 11: Lifting a control valve with welding ends (example shown): The attached slings are secured against slipping using a connector.

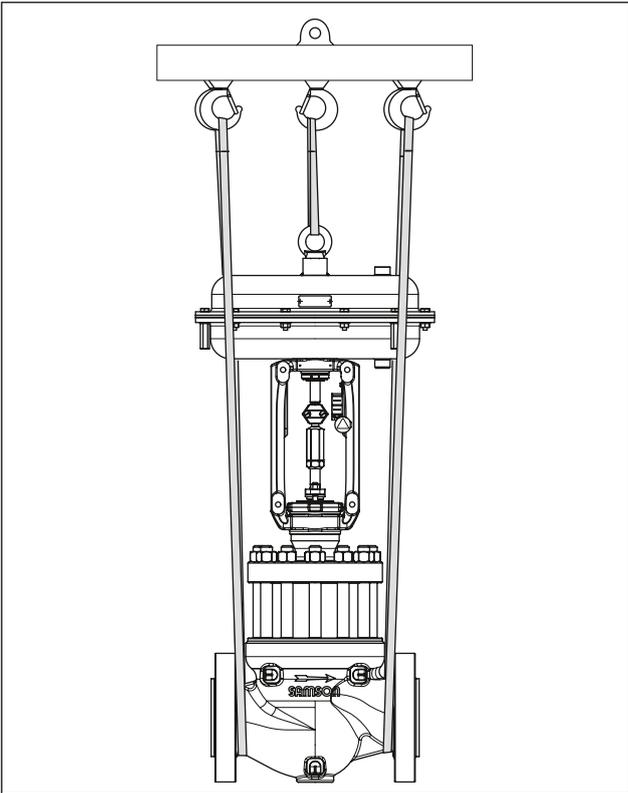


Fig. 12: Lifting the control valve using a crossbeam

4.3.2 Lifting the valve

See Fig. 9 to Fig. 12

To install a large control valve into the pipeline, use lifting equipment (e.g. crane or forklift) to lift it.

Lifting instructions

- Use a hook with safety latch to secure the slings from slipping off the hook during lifting and transporting.
- Secure slings against slipping.
- Make sure the slings can be removed from the device once it has been installed into the pipeline.
- Prevent the control valve from tilting or tipping over.
- Do not leave loads suspended when interrupting work for longer periods of time.
- Make sure that the axis of the pipeline is always horizontal during lifting and the axis of the plug stem is always vertical.
- Make sure that the additional sling between the lashing point on the actuator and rigging equipment (hook, shackle etc.) does not bear any load when lifting valves with an actuator that has a lifting eyelet/eyebolt on it. The sling only protects the control valve from tilting while being lifted. Before lifting the control valve, tighten the sling.

Version with flanges

1. Attach one sling to each flange of the body and to the rigging equipment (e.g. hook) of the crane or forklift.
2. **Mounted actuator with lashing point:** Attach other slings to the lashing point on the actuator and to the rigging equipment.
3. Carefully lift the control valve. Check whether the lifting equipment and accessories can bear the weight.
4. Move the control valve at an even pace to the site of installation.
5. Install the control valve into the pipeline (see Chapter 5).
6. After installation in the pipeline, check whether the flanges are bolted tight and the valve in the pipeline holds.
7. Remove slings.

Version with welding ends

1. Attach one sling to each welding end of the body and to the rigging equipment (e.g. hook) of the crane or forklift.
2. Secure the slings attached to the body against slipping using a connector.
3. **Mounted actuator with lashing point:** Attach other slings to the lashing point on the actuator and to the rigging equipment.

4. Carefully lift the control valve. Check whether the lifting equipment and accessories can bear the weight.
5. Move the control valve at an even pace to the site of installation.
6. Install the control valve into the pipeline (see Chapter 5).
7. After installation, check whether the weld seams hold.
8. Remove slings.

4.4 Storing the valve

NOTICE

Risk of valve damage due to improper storage.

- ⇒ Observe the storage instructions.
- ⇒ Avoid longer storage periods.
- ⇒ Contact SAMSON in case of different storage conditions or longer storage times.

Note

SAMSON recommends to regularly check the control valve and the prevailing storage conditions during long storage periods.

Storage instructions

- Protect the control valve against external influences (e.g. impact).
- Secure the control valve assembly in the stored position against slipping or tipping over.
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the control valve against moisture and dirt. Store it at a relative humidity of less than 75 %. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Make sure that the ambient air is free of acids or other corrosive media.
- The permissible storage temperature of standard control valves is -4 to +149 °F (-20 to +65 °C). Contact our after-sales service for the storage temperatures of other valve versions.
- Do not place any objects on the control valve.

- For storage periods longer than 4 months, SAMSON recommends storing the following valves upright with the actuator on top:
 - ≥NPS 4 in versions with pressure balancing
 - ≥NPS 6 in versions without pressure balancing

Special storage instructions for elastomers

Elastomer, e.g. actuator diaphragm

- To keep elastomers in shape and to prevent cracking, do not bend them or hang them up.
- SAMSON recommends a storage temperature of 59 °F (15 °C) for elastomers.
- Store elastomers away from lubricants, chemicals, solutions and fuels.

Tip

Our after-sales service can provide more detailed storage instructions on request.

5 Installation

The work described in this chapter is to be performed only by personnel appropriately qualified to carry out such tasks.

5.1 Installation conditions

Work position

The work position for the control valve is the front view looking onto the operating controls (including valve accessories).

Plant operators must ensure that, after installation of the device, the operating personnel can perform all necessary work safely and easily access the device from the work position.

Pipeline routing

The inlet and outlet lengths (see Table 6) vary depending on several variables and process conditions and are intended as recommendations. Contact SAMSON if the lengths are significantly shorter than the recommended lengths.

To ensure that the control valve functions properly, proceed as follows:

- ⇒ Observe the recommended inlet and outlet lengths (see Table 6). Contact SAMSON if the valve conditions or state of the process medium are different from those specified.
- ⇒ Install the control valve free of stress and with the least amount of vibrations as possible. Read sections 'Mounting position' and 'Support and suspension' in this chapter.
- ⇒ Install the control valve allowing sufficient space to remove the actuator and valve or to perform service and repair work on them.

Table 6: Inlet and outlet lengths

	<p>Globe valve</p>	<p>Q Flow rate a Inlet length b Outlet length</p>	
State of process medium	Valve conditions	Inlet length a	Outlet length b
Liquids	Free of cavitation/ $w < 10$ m/s	2	4
	Cavitation producing noise/ $w \leq 3$ m/s	2	4
	Cavitation producing noise/ $3 < w < 5$ m/s	2	10
	Critical cavitation/ $w \leq 3$ m/s	2	10
	Critical cavitation/ $3 < w < 5$ m/s	2	20

Mounting position

Generally, SAMSON recommends installing the valve with the actuator upright and on top of the valve.

In the following versions/applications, the valve **must** be installed with the actuator on top:

- Nominal sizes NPS 4 and larger
- ⇒ Contact SAMSON if the mounting position is not as specified above.

Support and suspension

i Note

The plant engineering company is responsible for selecting and implementing a suitable support or suspension of the installed control valve and the pipeline.

Depending on the valve version and mounting position, the valve, actuator and pipeline must be supported or suspended.

Valves, which are not installed in the pipeline in the upright position with the actuator on top, must be supported or suspended.

Valve accessories

- ⇒ During connection of valve accessories, make sure that they are easily accessible and can be operated safely from the work position.

Vent plug

Vent plugs are screwed into the exhaust air ports of pneumatic and electropneumatic devices. They ensure that any exhaust air that forms can be vented

to the atmosphere (to avoid excess pressure in the device). Furthermore, the vent plugs allow air intake to prevent a vacuum from forming in the device.

- ⇒ Locate the vent plug on the opposite side to the work position of operating personnel.

5.2 Preparation for installation

Before installation, make sure the following conditions are met:

- The valve is clean.
- The valve and all valve accessories (including piping) are not damaged.
- The valve data on the nameplate (type designation, nominal size, material, pressure rating and temperature range) match the plant conditions (nominal size and pressure rating of the pipeline, medium temperature etc.). See Chapter 2 for more details on the nameplate.
- The requested or required additional pipe fittings (see Chapter 3.3) have been installed or prepared as necessary before installing the valve.

NOTICE

Risk of control valve damage due to incorrect insulation.

- ⇒ Only insulate control valves up to the bonnet flange of the valve body (see Fig. 13). This also applies to versions with bellows seal or insulating section at medium temperatures below 32 °F (0 °C) or above 428 °F (220 °C). If the insulating section is insulated, it will not function properly.
- ⇒ Do not insulate valves mounted to comply with NACE MR0175 requirements and which have nuts and bolts that are not suitable for sour gas environments.

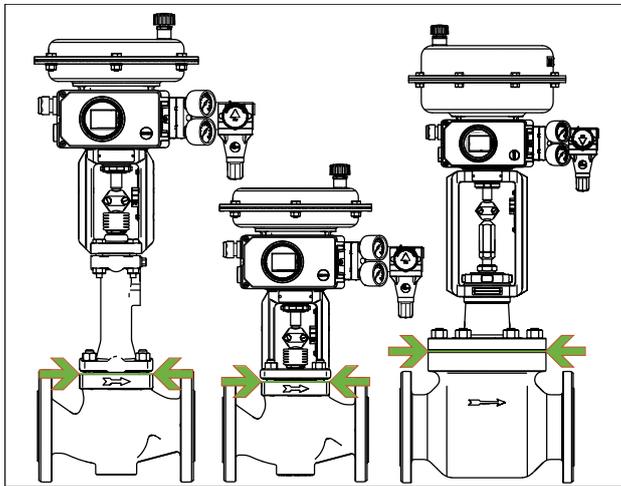


Fig. 13: Limit of insulation for control valves (example shown)

Proceed as follows:

- ⇒ Lay out the necessary material and tools to have them ready during installation work.
- ⇒ Flush the pipelines.

Note

The plant operator is responsible for cleaning the pipelines in the plant.

- ⇒ For steam applications, dry the pipelines. Moisture will damage the inside of the valve.
- ⇒ Check any mounted pressure gauges to make sure they function properly.
- ⇒ When the valve and actuator are already assembled, check the tightening torques of the bolted joints. Components may loosen during transport.

5.3 Mounting the device

The activities listed below are necessary to install the valve and before it can be started up.

NOTICE

Risk of leakage and valve damage due to over- or under-torquing.

Observe the specified torques when tightening control valve components. Over-torquing leads to parts wearing out more quickly. Under-torquing may cause leakage.

- ⇒ Observe tightening torques.

NOTICE

Risk of valve damage due to the use of unsuitable tools.

Certain tools are required to work on the valve.

- ⇒ Only use tools approved by SAMSON.

5.3.1 Mounting the external anti-rotation fixture

Before mounting the actuator, the external anti-rotation fixture must be mounted onto the plug stem in some cases. The valve must be closed beforehand. For SAMSON Type 3271 and Type 3277 Actuators with Type 3273 Hand-operated Actuator, observe the mounting and operating instructions of the hand-operated actuator (handwheel) to mount the anti-rotation fixture (► EB 8312-X).

Special version for Series SMS Valves in nominal sizes DN 50 to 100/NPS 2 to 4

See Fig. 14 and Fig. 15

1. Version with packing flange:

- a) Gradually unthread the two packing nuts (163) at the hex head in a crisscross pattern.
- b) Lift the two packing nuts (including disk springs when packing flange is loaded by external spring elements) as well as the packing flange (162) upward over the studs (164) off the valve bonnet (2/21).

Version with centrally fastened packing:

Continue as described in step 2.

2. Fasten the travel indicator scale (84) with hanger (83) and warning label (255), if applicable, to

the yoke using the screws (82). While fastening it, position the travel indicator scale (84) on the hanger (83) according to Table 8.

3. Screw tight the holder (302) using the screws (306) and washers (308). Observe the tightening torques specified in Table 7.
4. Place the yoke (3) on the bonnet in such a way that the two holes on the top of the bonnet are aligned with the open sides of the yoke (see Fig. 16).
5. Fasten the yoke (3) using the castellated nut (92).
6. **Version with packing flange:**
 - a) Place the packing flange (162) over the studs (164) of the valve bonnet (2/21) on the packing follower (8).
 - b) Thread the two packing nuts (163) (including disk springs when packing flange is loaded by external spring elements) onto the studs (164) and finger-tighten them. In the version with spring-loaded packing, the packing nuts (163) must be guided through the holes in the packing flange.

Version with centrally fastened packing:

Continue as described in step 7.

7. Use a soft-faced hammer or lever press to press the sliding washers (309) (without using any lubricant) into the holes of the clamps (301) as far as they will go. Remove any excess material.
8. Apply a thin film of lubricant (114) to the threads of the stem (9) and screws (303).

NOTICE

Impaired functioning due to incorrectly applied lubricant.

⇒ Do not apply any lubricant to the threads of the clamps (301) or the plug stem.

9. Position the clamps (301) and stem (9) on the plug stem according to Table 8 and tighten screws (303) and washers (304) by hand.
10. Mount the actuator onto the valve (see Chapter 5.3.2).
11. Thread the stem (9) upwards until the head of the stem rests on the extended actuator stem.
12. Retract the actuator stem to relieve the stem (9).
13. Gradually tighten the screws (303) in a criss-cross pattern. Observe the tightening torques specified in Table 7.

