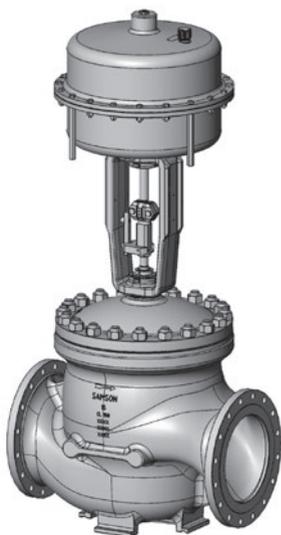


MOUNTING AND OPERATING INSTRUCTIONS

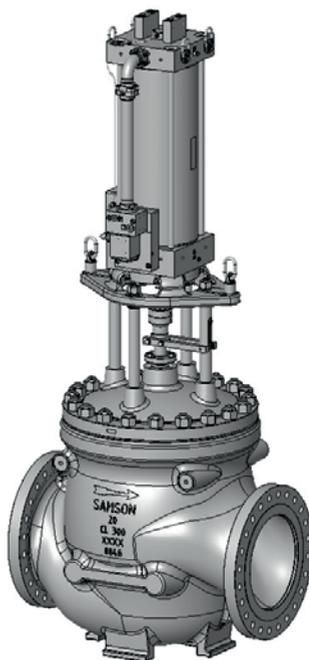


EB 8075 EN

Translation of original instructions



Type 3591-1 Control Valve



Type 3591 with hydraulic piston actuator

Type 3591 Valve · ANSI version

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

Edition June 2020



Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices. The images shown in these instructions 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 questions about these instructions, 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 at www.samsongroup.com > **Service & Support > 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

Note

Additional information

Tip

Recommended action

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1 Safety instructions and measures

Intended use

The SAMSON Type 3591 Globe Valve in combination with an actuator (e.g. Type 3271 Pneumatic Actuator) is designed to regulate the flow rate, pressure or temperature of liquids, gases or vapors. 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 other applications or conditions than 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 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 must only be performed by personnel who has the necessary qualification to perform the applied welding procedure and handle the materials used.

Explosion-protected versions of this device must be operated only by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

Safety instructions and measures

The operating personnel must be specially trained for the correct and safe handling of oxygen when valves are used for oxygen service.

Personal protective equipment

We recommend checking the hazards posed by the process medium being used (e.g. ► GESTIS (CLP) 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 when working at height
 - Safety footwear, ESD (electrostatic discharge) footwear, if necessary
- ➔ 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 the SAMSON Type 3271 Pneumatic Actuator, the valve moves to a certain fail-safe position (see the 'Design and principle of operation' section) upon supply air or control signal failure. 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 be identified in a risk assessment and prevented through the corresponding safety instructions 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. Valves with a CE marking have a declaration of conformity, which includes information about the applied conformity assessment procedure. The 'Certificates' section 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 hazard assessment stipulated in Clause 5.2 of ISO 80079-36, even in the rare incident of an operating fault. Therefore, such valve versions do not fall within the scope of Directive 2014/34/EU.

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

Referenced documentation

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

- Mounting and operating instructions for the mounted actuator, e.g. ► EB 8310-X for SAMSON Type 3271 Actuator
- Mounting and operating instructions for mounted valve accessories (positioner, solenoid valve etc.)

Safety instructions and measures

- For oxygen service: Manual ▶ H 01

The packaging of valve constructed and sized for oxygen service has the following label on it:



- When a substance is used in the device, which is listed as being a substance of very high concern on the candidate list of the REACH regulation:

Information on safe use of the part affected

▶ www.samsongroup.com > About SAMSON > Material Compliance > REACH

If a device contains a substance which is listed as being a substance of very high concern on the candidate list of the REACH regulation, this circumstance is indicated on the SAMSON delivery note.

1.1 Notes on possible severe personal injury

⚠ DANGER

Risk of bursting in pressure equipment.

Valves and pipelines are pressure equipment. Impermissible pressure or improper opening can lead to valve components bursting.

- Observe the maximum permissible pressure for valve and plant.
- Before starting any work on the control valve, depressurize all plant sections affected as well as the valve.
- Drain the process medium from all the plant sections concerned as well as 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 and cause burn injuries.

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

Risk of hearing loss or deafness due to loud noise.

The noise emissions depend on the valve version, plant facilities and process medium.

- Wear hearing protection when working near the valve.

Risk of personal injury due to exhaust air being vented.

While the valve is operating, air is vented from the actuator, for example, during closed-loop operation or 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 silencers and vent plugs.
- Wear eye protection when working in close proximity to the control valve.

WARNING

Crush hazard arising from moving parts.