Table 7: Tightening torques

Item	Screw size	Tightening torque [Nm]
306	M10	30
303	M8	15

14. Check and ensure the following:
 - There is a nominal clearance of 0.5 to 1 mm between the sliding washers and their contact surface on the yoke on each side (see detailed view Y in Fig. 15).
 - The anti-rotation fixture does not get stuck on the yoke and can move freely in the direction of travel.
15. Extend the actuator stem again and mount the stem connector clamps.

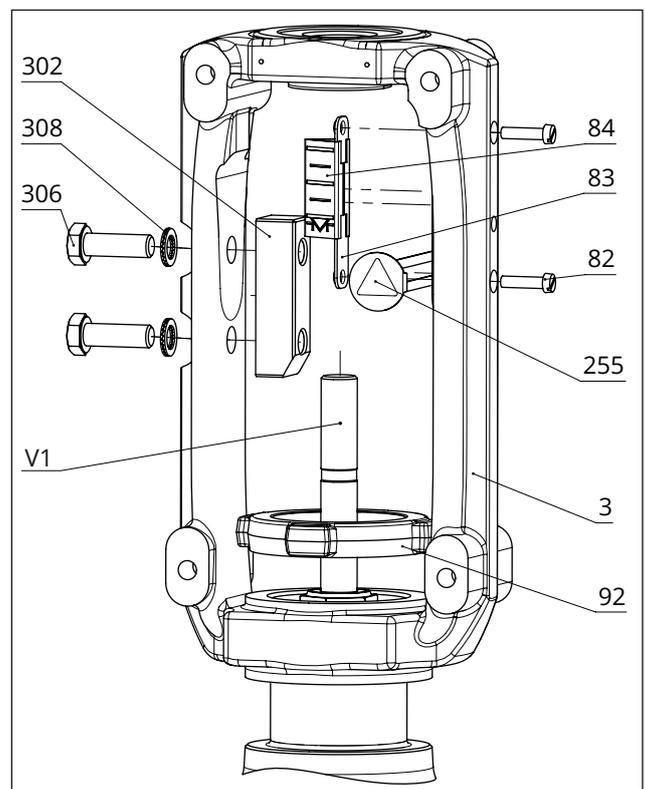


Fig. 14: Overview of yoke assembly with travel indicator scale in the special version

3	Yoke	255	Warning label
82	Screws	302	Holder
83	Hanger	306	Screws
84	Travel indicator scale	308	Washers
92	Castellated nut	V1	Plug stem

Installation

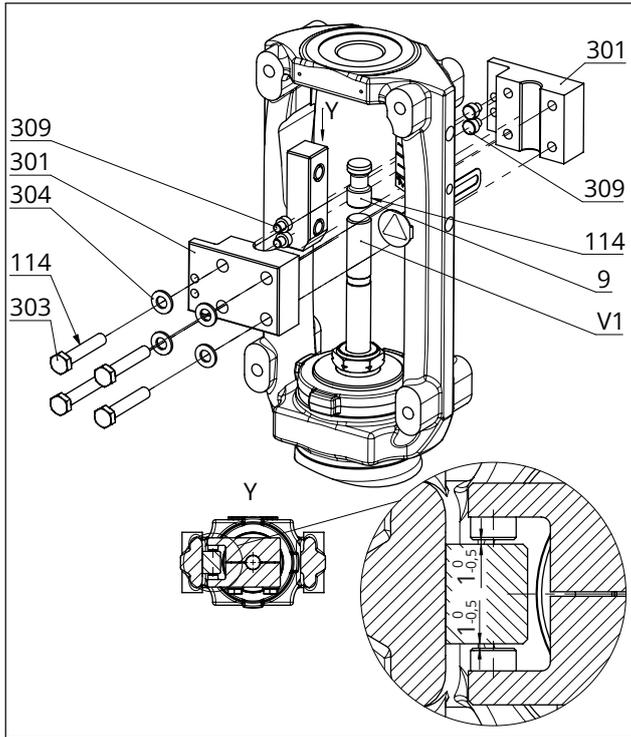


Fig. 15: Overview of anti-rotation fixture assembly in the special version

9	Stem	304	Washers
114	Lubricant Gleitmo 1763 V	309	Sliding washers
301	Clamps	V1	Plug stem
303	Screws		

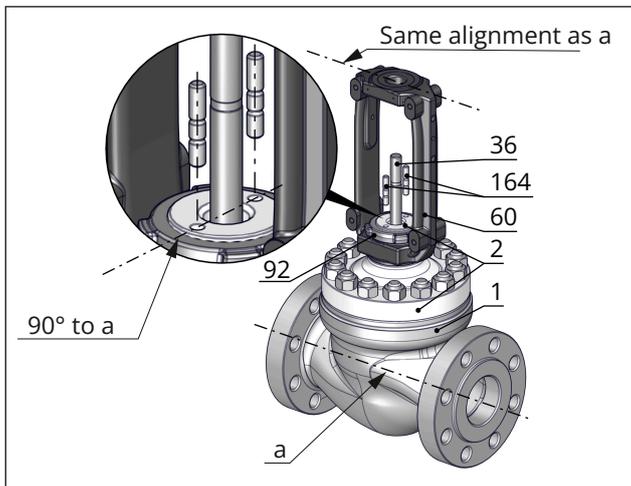


Fig. 16: Alignment of bonnet on the valve body and alignment of yoke on the bonnet

a	Pipeline axis	60	Yoke
1	Valve body	92	Castellated nut
2	Bonnet	164	Studs (when a packing flange is used)
36	Plug/piston stem		

Table 8: Mounting dimensions for Types 3271 and 3277 Pneumatic Actuators · See Fig. 17 for dimensional drawing

Nominal size		Actuator [cm ²]	Travel [mm]	Actuator preloading		Dimension when the valve is closed [mm]							
DN	NPS			[%]	[mm]	H _F	H _G	H _I	H _K	H _L	H _N	H _O	H _T
DN 50 to 100/NPS 2 to 4 · Special version													
50	2	350v2	15	0	0	157	75	238	54	80.5	112	42	30
			15	25	3.75	161	71						
		355v2 750v2	15	50	15	157	75						
			15	75	22.5	164.5	67.5						
1000 1400-60	15	100	60	182	105								
	50 to 80	2 to 3	19	63	19	160.5	71.5						
50 to 100	2 to 4	355v2 750v2	30	0	0	142	90						
			30	25	7.5	149.5	82.5						
			38	0	0	142	90						
		1000 1400-60	30	75	45	167	120						
			38	62.5	37.5	159.5	127.5						
		1400-120	30	75	90	277	195						
			38	69	82.5	269.5	202.5						
		2800	30	100	120	277	195						
			38	94	112.5	269.5	202.5						

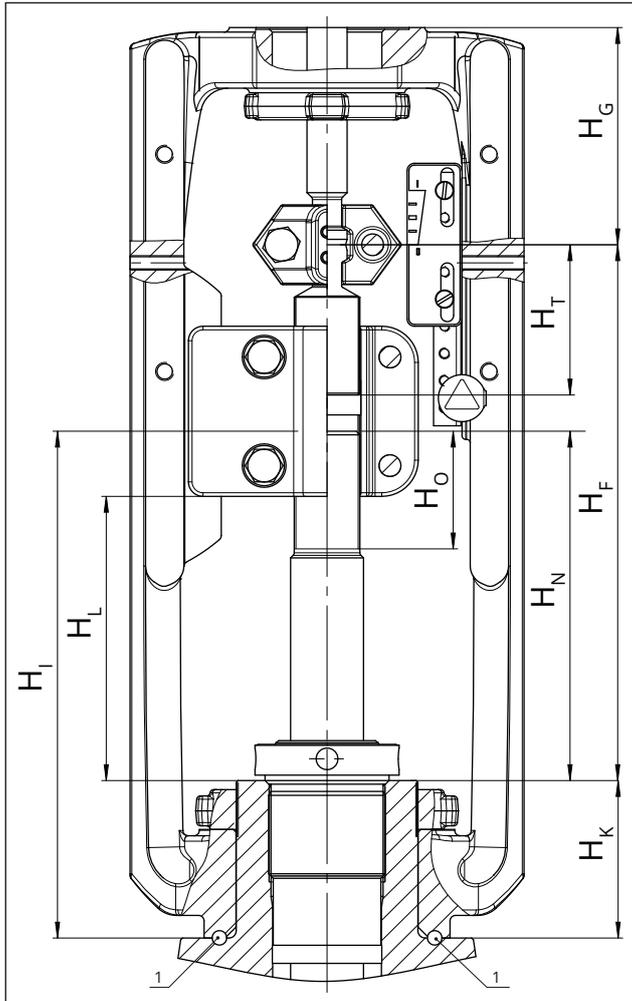


Fig. 17: Dimensional drawing with mounting dimensions for Types 3271 and 3277 Pneumatic Actuators

1 Ball bearings (standard version only)

5.3.2 Mounting the actuator onto the valve

⚠ WARNING

Risk of personal injury due to preloaded springs in pneumatic actuators.

Valves in combination with pneumatic actuators with preloaded springs are under tension. These control valves with SAMSON Type 3271 or Type 3277 Pneumatic Actuators can be identified by the long bolts protruding from the bottom of the actuator.

- ⇒ Before starting any work on the actuator, which requires the actuator to be opened, or when the actuator stem has become blocked, relieve the compression from the preloaded springs (see associated actuator documentation).

⚠ WARNING

Risk of personal injury due to incorrect removal of the anti-rotation fixture under tension.

Once the actuator has been mounted on the valve and the assembly is ready for use, the clamps (301) of the anti-rotation fixture on the plug stem are under tension.

- ⇒ Follow the instructions in this document during mounting or removal.
- ⇒ Do not loosen the screws (303) of the anti-rotation fixture while the force generated by the supply air and/or the actuator springs is transmitted to the actuator stem and the stem (9).
- ⇒ Remove the actuator from the valve or otherwise ensure that it cannot transmit any forces to the actuator stem before removing the anti-rotation fixture from the plug stem.

Depending on the version, SAMSON control valves are either delivered with the actuator already mounted on the valve or the valve and actuator are delivered separately. When delivered separately, the valve and actuator must be assembled together on site.

Versions with CDST and V-port contour at the first plug stage

The first stage of a CDST plug is the stage at which the plug shuts off the flow in the seat (i.e. closed valve). If the first stage is designed as the V-port contour, the plug must be aligned in the valve in such a way that the ports face towards the front and back of the valve body. This leads to the best flow conditions inside the valve (see Fig. 18).

- ⇒ Before mounting the actuator, check whether the first stage of the CDST plug is designed as the V-port contour. This is always the case for a 3-stage CDST plug. However, it varies in a 4-stage or 6-stage CDST plug, depending on the version.
- ⇒ When mounting the actuator, make sure that the ports face towards the front and back of the valve body, i.e. do **not** face the valve inlet and outlet.

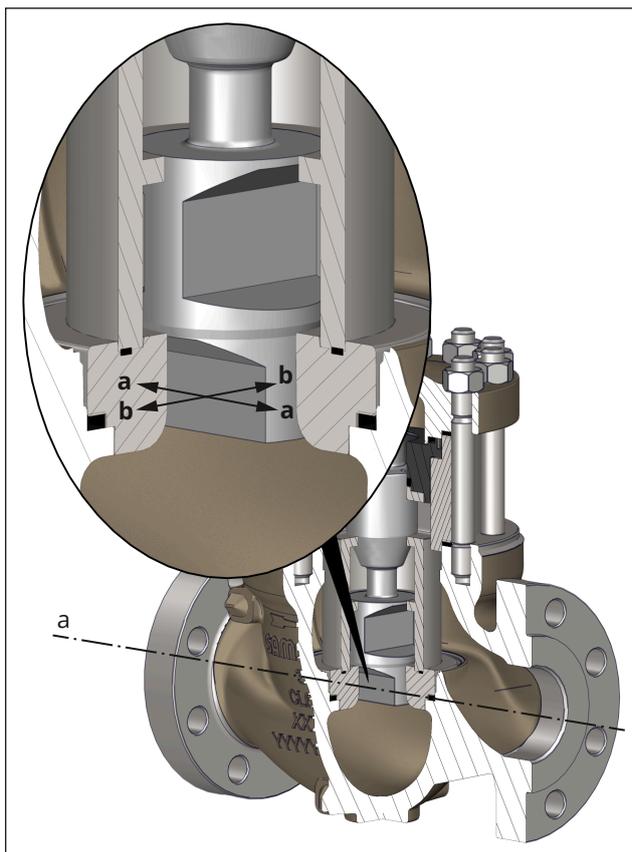


Fig. 18: Plug alignment in the valve when the V-port contour is the first plug stage

- a Pipeline axis
- b 90° to the pipeline axis: Facing towards the front or back of the valve body

i Note

In contrast to unsymmetrical plugs (e.g. V-port plug or perforated plug), the parabolic plug does not need to be aligned in any special way.

Mounting the actuator

⇒ To mount the actuator, proceed as described in the associated actuator documentation.

Aligning the travel indicator scale

After mounting the actuator, the travel indicator scale must be aligned. To do so, align '0' on the travel indicator scale with the tip of the stem connector clamp (see Fig. 17).

1. Move the valve to the closed position.
2. Loosen the screws on the travel indicator scale.
3. Align the travel indicator scale.
4. Fix the travel indicator scale into place by tightening the screws.

5.4 Installing the valve into the pipeline

NOTICE

Risk of valve damage due to work being carried out by personnel not qualified for such tasks.

The plant operator or specialist company performing the welding is responsible for the selection of the welding procedure and the actual welding operations on the valve. This also applies to any required heat treatment to be performed on the valve.

- ⇒ Only allow qualified welding personnel to carry out welding operations.
- ⇒ Before welding painted valves into the pipeline and/or subject them to heat in any way, observe the temperature resistance of the paint coating system. The number of the coating system used can be found in the order documentation. The temperature resistance of all of our coating systems is specified in the Brochure ► WA 268.

NOTICE

Premature wear and leakage due to insufficient support or suspension.

- ⇒ Support or suspend the valve sufficiently at suitable points.

Version with flanges

1. Close the shut-off valves in the pipeline at the inlet and outlet of the plant section while the valve is being installed.
2. Prepare the relevant section of the pipeline for installing the valve.
3. Remove the protective caps from the valve ports before installing the valve.
4. Lift the valve using suitable lifting equipment to the site of installation (see Chapter 4.3.2). Observe the flow direction through the valve. The arrow on the valve indicates the direction of flow.
5. Make sure that the correct flange gaskets are used.
6. Bolt the pipe to the valve free of stress.
7. Attach a support or suspension on the valve, if necessary.

Installation

Version with welding ends

1. Close the shut-off valves in the pipeline at the inlet and outlet of the plant section while the valve is being installed.
2. Prepare the relevant section of the pipeline for installing the valve.
3. Remove the protective caps from the valve ports before installing the valve.
4. Lift the valve using suitable lifting equipment to the site of installation (see Chapter 4.3.2). Observe the flow direction through the valve. The arrow on the valve indicates the direction of flow.
5. Completely retract the actuator stem to protect the plug from sparks during welding.
6. Weld the valve free of stress into the pipeline.
7. Attach a support or suspension on the valve, if necessary.

5.5 Testing the installed valve

⚠ DANGER

Risk of bursting due to incorrect opening of pressurized equipment or components.

Control valves and pipelines are pressure equipment that may burst when handled incorrectly. Flying projectile fragments or the release of process medium under pressure can cause serious injury or even death. Before starting any work on pressure-bearing or pressure-retaining parts belonging to the valve assembly:

- ⇒ Depressurize all plant sections affected and the valve (including the actuator). Release any stored energy.
- ⇒ Drain the process medium from the plant sections affected as well as from the valve.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions. Additionally, a loud noise may briefly occur through the sudden venting of the pneumatic actuator or pneumatic valve accessories not fitted with noise-reducing elements. Both can damage hearing.

- ⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ Wear hearing protection when working near the valve.

⚠ WARNING

Crush hazard arising from moving parts.

The control valve contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- ⇒ Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- ⇒ Before working on the pneumatic control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- ⇒ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.
- ⇒ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

⚠ WARNING

Risk of personal injury due to exhaust air being vented or compressed air escaping from pneumatically operated components.

When the valve is operated with a pneumatic actuator or pneumatic valve accessories, exhaust air is vented from the actuator, for example, while the valve is operating and when the valve opens or closes.

- ⇒ Wear eye protection when working in close proximity to pneumatic fittings and in the danger zone of the vent openings.

⚠ WARNING

Risk of personal injury due to preloaded springs in pneumatic actuators.

Valves in combination with pneumatic actuators with preloaded springs are under tension. These control valves with SAMSON Type 3271 or Type 3277 Pneumatic Actuators can be identified by the long bolts protruding from the bottom of the actuator.

⇒ Before starting any work on the actuator, which requires the actuator to be opened, or when the actuator stem has become blocked, relieve the compression from the preloaded springs (see associated actuator documentation).

To test the valve functioning before start-up or putting back the valve into operation, perform the following tests:

5.5.1 Leak test

The plant operator is responsible for performing the leak test and selecting the test method. The leak test must comply with the requirements of the national and international standards that apply at the site of installation.

Tip

Our after-sales service can support you to plan and perform a leak test for your plant.

1. Close the valve.
2. **Packing centrally fastened with threaded bushing:** Tighten threaded bushing (8) gradually applying the specified tightening torque.
Version with packing flange: Gradually tighten the two packing nuts (163) on the packing flange (162) at the hex head in a crisscross pattern until the specified tightening torque is reached.
3. Slowly apply the test medium to the inlet space upstream of the valve. A sudden surge in pressure and resulting high flow velocities can damage the valve.
4. Open the valve.
5. Apply the required test pressure.
6. Check the valve for leakage to the atmosphere.
7. Depressurize the pipeline section and valve.
8. Rework any parts that leak (see section 'Adjusting the packing') and repeat the leak test.

Adjusting the packing

The sealing elements of the adjustable packing are compressed between the valve body and plug stem by applying a specified tightening torque. If the packing leaks, the threaded bushing or packing flange can be repeatedly tightened further by the specified tightening torque during the valve's service life until the sealing elements must be replaced.

Live-loaded packings are loaded by internal or external springs. Pre-loaded springs maintain a constant load on the sealing elements, which is automatically adjusted, even as the sealing elements wear down over time until they must be replaced. Once the specified tightening torque has been applied to the live-loaded packing during first start-up, additional tightening of the packing set is only permitted if the packing does not seal properly directly after tightening with the specified torque.

A label on the yoke indicates whether an adjustable packing is installed (see Chapter 2).

NOTICE

Impaired valve functioning due to increased friction as a result of the threaded bushing or packing flange being tightened too far.

⇒ Make sure that the plug stem can still move smoothly after the threaded bushing or the packing nuts on the packing flange have been tightened.

Packing centrally fastened with threaded bushing

See Fig. 19

1. Continue to gradually tighten the threaded bushing (8) ($\frac{1}{8}$ turn at a time).
 2. Open and close the valve several times.
 3. Check the valve for leakage to the atmosphere.
 4. Repeat steps 1 and 2 until the packing completely seals the valve or (depending on the packing type) no further than the point at which the threaded bushing rests on the valve bonnet.
- ⇒ If the adjustable packing does not seal properly, contact our after-sales service.

Installation

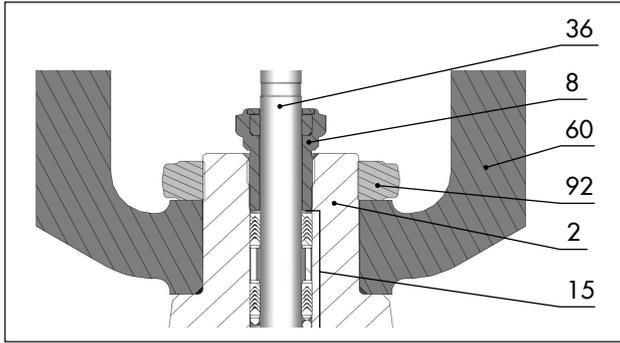


Fig. 19: Packing with threaded bushing (centrally fastened) (example shown)

2	Valve bonnet	36	Plug or piston stem
8	Threaded bushing	60	Yoke
15	Packing set	92	Castellated nut

Packing with packing flange

See Fig. 20 and Fig. 21

1. Gradually tighten the two packing nuts (163) on the packing flange (162) at the hex head in a crisscross pattern ($\frac{1}{8}$ turn at a time).
 2. Open and close the valve several times.
 3. Check the valve for leakage to the atmosphere.
 4. Repeat steps 1 and 2 until the packing completely seals the valve.
- ⇒ If the adjustable packing does not seal properly, contact our after-sales service.

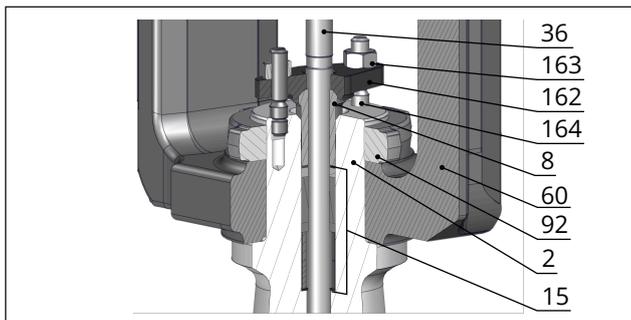


Fig. 20: Version with packing flange (without external spring elements)

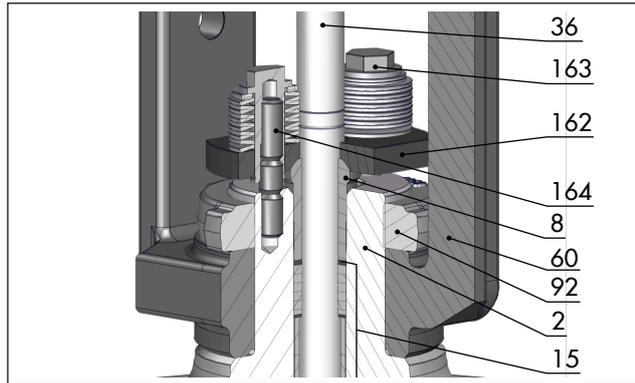


Fig. 21: Version with packing flange loaded by external spring elements

Legend for Fig. 21 and Fig. 20

2	Valve bonnet	92	Castellated nut
8	Packing follower	162	Packing flange
15	Packing set	163	Packing nut (including disk spring with packing flange loaded by external spring elements)
36	Plug/piston stem	164	Stud
60	Yoke		

5.5.2 Travel motion

The movement of the actuator stem must be linear and smooth.

- ⇒ Apply the maximum and minimum control signals to check the end positions of the valve while observing the movement of the actuator stem.
- ⇒ Check the travel reading at the travel indicator scale.

5.5.3 Fail-safe position

The fail-safe position of a valve can only be checked when the valve is combined with an actuator that moves to the fail-safe position upon air supply or control signal failure.

Fail-safe position with pneumatic actuators with integrated springs

- ⇒ Shut off the signal pressure line.
- ⇒ Check whether the valve moves to the fail-safe position (see Chapter 3.1).

5.5.4 Pressure test

The plant operator is responsible for performing the pressure test.

 **Tip**

Our after-sales service can support you to plan and perform a pressure test for your plant.

During the pressure test, make sure the following conditions are met:

- Retract the plug stem to open the valve.
- Observe the maximum permissible pressure for both the valve and plant.

6 Start-up

The work described in this chapter is to be performed only by personnel appropriately qualified to carry out such tasks.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipelines.

Depending on the process medium, valve components and pipelines may get very hot or cold during operation and cause burn injuries.

⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

⇒ Allow components and pipelines to cool down or warm up to the ambient temperature.

⇒ Wear protective clothing and safety gloves.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions. Additionally, a loud noise may briefly occur through the sudden venting of the pneumatic actuator or pneumatic valve accessories not fitted with noise-reducing elements. Both can damage hearing.

⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

⇒ Wear hearing protection when working near the valve.

⚠ WARNING

Crush hazard arising from moving parts.

The control valve contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

⇒ Do not insert hands or finger into the yoke while the air supply is connected to the actuator.

⇒ Before working on the pneumatic control valve, disconnect and lock the pneumatic air supply as well as the control signal.

⇒ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.

⇒ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

⚠ WARNING

Risk of personal injury due to exhaust air being vented or compressed air escaping from pneumatically operated components.

When the valve is operated with a pneumatic actuator or pneumatic valve accessories, exhaust air is vented from the actuator, for example, while the valve is operating and when the valve opens or closes.

⇒ Wear eye protection when working in close proximity to pneumatic fittings and in the danger zone of the vent openings.

Before start-up or putting the device back into service, make sure the following conditions are met:

- The control valve is properly installed into the pipeline (see Chapter 5).
- The leak and function tests have been completed successfully (see Chapter 5.5).
- The prevailing conditions in the plant section affected meet the valve sizing requirements (see section 'Intended use' in Chapter 1).

Start-up/putting the device back into operation

1. Allow the valve to cool down or warm up to reach ambient temperature before start-up when the ambient temperature and process medium temperature differ greatly or the medium properties require such a measure.
2. Slowly open the shut-off valves in the pipeline. Slowly opening these valves prevents a sudden surge in pressure and high flow velocities which may damage the valve.
3. Check the valve to ensure it functions properly.

7 Operation

Immediately after completing start-up or putting the valve back into operation, the valve is ready for use.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipelines.

Depending on the process medium, valve components and pipelines may get very hot or cold during operation and cause burn injuries.

⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ Allow components and pipelines to cool down or warm up to the ambient temperature.
- ⇒ Wear protective clothing and safety gloves.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions. Additionally, a loud noise may briefly occur through the sudden venting of the pneumatic actuator or pneumatic valve accessories not fitted with noise-reducing elements. Both can damage hearing.

⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ Wear hearing protection when working near the valve.

⚠ WARNING

Crush hazard arising from moving parts.

The control valve contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- ⇒ Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- ⇒ Before working on the pneumatic control valve, disconnect and lock the pneumatic air supply as well as the control signal.

- ⇒ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.
- ⇒ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

⚠ WARNING

Risk of personal injury due to exhaust air being vented or compressed air escaping from pneumatically operated components.

When the valve is operated with a pneumatic actuator or pneumatic valve accessories, exhaust air is vented from the actuator, for example, while the valve is operating and when the valve opens or closes.

- ⇒ Wear eye protection when working in close proximity to pneumatic fittings and in the danger zone of the vent openings.

7.1 Normal operation

The handwheel of valves with actuators fitted with a handwheel must be in the neutral position during normal operation.