The control valve contains moving parts (actuator and piston 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 control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- Do not impede the movement of the actuator and piston stem by inserting objects into the yoke.
- Before unblocking the actuator and piston 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.

Risk of personal injury due to preloaded springs.

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

- Before starting any work on the actuator, relieve the compression from the preloaded springs (see associated actuator documentation).

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.

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

⚠ WARNING

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

Over time, markings, labels and nameplates on the 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.

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.

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 valve.

Risk of leakage and valve damage due to excessively high or low tightening torques.

Observe the specified torques when tightening control valve components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

- Observe the specified tightening torques.

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.

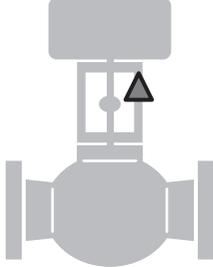
→ Only use lubricants approved by SAMSON.

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

→ If necessary, keep the valve and the tools used free from solvents and grease.

→ Make sure that only suitable lubricants are used.

1.4 Warnings on the device

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

2 Markings on the device

2.1 Valve nameplate

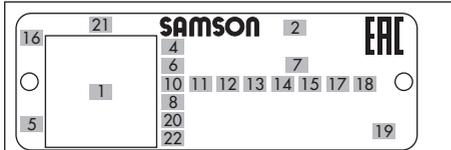


Fig. 2-1: Inscriptions on the valve nameplate

i Note

Fig. 2-1 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 3591 Valve actually appear on the nameplate.

Item	Inscription meaning
1	Data Matrix code
2	Type designation
4	Material
5	Month and year of manufacture
6	Valve size: DIN: DN · ANSI: NPS · JIS: DN
7	Pressure rating: DIN: PN · ANSI: CL · JIS: K
8	Order number/item
10	Flow coefficient: DIN: KVS · ANSI: CV
11	Characteristic: %: equal percentage · LIN : linear mod-lin : modified linear NO/NC : on/off service
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: DIN: D · ANSI/JIS: B Version: M : mixing valve · V : flow-diverting valve

Item	Inscription meaning
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 : AC trim, versions 1 to 5 LK : perforated plug · LK1/LK2/LK3 : perforated plug with flow divider ST 1 to ST 3 · MHCT : multi-hole cage CC1 : Combi Cage · ZT1 : Zero Travel
16	Country of origin
17	PSA version: PSA
18	Cage/seat style: CC : clamped cage, clamped seat SF : suspended cage, flanged seat
19	CE marking
20	ID of the notified body 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
21	Serial number
22	NE 53 (NAMUR Recommendation)

Markings on the device

The valve nameplate (80) in valve sizes NPS 10 to 12 and NPS 16 (Class 150) is affixed to the yoke (see Fig. 2-2). The valve nameplate in valve sizes NPS 16 and larger (Class 300 and higher) is located on the bonnet (see Fig. 2-3).

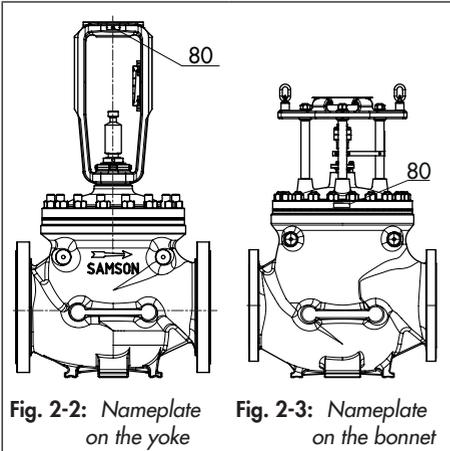


Fig. 2-2: Nameplate on the yoke

Fig. 2-3: Nameplate on the bonnet

2.2 Actuator nameplate

See associated actuator documentation.

2.3 Material number

The seat and piston 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.

Seat code	Material
01	A182 F6a Cl. 3/1.4006+QT
02	A479 410 2/1.4006+QT
03	A182 F316(L)/1.4401/1.4404
04	A479 346(L)/1.4401/1.4404
05	A182 F304/1.4301
06	A479 304/1.4301

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. 2-4).



Fig. 2-4: Label when an adjustable packing is installed

3 Design and principle of operation

The Type 3591 Globe Valve is preferably combined with a Type 3271 Pneumatic Actuator or a piston actuator.

The Type 3591 Valve uses a piston (5), which moves within a cage (124), as the closure member. The piston is pressure-balanced as standard. The piston stem (36) connected to the actuator stem by a stem connector. The piston stem is sealed by either a PTFE or graphite packing (15), which is either self adjusting or can be adjusted manually.

The medium flows through the valve as indicated by the arrow on the body. A change in the signal acting on the actuator causes the piston to move. The piston position and cage shape determine the released cross-section and the flow rate with it.