7.2 Manual operation

Valves with actuators fitted with a handwheel can be manually closed or opened in the event of failure of the auxiliary energy supply.

8 Malfunctions

Read hazard statements, warnings and caution notes in Chapter 1.

8.1 Troubleshooting

Error	Possible reasons	Recommended action
Actuator and plug stem does not move on demand.	Actuator is blocked.	Put the control valve out of operation (see Chapter 10) and remove the blockage. WARNING! A blocked actuator or plug stem (e.g. due to seizing up after remaining in the same position for a long time) can suddenly start to move uncontrollably. Injury to hands or fingers is possible if they are inserted into the actuator or valve. Before trying to unblock the actuator or plug stem, disconnect and lock the pneumatic air supply as well as the control signal. Before unblocking the actuator, release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.
	Pneumatic actuators: Diaphragm in the actuator defective	See associated actuator documentation.
	Pneumatic actuator: Signal pressure too low	Check the signal pressure. Check the signal pressure line for leakage.
Jolting movement of the actuator and plug stem	Version with adjustable packing ¹⁾ : Packing tightened too far	Tighten the packing correctly (see section 'Adjusting the packing' in Chapter 5.5.1).
Actuator and plug stem do not stroke through the full range.	Pneumatic actuator: Signal pressure too low	Check the signal pressure. Check the signal pressure line for leakage.
	Travel stop active	See associated actuator documentation.
	Incorrect setting of valve accessories	Check the settings of the valve accessories.
Restricted medium flow or no flow at all through a partly open valve	Large dirt particles have clogged up the valve.	Briefly move the valve to the fully open position to flush out the valve.
Increased flow through closed valve (seat leakage)	Dirt or other foreign particles deposited between the seat and plug.	Shut off the section of the pipeline and flush the valve.
	Valve trim is worn out.	Replace valve trim (see Chapter 9) or contact our after-sales service.
The valve leaks to the atmosphere (fugitive emissions).	Defective packing	Replace packing (see Chapter 9) or contact our after-sales service.
	Version with adjustable packing ¹⁾ : Packing not tightened correctly	Adjust the packing (see section 'Adjusting the packing' in Chapter 5.5.1). Contact our after-sales service when it continues to leak.
	Flanged joint loose or body gaskets worn out	Check the flanged joint. Replace gaskets at the flanged joint (see Chapter 9) or contact our after-sales service.

¹⁾ See Chapter 2

i Note

Contact SAMSON's After-sales Service for malfunctions not listed in the table.

8.2 Emergency action

Plant operators are responsible for emergency action to be taken in the plant.

In the event of a valve malfunction:

1. Close the shut-off valves upstream and downstream of the control valve to stop the process medium from flowing through the valve.
2. Perform troubleshooting (see Chapter 8.1).
3. Rectify those malfunctions that can be remedied following the information given in this document. Contact our after-sales service in all other cases.

Putting the device back into operation after a malfunction

See Chapter 6.

9 Servicing and conversion

The work described in this chapter is to be performed only by personnel appropriately qualified to carry out such tasks.

Only perform service or conversion work on valves which meet all the following conditions:

- The valve does not have a balanced plug.
- ⇒ Contact our after-sales service for service or conversion work on all other valve versions.

The following documents are also required for servicing the control valve:

- Mounting and operating instructions for the mounted actuator, for example:
 - ► EB 8310-X for Type 3271 and Type 3277 Pneumatic Actuators

⚠ DANGER

Risk of bursting due to incorrect opening of pressurized equipment or components.

Control valves and pipelines are pressure equipment that may burst when handled incorrectly. Flying projectile fragments or the release of process medium under pressure can cause serious injury or even death. Before starting any work on pressure-bearing or pressure-retaining parts belonging to the valve assembly:

- ⇒ Depressurize all plant sections affected and the valve (including the actuator). Release any stored energy.
- ⇒ Drain the process medium from the plant sections affected as well as from the valve.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipelines.

Depending on the process medium, valve components and pipelines may get very hot or cold during operation and cause burn injuries.

- ⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ Allow components and pipelines to cool down or warm up to the ambient temperature.
- ⇒ Wear protective clothing and safety gloves.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions. Additionally, a loud noise may briefly occur through the sudden venting of the pneumatic actuator or pneumatic valve accessories not fitted with noise-reducing elements. Both can damage hearing.

- ⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ Wear hearing protection when working near the valve.

⚠ WARNING

Crush hazard arising from moving parts.

The control valve contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- ⇒ Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- ⇒ Before working on the pneumatic control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- ⇒ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.
- ⇒ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

⚠ WARNING

Risk of personal injury due to exhaust air being vented or compressed air escaping from pneumatically operated components.

When the valve is operated with a pneumatic actuator or pneumatic valve accessories, exhaust air is vented from the actuator, for example, while the valve is operating and when the valve opens or closes.

- ⇒ Wear eye protection when working in close proximity to pneumatic fittings and in the danger zone of the vent openings.

⚠ WARNING

Risk of personal injury due to preloaded springs in pneumatic actuators.

Valves in combination with pneumatic actuators with preloaded springs are under tension. These control valves with SAMSON Type 3271 or Type 3277 Pneumatic Actuators can be identified by the long bolts protruding from the bottom of the actuator.

⇒ Before starting any work on the actuator, which requires the actuator to be opened, or when the actuator stem has become blocked, relieve the compression from the preloaded springs (see associated actuator documentation).

⚠ WARNING

Risk of personal injury due to residual process medium in the valve.

While working on the valve, residual medium can flow out of the valve and, depending on its properties, cause personal injury, e.g. (chemical) burns.

⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ If possible, drain the process medium from the plant sections affected and from the valve.
- ⇒ Wear protective clothing, safety gloves, respiratory protection and eye protection.

📌 NOTICE

Risk of leakage and valve damage due to over- or under-torquing.

Observe the specified torques when tightening control valve components. Over-torquing leads to parts wearing out more quickly. Under-torquing may cause leakage.

⇒ Observe tightening torques.

📌 NOTICE

Risk of valve damage due to the use of unsuitable tools.

Certain tools are required to work on the valve.

⇒ Only use tools approved by SAMSON.

📌 NOTICE

Risk of valve damage due to the use of unsuitable lubricants.

The lubricants to be used depend on the valve material. Unsuitable lubricants may corrode and damage surfaces.

⇒ Only use lubricants approved by SAMSON.

i Note

The control valve was checked by SAMSON before delivery.

- Certain test results certified by SAMSON lose their validity when the valve is opened. Such testing includes seat leakage and leak tests.
- The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON's After-sales Service.
- Only use original spare parts by SAMSON, which comply with the original specifications.

9.1 Periodic testing

Depending on the operating conditions, check the control valve at certain intervals to prevent possible failure before it can occur. Plant operators are responsible for drawing up an inspection and test plan.

💡 Tip

Our after-sales service can support you in drawing up an inspection and test plan for your plant.

Servicing and conversion

SAMSON recommends the following inspections and tests:

Inspection and testing	Recommended action to be taken in the event of a negative result
Check the markings, labels and nameplates on the control valve for their readability and completeness.	Immediately renew damaged, missing or incorrect nameplates or labels. Clean any inscriptions that are covered with dirt and are illegible.
External leakage ¹⁾ : Inspect the control valve at the possible points of leakage to ensure there is no leakage (see following image).	Check the bolted joint (tightening torque). Replace the gaskets at the flanged joints. To do so, put the control valve out of operation (see Chapter 10). Version with adjustable packing ²⁾ : Adjust the packing (see section 'Adjusting the packing' in Chapter 5.5.1) or replace the packing (see Chapter 9.4).
Seat leakage ¹⁾ (see following image) (without testing to check that the leakage class requirements are met)	Shut off the section of the pipeline and flush the valve to remove any dirt and/or deposited foreign particles between the seat and plug or cage and piston. Renew trim, if necessary (see Chapter 9.4). To do so, put the control valve out of operation (see Chapter 10).
Check the control valve for external damage that could impair the proper functioning of the control valve or even its safe operation.	Repair any damage immediately. If necessary, put the control valve out of operation to do so (see Chapter 10).
Check the valve accessories to ensure they are firmly mounted.	Tighten the connections of the valve accessories.
Check to ensure that the actuator stem and plug/piston stems move smoothly.	Version with adjustable packing ²⁾ : Tighten the packing correctly (see section 'Adjusting the packing' in Chapter 5.5.1). If the actuator stem or plug/piston stem is blocked, put the control valve out of operation (see Chapter 10) and remove the blockage. WARNING! A blocked actuator or plug or piston stem (e.g. due to seizing up after remaining in the same position for a long time) can suddenly start to move uncontrollably. Injury to hands or fingers is possible if they are inserted into the actuator or valve. Before trying to unblock the actuator stem or plug/piston stem, disconnect and lock the air supply as well as the control signal. Before unblocking the actuator, release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation. SAMSON recommends the use of positioners with integrated diagnostic firmware for control valves used for on/off service. The partial stroke test included in this software helps prevent a shut-off valve normally in its end position from seizing up or getting jammed.
If possible, check the valve's fail-safe position by briefly interrupting the air supply.	Put the control valve out of operation (see Chapter 10). Identify the cause for the malfunction and rectify it (see Chapter 8).

¹⁾ EXPERTplus valve diagnostics can help identify external leakage at dynamic sealing systems as well as seat leakage in valve versions without balanced plugs while the valve is in use. EXPERTplus comes as standard in the digital positioners (Type 3730, TROVIS 3730, Type 3731, TROVIS 3793, TROVIS 3797).

²⁾ See Chapter 2

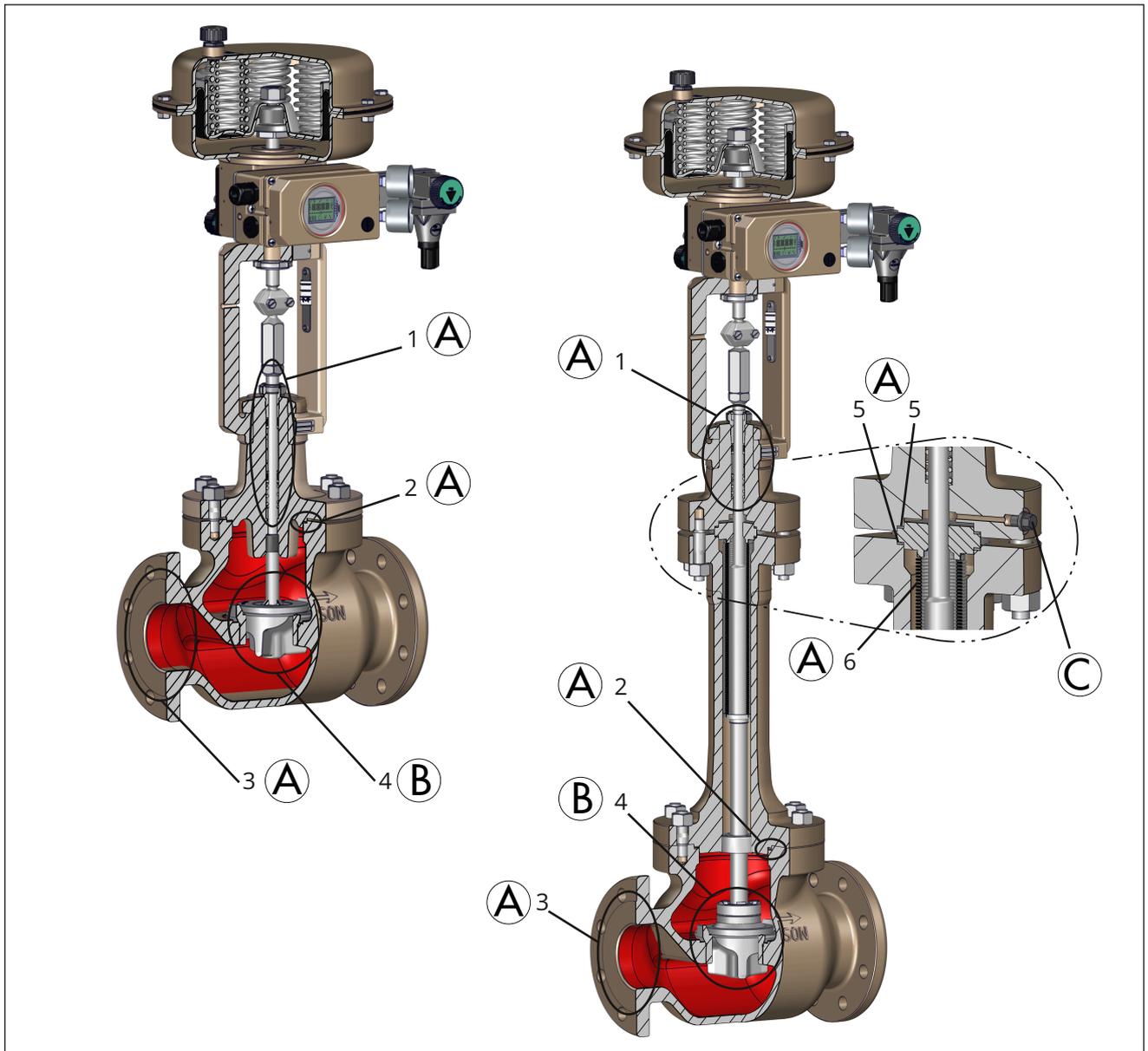


Fig. 22: Possible points of leakage on the control valve: Version with standard bonnet (left) and version with bellows seal (right), which also applies to versions with insulating section or intermediate piece.

- | | |
|--|---|
| Ⓐ External leakage | 3 Seat/body and plug/seat |
| Ⓑ Seat leakage | 4 Connection to the pipeline
(static sealing) |
| Ⓒ Test connection to monitor bellows for leakage | 5 Body gaskets at bellows seal/insulating section/intermediate
piece
(static sealing) |
| 1 Plug stem guide (packing)
(dynamic sealing) | 6 Metal bellows
(dynamic sealing) |
| 2 Body gaskets
(static sealing) | |

9.2 Preparation for servicing or conversion work

⚠ WARNING

Risk of personal injury due to incorrect removal of the anti-rotation fixture under tension.

Once the actuator has been mounted on the valve and the assembly is ready for use, the clamps (301) of the anti-rotation fixture on the plug stem are under tension.

- ⇒ Follow the instructions in this document during mounting or removal.
- ⇒ Do not loosen the screws (303) of the anti-rotation fixture while the force generated by the supply air and/or the actuator springs is transmitted to the actuator stem and the stem (9).
- ⇒ Remove the actuator from the valve or otherwise ensure that it cannot transmit any forces to the actuator stem before removing the anti-rotation fixture from the plug stem.

1. Lay out the necessary material and tools to have them ready for the service work.
2. Put the control valve out of operation (see Chapter 10).
3. Remove the actuator from the valve (see associated actuator documentation).

i Note

To remove an actuator with "stem extends" fail-safe action and/or with preloaded springs, a certain signal pressure must be applied to the actuator (see associated actuator documentation). Once the work is completed, the signal pressure must be removed and the air supply disconnected again and locked.

4. **Valve version without anti-rotation fixture:** Unscrew the stem connector nut (9) and lock nut (10) from the plug/piston stem.

Valve version with anti-rotation fixture: Unscrew the stem connector clamps (301) and stem (9) from the plug/piston stem. Keep them together with the screws (303) and washers (304) in a safe place for later use.

💡 Tip

SAMSON recommends removing the valve from the pipeline before performing any service work (see Chapter 11).

Once preparation is completed, the service and/or conversion work can be performed as described in the subchapters of Chapter 9.4.

9.3 Mounting the actuator on the valve after service and conversion work

1. **Valve version without anti-rotation fixture:** Loosely thread the lock nut (10) and stem connector nut (9) on the plug/piston stem (36).

Valve version with anti-rotation fixture: Apply a thin film of lubricant (114) to the threads of the stem (9) and screws (303).

⚠ NOTICE

Impaired functioning due to incorrectly applied lubricant.

- ⇒ Do not apply any lubricant to the threads of the clamps (301) or the plug stem.

Position the clamps (301) and stem (9) on the plug or piston stem according to Table 8 in Chapter 5.3.1 and tighten screws (303) and washers (304) by hand.

2. Mount the actuator on the valve (see associated actuator documentation and Chapter 5).
3. Adjust lower or upper signal bench range (see associated actuator documentation).
4. If the valve has been removed, re-install the valve into the pipeline (see Chapter 5).
5. Put the control valve back into operation (see Chapter 6). Observe the requirements and conditions for start-up or putting the device back into operation.

9.4 Service or conversion work

- ⇒ Before performing any service or conversion work, preparations must be made to the control valve (see Chapter 9.2).

- ⇒ After all service or conversion work is completed, check the control valve before putting it back into operation (see Chapter 5.5).

NOTICE

Risk of control valve damage due to incorrect servicing or conversion.

- ⇒ Only perform service or conversion work on valves which meet all the following conditions:
 - The valve does not have a balanced plug.
- ⇒ Contact our after-sales service for service or conversion work on all other versions.

9.4.1 Mounting and removing the standard bonnet

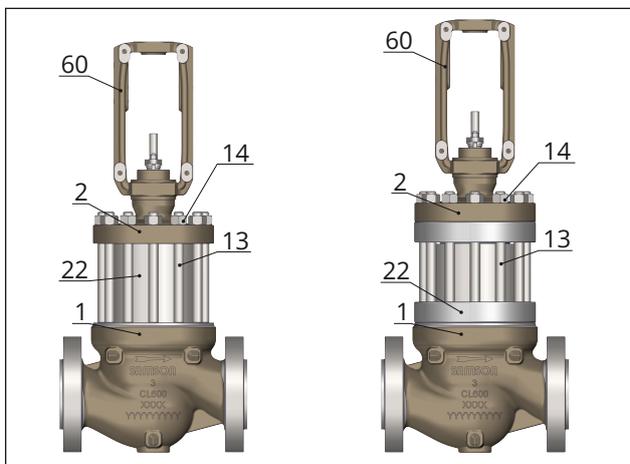


Fig. 23: Mounting versions of the intermediate piece

- | | |
|-------------------|-----------------------|
| 1 Valve body | 14 Hex nut |
| 2 Standard bonnet | 22 Intermediate piece |
| 13 Stud | 60 Yoke |

There are two different ways to fasten the standard bonnet on the valve body, depending on the valve version. An intermediate piece designed with or without flanges is mounted between the bonnet and body. The intermediate piece with flanges (right image) must be guided over the studs while the intermediate piece without flanges (left image) is simply placed between the studs onto the valve body. The bonnet is placed over the studs onto the intermediate piece and fastened using nuts to the valve body. The intermediate piece is clamped into place through the bolted joint of the body and bonnet. The following table provides an overview.

Table 9: Mounting versions of the bonnet and intermediate piece

NPS	Class	CDST stages	V1	V2
1 to 2	300 to 900	3	•	
		4	•	
		6	•	
3	300 to 600	3	•	•
		4		•
		6	•	•
	900	3	•	•
		4	•	•
		6	•	•

V1 Version 1 • Intermediate piece without flanges (left)
 V2 Version 2 • Intermediate piece with flanges (right)

a) Removing the standard bonnet

1. **Packing centrally fastened with threaded bushing:** Unscrew the threaded bushing (8) and pull it off the plug stem (36).
Packing with packing flange:
 - a) Gradually unthread the two packing nuts (163) at the hex head in a crisscross pattern.
 - b) Lift the two packing nuts (including disk springs when packing flange is loaded by external spring elements) as well as the packing flange (162) upward over the studs (164) off the valve bonnet (2).
 - c) Pull out the packing follower (8).
2. Undo the body nuts (14) gradually in a crisscross pattern.
3. Pull the valve bonnet (2) including yoke (60) upward off the plug stem (36) and lift it off the intermediate piece (22). If necessary, slightly press the plug stem (36) downward. This helps overcome the static friction between the packing (15) and plug stem (36) to ensure that the trim remains in the body (1).

b) Mounting the standard bonnet

1. Place the valve bonnet (2) including yoke (60) from the top vertically over the plug stem (36) (depending on the version, see Fig. 23) on the intermediate piece (22) without fastening it. Observe the alignment (see Fig. 26). The two boreholes on the top of the bonnet must be at a right angle to the pipeline axis.
2. Firmly press the plug (5) into the seat (4). At the same time, fasten the valve bonnet (2) using the body nuts (14). Tighten the body nuts (14) gradually in a crisscross pattern. Observe tightening torques.
3. Install the packing (see Chapter 9.4.3).

9.4.2 Replacing the trim

NOTICE

Risk of damage to the facing of the seat and plug due to incorrect servicing.

⇒ Always replace both the seat and plug.

Tip

SAMSON recommends using new packing parts and gaskets when replacing the trim.

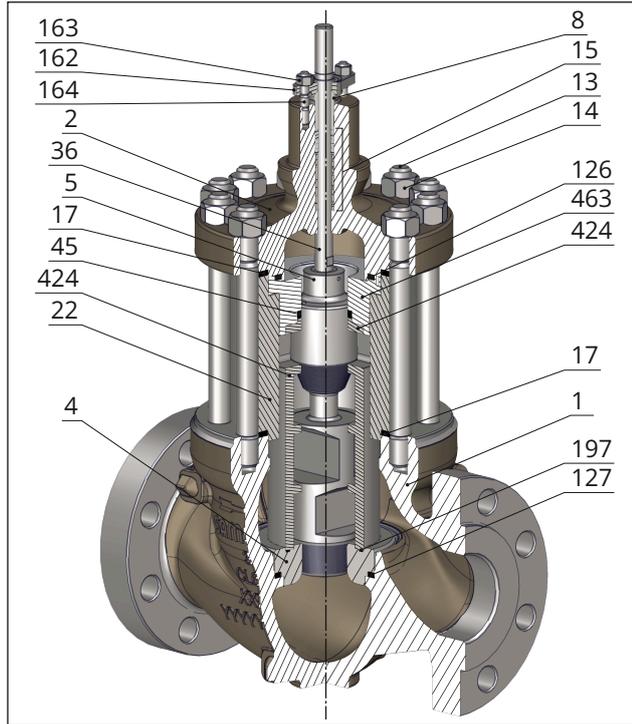


Fig. 24: Type 261GR Globe Valve with 4-stage CDST plug

1	Valve body	36	Plug stem
2	Standard bonnet	45	Pressure-balancing seal (version with pressure balancing only)
4	Seat	126	Spiral wound gasket
5	Plug (CDST)	127	Spiral wound gasket
8	Threaded bushing/packing follower	162	Packing flange
13	Stud	163	Packing nuts for packing flange (including disk springs when packing flange is loaded by external spring elements)
14	Hex nut	17	Spiral wound gasket
15	Packing set	197	Flat gasket
17	Spiral wound gasket	424	Liner
22	Intermediate piece	463	Cylinder

a) Removing the seat and plug

1. Remove the valve bonnet (2), see section "a) Removing the standard bonnet" in Chapter 9.4.1.
2. Pull all the packing parts out of the packing chamber in the valve bonnet (2) using a suitable tool.
3. Remove the spiral wound gaskets (17, 126) from the intermediate piece (22) and cylinder (463) or valve bonnet (2).
4. Use the special tool to remove the cylinder (463) upward out of the intermediate piece (22). During the removal procedure, press the plug stem (36) downward. This helps overcome the static

- friction between the seal (45) and plug (5) to ensure that the trim remains in the body (1).
5. Pull the plug (5) and plug stem (36) upward out of the liner (424) and remove them from the valve body (1) and intermediate piece (22).
 6. Remove the liner (424) upward out of the valve body (1) and intermediate piece (22).
 7. Depending on the mounting version of the intermediate piece (see Fig. 23), lift the intermediate piece (22) off the valve body (1).
 8. Remove the spiral wound gasket (17) from the valve body (1).
 9. Remove the seat (4) from the valve body (1).
 10. Remove the flat gasket (197) from the seat (4).
 11. Remove the spiral wound gasket (127) from the valve body (1).

d) Installing the seat and plug

1. Clean the inside of the valve body (seating surfaces of the gaskets) and check it to ensure that it is free of damage.
2. Clean the packing chamber in the valve bonnet (2) thoroughly.
3. Insert a new spiral wound gasket (127) into the valve body (1) in the seat bridge area.
4. Insert the new flat gasket (197) into the new seat (4).
5. Place the new seat (4) on the spiral wound gasket (127) in the valve body (1).
6. Place the liner (424) vertically from above into the corresponding groove onto the seat (4). Make sure the liner is correctly aligned. The openings which allow the medium to flow out must be positioned at the top and be symmetrically aligned with the pipeline axis.
7. Place a new spiral wound gasket (17) at the top of the valve body (1).
8. Place the intermediate piece (22) from the top over the liner (424) loosely onto the valve body (1).
9. Insert the new plug (5) and plug stem (36) upright into the liner (424) until the plug (5) rests in the center of the seat (4).

Versions with V-port contour at the first plug stage: Align the plug (5) in such a way that ports face towards the front and back of the valve body (1), i.e. do **not** face the valve inlet and outlet.

See Chapter 5.3.2.

10. Insert a new pressure-balancing seal (45) on the cylinder (463). Make sure the seal is properly aligned (see Fig. 25).
11. Place the cylinder (463) with pressure-balancing seal (45) over the plug stem (36) into the intermediate piece (22) until it rests on the plug (5) and on the intermediate piece (22). Use the special tool for this step.
12. Place new spiral wound gaskets (17, 126) on the top of the intermediate piece (22) and on the cylinder (463).
13. Mount the valve bonnet (2), see section “b) Mounting the standard bonnet” in Chapter 9.4.1.

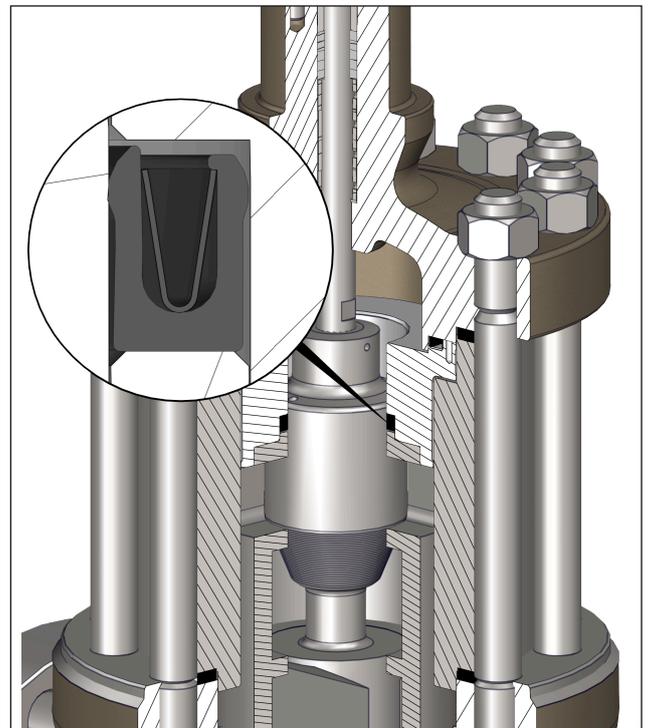


Fig. 25: Alignment of pressure-balancing seal (45) for FTO direction of flow

9.4.3 Replacing the packing

a) Packing centrally fastened with threaded bushing

Different types of packing can be installed in the valve, which are centrally fastened with the threaded bushing. Refer to the documentation of the spare packing for the sequence and alignment of the packing parts as well as information on lubricants.

Servicing and conversion

1. Remove the valve bonnet (2), see section "a) Removing the standard bonnet" in Chapter 9.4.1.
2. Pull the entire packing out of the packing chamber using a suitable tool.
3. Clean the packing chamber thoroughly.
4. Use new packing parts (15) if they are worn or damaged.
5. Refer to the documentation of the spare packing for information on lubricants.

Depending on packing version and application:

Apply a suitable lubricant to all packing parts and the plug stem (36).

Or if applicable: Do not use any lubricant.

6. Insert the plug (5) together with the plug stem (36) and position them in the seat (4) in the closed position.

Versions with V-port contour at the first plug stage: Align the plug (5) in such a way that ports face towards the front and back of the valve body (1), i.e. do **not** face the valve inlet and outlet.

See Chapter 5.3.2.

7. Place new spiral wound gaskets (17, 126) on the top of the intermediate piece (22) and on the cylinder (463). Beforehand clean the seating surfaces of the gaskets and check them to ensure that they are free of damage.
8. Mount the valve bonnet (2), see section "b) Mounting the standard bonnet" in Chapter 9.4.1.
9. Carefully slide the packing parts over the plug stem (36) into the packing chamber using a suitable tool. Refer to the documentation of the spare packing for the correct sequence and alignment of the parts.
10. Screw in and hand-tighten threaded bushing (8).
11. Tighten threaded bushing (8) gradually applying the specified tightening torque.
12. If necessary, adjust the packing (see section 'Adjusting the packing' in Chapter 5.5.1).

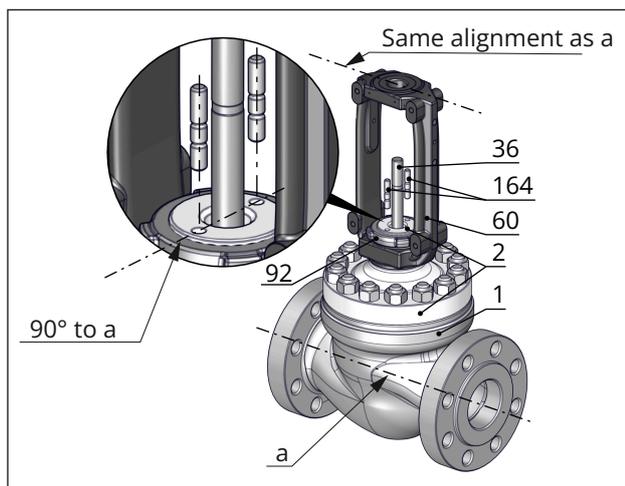


Fig. 26: Alignment of bonnet on the valve body and alignment of yoke on the bonnet

a	Pipeline axis	60	Yoke
1	Valve body	92	Castellated nut
2	Bonnet	164	Studs (when a packing flange is used)
36	Plug/piston stem		

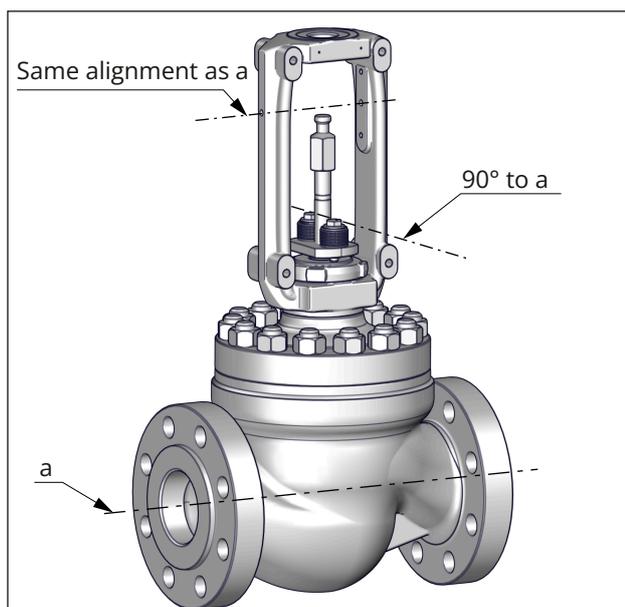


Fig. 27: Alignment of the packing flange in the yoke

a	Pipeline axis
---	---------------

b) Version with packing flange (with or without external spring elements)

Different types of packing can be installed in the valve using the packing flange. Refer to the documentation of the spare packing for the sequence and alignment of the packing parts as well as information on lubricants.

1. Remove the valve bonnet (2), see section "a) Removing the standard bonnet" in Chapter 9.4.1.
2. Pull the entire packing out of the packing chamber using a suitable tool.
3. Clean the packing chamber thoroughly.
4. Use new packing parts (15) if they are worn or damaged.
5. Refer to the documentation of the spare packing for information on lubricants.

Depending on packing version and application: Apply a suitable lubricant to all packing parts and the plug stem (36).

Or if applicable: Do not use any lubricant.

6. Insert the plug (5) together with the plug stem (36) and position them in the seat (4) in the closed position.

Versions with V-port contour at the first plug stage: Align the plug (5) in such a way that ports face towards the front and back of the valve body (1), i.e. do **not** face the valve inlet and outlet.

See Chapter 5.3.2.

7. Place new spiral wound gaskets (17, 126) on the top of the intermediate piece (22) and on the cylinder (463). Beforehand clean the seating surfaces of the gaskets and check them to ensure that they are free of damage.
8. Mount the valve bonnet (2), see section "b) Mounting the standard bonnet" in Chapter 9.4.1.
9. Carefully slide the packing parts over the plug stem (36) into the packing chamber using a suitable tool. Refer to the documentation of the spare packing for the correct sequence and alignment of the parts.
10. Insert packing follower (8).
11. Place the packing flange (162) over the studs (164) of the valve bonnet (2) on the packing follower (8).
12. Thread the two packing nuts (163) (including disk springs when packing flange is loaded by external spring elements) onto the studs (164) and finger-tighten them. In the version with spring-loaded packing, the packing nuts (163) must be guided through the holes in the packing flange.

13. Gradually tighten the two packing nuts (163) on the packing flange (162) at the hex head in a crisscross pattern until the specified tightening torque is reached.
14. If necessary, adjust the packing (see section 'Adjusting the packing' in Chapter 5.5.1).

9.4.4 Replacing the gaskets

NOTICE

Risk of impaired functioning of the control valve due to damaged parts.

⇒ Clean and check all the contact facings in the body and all other parts that come into contact with the gaskets to ensure they are free from damage before installing any new gaskets.

⇒ Renew any parts with damaged facings or contact our after-sales service.

1. Proceed as described in Chapter 9.4.2, section 'a) Removing the seat and plug'.
2. Proceed as described in Chapter 9.4.2, section 'd) Installing the seat and plug'.

9.4.5 Replacing the plug on the plug stem

The plug and plug stem are fastened together. To prevent the plug from becoming unintentionally detached from the plug stem, the connection is additionally secured by a tangentially inserted pin (see Fig. 28). To replace the plug, proceed as follows:

1. Firmly clamp the plug (5) into a vise.
2. Use a suitable tool (mandrel) to drive the locking pin (103) out of the plug in the "OUT" direction (see Fig. 28).
3. Unscrew the plug stem (36) from the plug (5) using a suitable tool.
4. Dispose of the worn plug.
5. Firmly clamp the new plug (5) into a vise using protective jaws. Make sure that the plug is not damaged by the vise.
6. Screw the plug stem (36) into the plug or piston (5) and tighten using a suitable tool. Observe tightening torque.

Servicing and conversion

7. Insert a new locking pin (103) into the hole in the plug in the "IN" direction. Use a suitable tool (mandrel) to drive the pin in as far as it will go.
8. Use a suitable tool to slightly caulk the pin hole on the "IN" side to prevent the pin from slipping out unintentionally during valve operation.

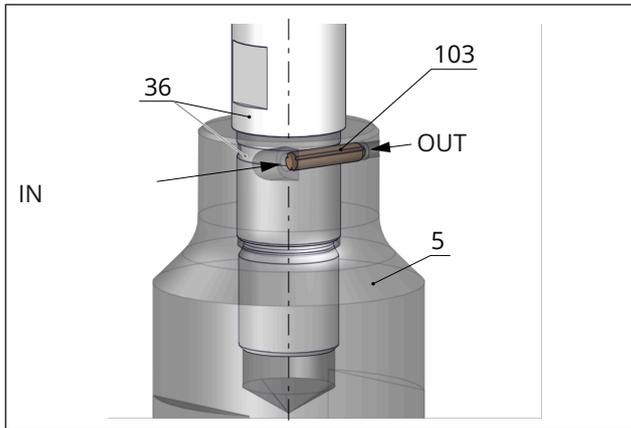


Fig. 28: Locking pin to secure plug and plug stem or piston and piston stem (schematic drawing)

- | | | | |
|----|-----------------------|-----|-------------|
| 5 | Plug/piston | 103 | Locking pin |
| 36 | Plug stem/piston stem | | |

9.5 Ordering spare parts and operating supplies

Contact your nearest SAMSON subsidiary or SAMSON's After-sales Service for information on spare parts, lubricants and tools.

Spare parts

See Chapter 15 for details on spare parts.

Lubricants

See Chapter 15 for details on suitable lubricants.

Tools

See Chapter 15 for details on suitable tools.

10 Decommissioning

The work described in this chapter is to be performed only by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of bursting due to incorrect opening of pressurized equipment or components.

Control valves and pipelines are pressure equipment that may burst when handled incorrectly. Flying projectile fragments or the release of process medium under pressure can cause serious injury or even death. Before starting any work on pressure-bearing or pressure-retaining parts belonging to the valve assembly:

- ⇒ Depressurize all plant sections affected and the valve (including the actuator). Release any stored energy.
- ⇒ Drain the process medium from the plant sections affected as well as from the valve.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipelines.

Depending on the process medium, valve components and pipelines may get very hot or cold during operation and cause burn injuries.

- ⇒ Follow the standard operating procedures provided by the plant operator.
- In the event of a potential risk:
 - ⇒ Allow components and pipelines to cool down or warm up to the ambient temperature.
 - ⇒ Wear protective clothing and safety gloves.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions. Additionally, a loud noise may briefly occur through the sudden venting of the pneumatic actuator or pneumatic valve accessories not fitted with noise-reducing elements. Both can damage hearing.

- ⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ Wear hearing protection when working near the valve.

⚠ WARNING

Crush hazard arising from moving parts.

The control valve contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- ⇒ Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- ⇒ Before working on the pneumatic control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- ⇒ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.
- ⇒ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

⚠ WARNING

Risk of personal injury due to exhaust air being vented or compressed air escaping from pneumatically operated components.

When the valve is operated with a pneumatic actuator or pneumatic valve accessories, exhaust air is vented from the actuator, for example, while the valve is operating and when the valve opens or closes.

- ⇒ Wear eye protection when working in close proximity to pneumatic fittings and in the danger zone of the vent openings.

⚠ WARNING

Risk of personal injury due to residual process medium in the valve.

While working on the valve, residual medium can flow out of the valve and, depending on its properties, cause personal injury, e.g. (chemical) burns.

- ⇒ Follow the standard operating procedures provided by the plant operator.

Decommissioning

In the event of a potential risk:

- ⇒ *If possible, drain the process medium from the plant sections affected and from the valve.*
 - ⇒ *Wear protective clothing, safety gloves, respiratory protection and eye protection.*
-

To put the control valve out of operation for service work or to remove it from the pipeline, proceed as follows:

1. Close the shut-off valves upstream and downstream of the control valve to stop the process medium from flowing through the valve.
2. Completely drain the pipelines and valve.
3. Disconnect and lock the pneumatic air supply to depressurize the actuator.
4. Release any stored energy.
5. If necessary, allow the pipeline and valve components to cool down or warm up to the ambient temperature.

11 Removal

The work described in this chapter is to be performed only by personnel appropriately qualified to carry out such tasks.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipelines.

Depending on the process medium, valve components and pipelines may get very hot or cold during operation and cause burn injuries.

⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ Allow components and pipelines to cool down or warm up to the ambient temperature.
- ⇒ Wear protective clothing and safety gloves.

⚠ WARNING

Crush hazard arising from moving parts.

The control valve contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- ⇒ Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- ⇒ Before working on the pneumatic control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- ⇒ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.
- ⇒ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

⚠ WARNING

Risk of personal injury due to residual process medium in the valve.

While working on the valve, residual medium can flow out of the valve and, depending on its properties, cause personal injury, e.g. (chemical) burns.

- ⇒ Follow the standard operating procedures provided by the plant operator.

In the event of a potential risk:

- ⇒ If possible, drain the process medium from the plant sections affected and from the valve.
- ⇒ Wear protective clothing, safety gloves, respiratory protection and eye protection.

⚠ WARNING

Risk of personal injury due to preloaded springs in pneumatic actuators.

Valves in combination with pneumatic actuators with preloaded springs are under tension. These control valves with SAMSON Type 3271 or Type 3277 Pneumatic Actuators can be identified by the long bolts protruding from the bottom of the actuator.

- ⇒ Before starting any work on the actuator, which requires the actuator to be opened, or when the actuator stem has become blocked, relieve the compression from the preloaded springs (see associated actuator documentation).

⚠ WARNING

Risk of personal injury due to incorrect removal of the anti-rotation fixture under tension.

Once the actuator has been mounted on the valve and the assembly is ready for use, the clamps (301) of the anti-rotation fixture on the plug stem are under tension.

- ⇒ Follow the instructions in this document during mounting or removal.
- ⇒ Do not loosen the screws (303) of the anti-rotation fixture while the force generated by the supply air and/or the actuator springs is transmitted to the actuator stem and the stem (9).
- ⇒ Remove the actuator from the valve or otherwise ensure that it cannot transmit any forces to the actuator stem before removing the anti-rotation fixture from the plug stem.

Before removing, make sure that the following conditions are met:

- The control valve is put out of operation (see Chapter 10).

Removal

11.1 Removing the valve from the pipeline

Version with flanges

1. Support the control valve to hold it in place when separated from the pipeline (see Chapter 4).
2. Unbolt the flanged joint.
3. Remove the valve from the pipeline (see Chapter 4).

Version with welding ends

1. Support the control valve to hold it in place when separated from the pipeline (see Chapter 4).
2. Cut the pipeline in front of the weld seam.
3. Remove the valve from the pipeline (see Chapter 4).

11.2 Removing the actuator from the valve

See associated actuator documentation.

12 Repairs

If the control valve does not function properly according to how it was originally sized or does not function at all, it is defective and must be repaired or exchanged.

NOTICE

Risk of valve damage due to incorrect service or repair work.

- ⇒ Do not perform any repair work on your own.
 - ⇒ Contact SAMSON's After-sales Service for service and repair work.
-

12.1 Returning devices to SAMSON

Defective devices can be returned to SAMSON for repair.

Proceed as follows to return devices:

1. Exceptions apply concerning some special device models ► www.samsongroup.com > SERVICE > After-sales Service > Returning goods.
2. Register the return shipment and include the following information by e-mail returns-de@samsongroup.com:
 - Type
 - Article no.
 - Configuration ID
 - Original order
 - Completed Declaration on Contamination, which can be downloaded from the Internet at: ► www.samsongroup.com > SERVICE > After-sales Service > Returning goods

After checking your registration, we will send you a return merchandise authorization (RMA).

3. Attach the RMA (together with the Declaration on Decontamination) to the outside of your shipment so that the documents are clearly visible.
4. Send the shipment to the address given on the RMA.

Note

Further information on returned devices and how they are handled can be found at:

► www.samsongroup.com > Service > After-sales Service

Disposal

13 Disposal



SAMSON is a producer registered in Europe, agency in charge

► www.samsongroup.com > About SAMSON > Environment, Social & Governance > Material Compliance > Waste electrical and electronic equipment (WEEE)
WEEE reg. no.: DE 62194439

Information on substances listed as substances of very high concern (SVHC) on the candidate list of the REACH regulation can be found in the document "Additional Information on Your Inquiry/Order", which is added to the order documents, if applicable. This document includes the SCIP number assigned to the devices concerned. This number can be entered into the database on the European Chemicals Agency (ECHA) website (► <https://www.echa.europa.eu/scip-database>) to find out more information on the SVHC contained in the device.

i Note

SAMSON can provide you with a recycling passport on request. Simply e-mail us at aftersaleservice@samsongroup.com giving details of your company address.

💡 Tip

On request, SAMSON can appoint a service provider to dismantle and recycle the product as part of a distributor take-back scheme.

- ⇒ Observe local, national and international refuse regulations.
- ⇒ Do not dispose of components, lubricants and hazardous substances together with your other household waste.

14 Certificates

These declarations are included on the next pages:

- Declaration of conformity in compliance with Pressure Equipment Directive 2014/68/EU:
 - Country of origin: Germany
- Declaration of conformity in compliance with Machinery Directive 2006/42/EC for Types 261GR-1 and 261GR-7 Control Valves
- Declaration of incorporation in compliance with Machinery Directive 2006/42/EC for Type 261GR Valve with other actuators other than the Type 3271 or Type 3277 Actuator

The certificates shown were up to date at the time of publishing. The latest certificates can be found on our website: ► www.samsongroup.com > Products > Valves > 261GR

Other optional certificates are available on request.

EU DECLARATION OF CONFORMITY TRANSLATION



Module H / N° CE-0062-PED-H-SAM 001-22-DEU-rev-B

For the following products, SAMSON hereby declares under its sole responsibility:

Devices	Series	Type	Version
Globe valve	240	3241	EN, body of gray cast iron from DN 150, body of spheroidal-graphite iron, from DN 100, fluids G2, L1, L2 ¹⁾
			EN/ANSI, body of steel, etc., all fluids
Three-way valve	240	3244	EN, body of gray cast iron from DN 150, body of spheroidal-graphite iron, from DN 100, fluids G2, L1, L2 ¹⁾
			EN/ANSI, body of steel, etc., all fluids
Cryogenic valve	240	3248	EN/ANSI, all fluids
Globe valve	250	3251	EN/ANSI, all fluids
Globe valve	250	3251-E	EN/ANSI, all fluids
Three-way valve	250	3253	EN/ANSI, body of steel, etc., all fluids
Globe valve	250	3254	EN/ANSI, all fluids
Angle valve	250	3256	EN/ANSI, all fluids
Split-body valve	250	3258	EN, all fluids
Angle valve (IG standards)	250	3259	EN, all fluids
Globe valve	V2001	3321	EN, body of steel, etc., all fluids
			ANSI, all fluids
Three-way valve	V2001	3323	EN, body of steel, etc., all fluids
			ANSI, all fluids
Angle seat valve	---	3353	EN, body of steel, etc., all fluids
Silencer	3381	3381-1	EN/ANSI, single attenuation plate with welding ends, all fluids
		3381-3	EN/ANSI, all fluids
		3381-4	EN/ANSI, single attenuation plate multi-stage with welding ends, all fluids
Globe valve	240	3241	ANSI, body of gray cast iron, Class 125, from NPS 5, fluids G2, L1, L2 ¹⁾
Cryogenic valve	240	3246	EN/ANSI, all fluids
Three-way valve	250	3253	EN, body of gray cast iron from DN200 PN16, fluids G2, L1, L2 ¹⁾
Globe valve	290	3291	ANSI, all fluids
Angle valve	290	3296	ANSI, all fluids
Cryogenic valve	---	3588	ANSI, up to NPS 6, Class 600, all fluids
Globe valve	590	3591	ANSI, all fluids
Angle valve	590	3596	ANSI, all fluids
Cryogenic valve	590	3598	ANSI, NPS 3 to NPS 8, Class 900, all fluids
Control valve	590	3595	ANSI, all fluids
Globe valve	SMS	241GR	EN/ANSI, all fluids
Globe valve	SMS	251GR	EN/ANSI, all fluids
Globe valve	SMS	261GR	EN/ANSI, all fluids

¹⁾ Gases according to Article 4(1)(c.i), second indent
Liquids according to Article 4(1)(c.ii)

that the products mentioned above comply with the requirements of the following standards:

Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating to the making available on the market of pressure equipment	2014/68/EU	of 15 May 2014
Applied conformity assessment procedure for fluids according to Article 4(1)	Module H	Certificate-No.: N°CE-0062-PED-H-SAM 001-22-DEU-rev-B by Bureau Veritas 0062

The manufacturer's quality management system is monitored by the following notified body:

Bureau Veritas Services SAS, 4 place des Saisons, 92400 Courbevoie, France
Applied harmonised standards and technical specifications:
EN 16668 (incl. EN 12516-2, EN 12516-3, EN 12266-1), ASME B16.34

Manufacturer: SAMSON AKTIENGESELLSCHAFT, Weismüllerstrasse 3, 60314 Frankfurt am Main, Germany

Frankfurt am Main, February 17, 2025

Dr. Andreas Widl
Chief Executive Officer (CEO)

Sebastian Krause
Vice President Product Development

EU DECLARATION OF CONFORMITY



Translation of the German original

Declaration of Conformity of Final Machinery

in accordance with Annex II, section 1.A. of the Directive 2006/42/EC

For the following products:

Types 261GR-1/-7 Pneumatic Control Valves consisting of Type 261GR Valve and Type 3271 or Type 3277 Pneumatic Actuator

We, SAMSON AG, hereby declare that the machinery mentioned above complies with all applicable requirements stipulated in Machinery Directive 2006/42/EC.

For product descriptions refer to:

- Type 261GR Valve (DIN): Mounting and Operating Instructions EB 8005-GR
- Type 261GR Valve (ANSI): Mounting and Operating Instructions EB 8006-GR
- Types 3271 and 3277 Actuators: Mounting and Operating Instructions EB 8310-X

Valve accessories (e.g. positioners, limit switches, solenoid valves, lock-up valves, supply pressure regulators, volume boosters and quick exhaust valves) are classified as machinery components in this declaration of conformity and do not fall within the scope of the Machinery Directive as specified in § 35 and § 46 of the Guide to Application of the Machinery Directive 2006/42/EC issued by the European Commission. In the SAMSON Manual H 02 titled "Appropriate Machinery Components for SAMSON Pneumatic Control Valves with a Declaration of Conformity of Final Machinery", SAMSON defines the specifications and properties of appropriate machinery components that can be mounted onto the above specified final machinery.

Referenced technical standards and/or specifications:

- VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]
- VCI, VDMA, VGB: "Zusatzdokument zum Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen vom Mai 2018" [German only], based on DIN EN ISO 12100:2011-03

Comment: Information on residual risks of the machinery can be found in the mounting and operating instructions of the valve and actuator as well as in the referenced documents listed in the mounting and operating instructions.

Persons authorized to compile the technical file:

SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany
Frankfurt am Main, 21 July 2025

Stephan Giesen
Director Product Management

Sebastian Krause
Vice President Product Development

DECLARATION OF INCORPORATION



Translation of the German original

Declaration of Incorporation in Compliance with Machinery Directive 2006/42/EC

For the following product:

Type 261GR Valve

We, SAMSON AG, hereby certify that the Type 261GR Valves are partly completed machinery as defined in the Machinery Directive 2006/42/EC and that the safety requirements stipulated in Annex I, sections 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.3.7 are observed. The relevant technical documentation described in Annex VII, part B has been compiled.

Products we supply must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive 2006/42/EC.

Operators are obliged to install the products observing the accepted industry codes and practices (good engineering practice) as well as the mounting and operating instructions. Operators must take appropriate precautions to prevent hazards that could be caused by the process medium and operating pressure in the valve as well as by the signal pressure and moving parts.

The permissible limits of application and mounting instructions for the products are specified in the associated mounting and operating instructions; the documents are available in electronic form on the Internet at www.samsongroup.com.

For product descriptions refer to:

- Type 261GR Valve (DIN): Mounting and Operating Instructions EB 8005-GR
- Type 261GR Valve (ANSI): Mounting and Operating Instructions EB 8006-GR

Referenced technical standards and/or specifications:

- VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]
- VCI, VDMA, VGB: "Zusatzdokument zum Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen vom Mai 2018" [German only], based on DIN EN ISO 12100:2011-03

Comments:

- See mounting and operating instructions for residual hazards.
- The referenced documents listed in the mounting and operating instructions must be observed.

Persons authorized to compile the technical file:

SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany
Frankfurt am Main, 21 July 2025

Stephan Giesen
Director Product Management

Sebastian Krause
Vice President Product Development

15 Appendix

15.1 Tightening torques, lubricants and tools

15.1.1 Tightening torques

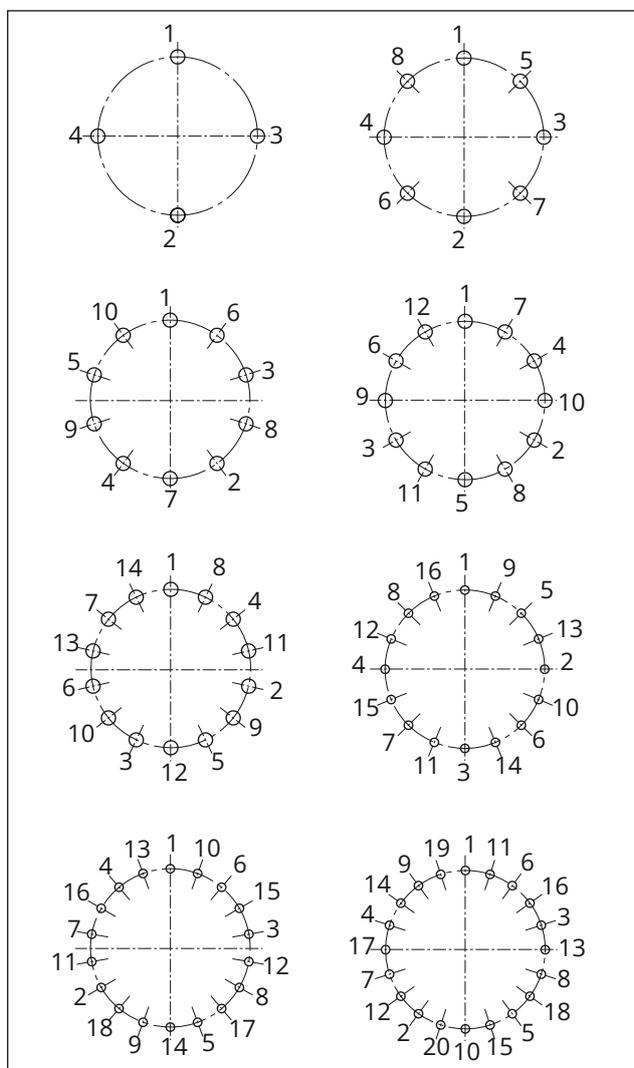


Fig. 29: Tightening sequence depending on the number of bolts (4, 8, 10, 12, 14, 16, 18 and 20 bolts)

Table 10: Numerical tightening sequence of bolts numbered in the clockwise direction

Number of bolts	Tightening sequence of bolts numbered sequentially in the clockwise direction
4	1, 3, 2, 4
6	1, 5, 3, 2, 6, 4
8	1, 5, 3, 7, 2, 6, 4, 8
10	1, 5, 3, 7, 9, 2, 6, 4, 8, 10
12	1, 5, 9, 3, 7, 11, 2, 6, 10, 4, 8, 12
14	1, 5, 9, 3, 7, 11, 13, 2, 6, 10, 4, 8, 12, 14
16	1, 5, 9, 13, 3, 7, 11, 15, 2, 6, 10, 14, 4, 8, 12, 16

Number of bolts	Tightening sequence of bolts numbered sequentially in the clockwise direction
18	1, 13, 5, 17, 9, 3, 15, 7, 11, 2, 14, 6, 18, 10, 4, 16, 8, 12
20	1, 13, 5, 17, 9, 3, 15, 7, 19, 11, 2, 14, 6, 18, 10, 4, 16, 8, 20, 12
22	1, 13, 5, 21, 9, 3, 15, 7, 19, 11, 17, 2, 14, 6, 22, 10, 4, 16, 8, 20, 12, 18
24	1, 9, 17, 5, 13, 21, 3, 11, 19, 7, 15, 23, 2, 10, 18, 6, 14, 22, 4, 12, 20, 8, 16, 24
26	1, 9, 25, 5, 13, 21, 3, 11, 19, 7, 15, 23, 17, 2, 10, 26, 6, 14, 22, 4, 12, 20, 8, 16, 24, 18
28	1, 21, 5, 13, 25, 9, 17, 3, 23, 7, 15, 19, 11, 27, 2, 22, 6, 14, 26, 10, 18, 4, 24, 8, 16, 20, 12, 28
30	1, 21, 5, 13, 27, 9, 17, 3, 23, 7, 15, 19, 11, 25, 29, 2, 22, 6, 14, 26, 10, 18, 4, 24, 8, 16, 20, 12, 26, 30
32	1, 21, 5, 13, 25, 9, 17, 29, 3, 23, 7, 15, 19, 11, 27, 31, 2, 22, 6, 14, 26, 10, 18, 30, 4, 24, 8, 16, 20, 12, 28, 32

- ⇒ Tighten radially arranged pressure-retaining bolting gradually according to the prescribed tightening sequence. Apply the target torque over several rounds.
- ⇒ Use a torque wrench to apply and check the tightening torques.

Tightening torques sorted by parts

All tightening torques specified in Nm

Table 11: Tightening torques for nuts (14) on valve bonnet (2)

Nominal size	Tightening torque for body nut (14)		
	Pressure rating Class ...		
NPS	300	600	900
1	45	45	50
2	95	95	150
3	165	175	360
4	185	220	330

Table 12: Tightening torques for plug/piston stem (36)

Stem diameter Ø in mm	Tightening torque for plug stem (36) in plug (5)/piston stem (36) in piston (5)
12	25
16	30
25	35
40	On req.

Appendix

Table 13: Tightening torques for threaded bushing (8): Version with centrally fastened packing

Stem diameter Ø in mm	Packing form				
	Adjustable (without internal spring)		Live-loaded (with internal spring)		
	GZA1	PZA4	PZS1	PZS2	PZS3
12	-	-	20	20	-
16	-	-	25	25	-
25	-	-	90	90	-
40	-	-	355	355	-

Table 14: Tightening torques for packing nuts (163): Live-loaded packing with packing flange loaded by external spring elements

Stem diameter Ø in mm	Packing form						
	PXS1	PXS2	PXS3	GXS1	GXS2	GXS3	PXS4
12	On req.	On req.	-	On req.	On req.	On req.	-
16	6	On req.	-	On req.	On req.	On req.	-
25	On req.	On req.	-	On req.	On req.	On req.	-
40	On req.	On req.	-	On req.	On req.	On req.	-

Table 15: Tightening torques for packing nuts (163): Live-loaded packing with packing flange without by spring elements

Stem diameter Ø in mm	Packing form				
	PXA1	GXA1	GXA2	GXA3	PXA4
12	-	Max. 18	-	-	-
16	-	On req.	-	-	-
25	-	On req.	-	-	-
40	-	On req.	-	-	-

15.1.2 Lubricants

⚠ WARNING

Exposure to hazardous substances poses a serious risk to health.

Certain lubricants and cleaning agents are classified as hazardous substances. These substances have a special label and a material safety data sheet (MSDS) issued by the manufacturer.

- ⇒ Make sure that an MSDS is available for any hazardous substance used. If necessary, contact the manufacturer to obtain an MSDS.
- ⇒ Inform yourself about the hazardous substances and their correct handling.

To minimize the friction in threaded joints, clean any dirty sliding surfaces on the joint and apply a suitable lubricant to them before tightening the joint. Optimum lubrication is achieved by lubricating all sliding surfaces (e.g. threads, seating surfaces on nuts, contact surfaces on moving bolt heads and washers, if used). This is required to achieve the required preload when applying the specified tightening torques. It also ensures that the threaded joint can still be undone without any problems after it has been exposed to thermal stress. Apply only a thin film of lubricant to the entire surface that needs lubrication.

- ⇒ Use lubricant as listed in the device bill of materials. Alternatively, contact our after-sales service for more information on the cleaning agents and lubricants to be used.

Table 16: Recommended lubricant

Item ²⁾	Application	Trade name	Temperature range in °C	Color	Material number
113/ 242	Chemical-resistant, high-temperature grease ¹⁾ : e.g. lubricant for packings	Gleitmo® 591	-25 to +260	White	8150-4000 (10 g)
					8150-0111 (1 kg)
114	High-temperature lubricant (paste): item 13/14, item 32/33, item 8 (threaded bushing) ³⁾ , item 92	Gleitmo® 1763 V	-20 to +1000	Gray	8150-4008 (250 g)
					100194184 (1 kg)
243	Special high-temperature anti-seize paste for bolted connections: item 103	Gleitmo® 165	-40 to +1200	Gray	1000036865 (1 kg)
113	Fully synthetic special grease: Lubricant for packings	SYN-setral-IN-T/200 V-2	-50 to +280	White	100141157 (100 g)
					100141160 (1 kg)

¹⁾ Parts that are to be lubricated and tools used for lubrication must be free of oil and grease.

²⁾ According to device BOM

³⁾ Depending on the application (process medium)

15.1.3 Tools

Tools

In addition to the standard tool, special tools are required to assemble and remove some parts. Use adjustable torque wrenches with a stop signal or that indicate the torque being applied to achieve the right tightening torques. Valves in large nominal sizes often require tightening torques that can only be achieved through additional torque multiplication by using a torque multiplier or hydraulic power tool. Depending on the valve model and version, special tools may be required for certain procedures.

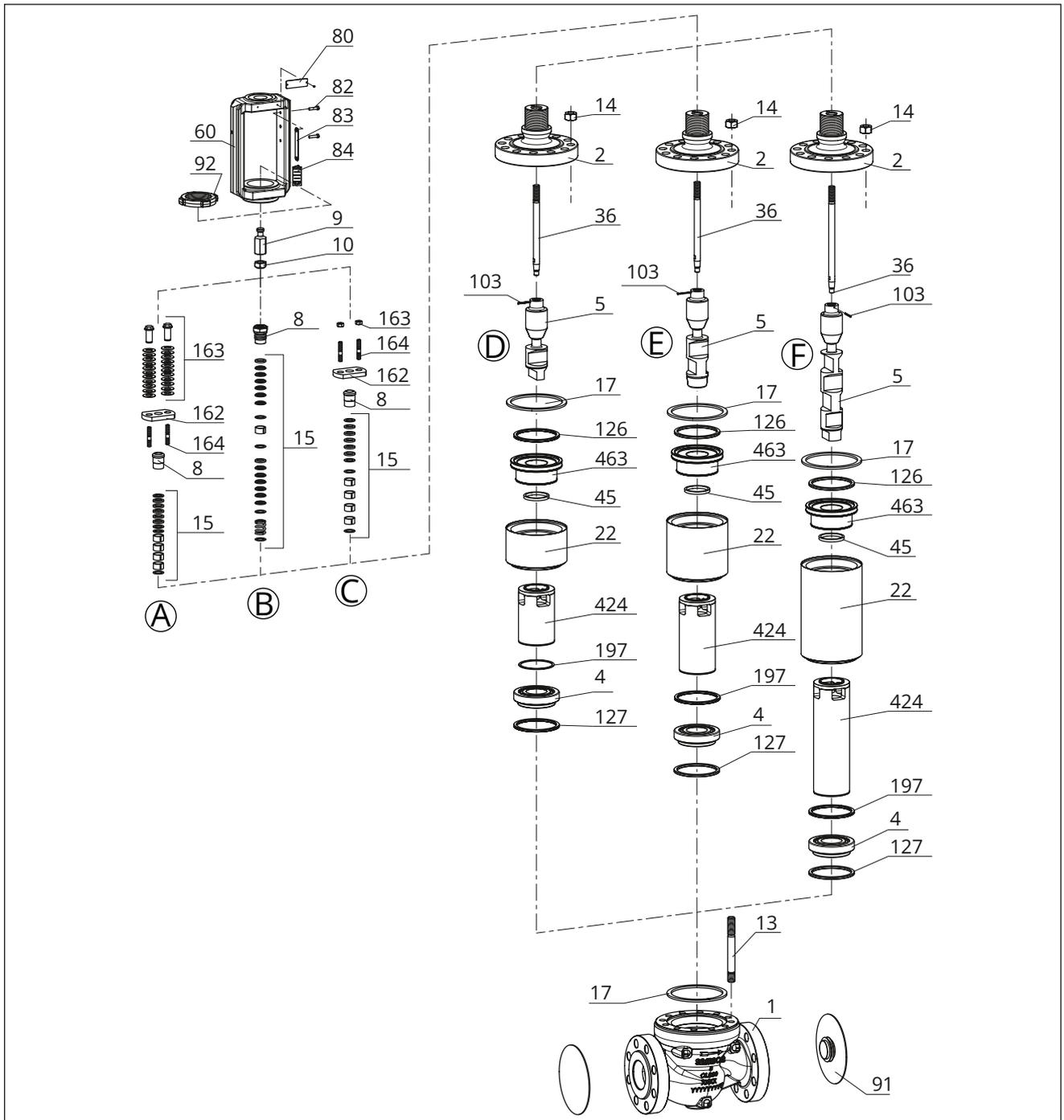
The required special tools can be purchased from SAMSON.

⇒ Contact our after-sales service.

15.2 Spare parts

1	Valve body
2	Standard bonnet
4	Seat
5	Plug
8	Threaded bushing/packing follower
9	Stem connector nut
10	Lock nut
13	Stud
14	Hex nut
15	Packing set
17	Spiral wound gasket
22	Intermediate piece
32	Bolt
33	Nut
36	Plug stem
45 ¹⁾	Seal (pressure balancing)
60	Yoke including external anti-rotation fixture
77	Direction of flow arrow (not shown)
80	Nameplate
81	Grooved pin
82	Screw
83	Hanger
84	Travel indicator scale
89	Dust shield
91	Protective caps on valve inlet/outlet
92	Castellated nut
103	Locking pin
105	Label for version with an adjustable packing (not shown)
113	Lubricants
114	Lubricants
126	Spiral wound gasket
127	Spiral wound gasket
162	Packing flange
163	Packing nuts for packing flange (including disk springs when packing flange is loaded by external spring elements)
164	Stud
424	Liner
463	Cylinder

¹⁾ Version with balanced valve plug



- Ⓐ Packing with packing flange (live-loaded by external spring elements)
- Ⓑ Centrally fastened packing (live-loaded or adjustable, depending on the packing set)
- Ⓒ Packing with packing flange (adjustable without external spring elements)
- Ⓓ 3-stage CDST
- Ⓔ 4-stage CDST
- Ⓕ 6-stage CDST

15.3 After-sales service

Contact our after-sales service for support concerning service or repair work or when malfunctions or defects arise.

E-mail contact

You can reach our after-sales service at the following e-mail address:
aftersalesservice@samsongroup.com

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found in product catalogs or on our website (► www.samsongroup.com).

Required specifications

Please submit the following details:

- Order number and position number in the order
- Type, model number, nominal size and valve version
- Pressure and temperature of the process medium
- Flow rate in m³/h or cu.ft/min
- Bench range of the actuator (e.g. 0.2 to 1 bar)
- Is a strainer installed?
- Installation drawing



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