The Type 3591 Valve is available either with a clamped or flanged seat (4). The seat is inserted into the seat bridge in the version

with clamped seat. The seat and cage are clamped into place by tightening the body nuts (14). The seat of the version with flanged seat is bolted into the seat bridge. The cage (124) is suspended in the valve body (1) (see Fig. 3-1 and Fig. 3-2).

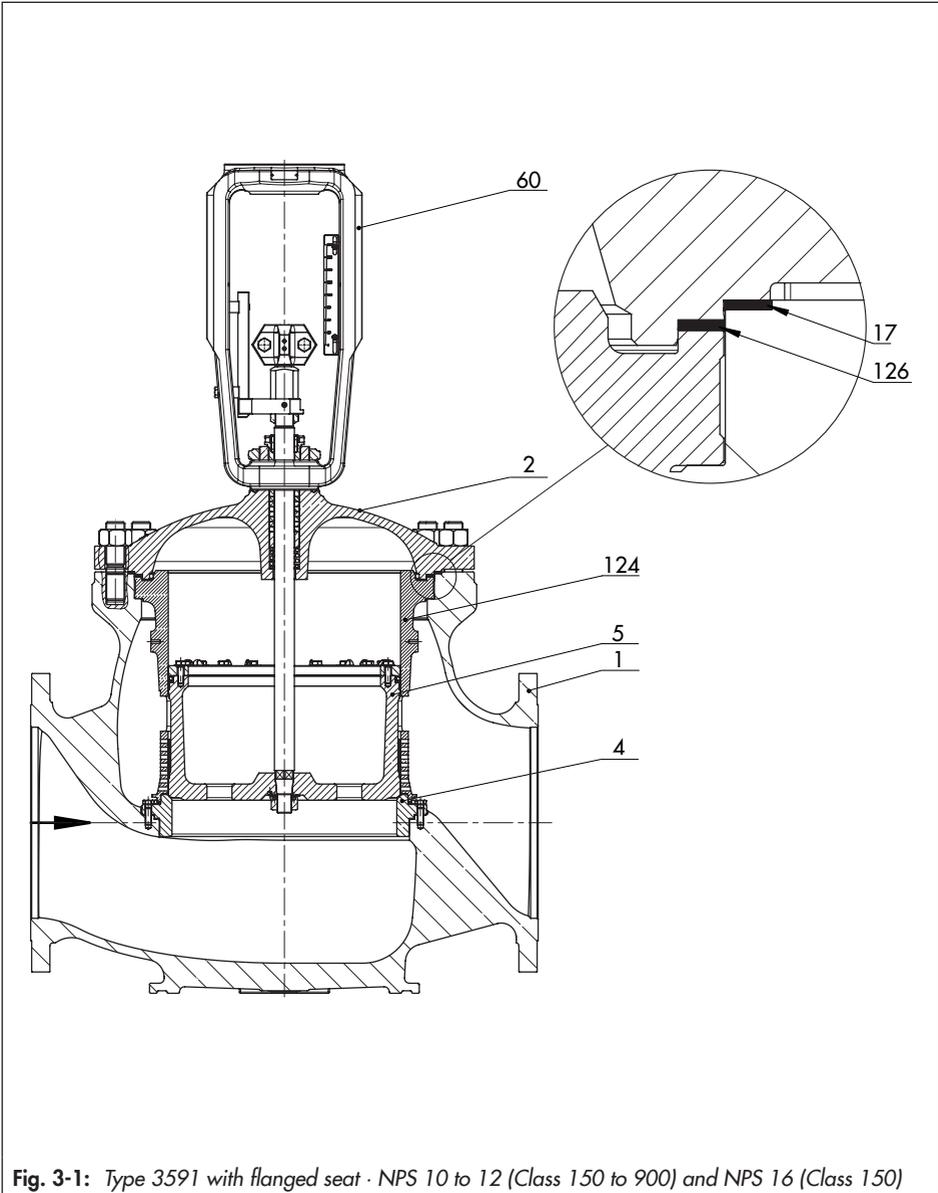
The actuator is connected using a special assembly (60), which varies depending on the mounted actuator. These assemblies are fitted with an external anti-rotation fixture for the piston stem.

The valves in valve sizes NPS 16 (Class 300 to 900) and NPS 20 (Class 150 to 900) to 32 (Class 150) can be equipped with additional lifting eyelets (148) to facilitate lifting and transporting.

Legend for Fig. 3-1

1 Valve body	49 Screw (pressure balancing)
2 Bonnet	50 Washer (pressure balancing)
4 Seat	60 Yoke assembly with anti-rotation fixture
5 Piston	124 Cage
17 Body gasket	126 Gasket between cage and bonnet
44 Ring (pressure balancing)	160 Screw
45 Gasket (pressure balancing)	

Design and principle of operation



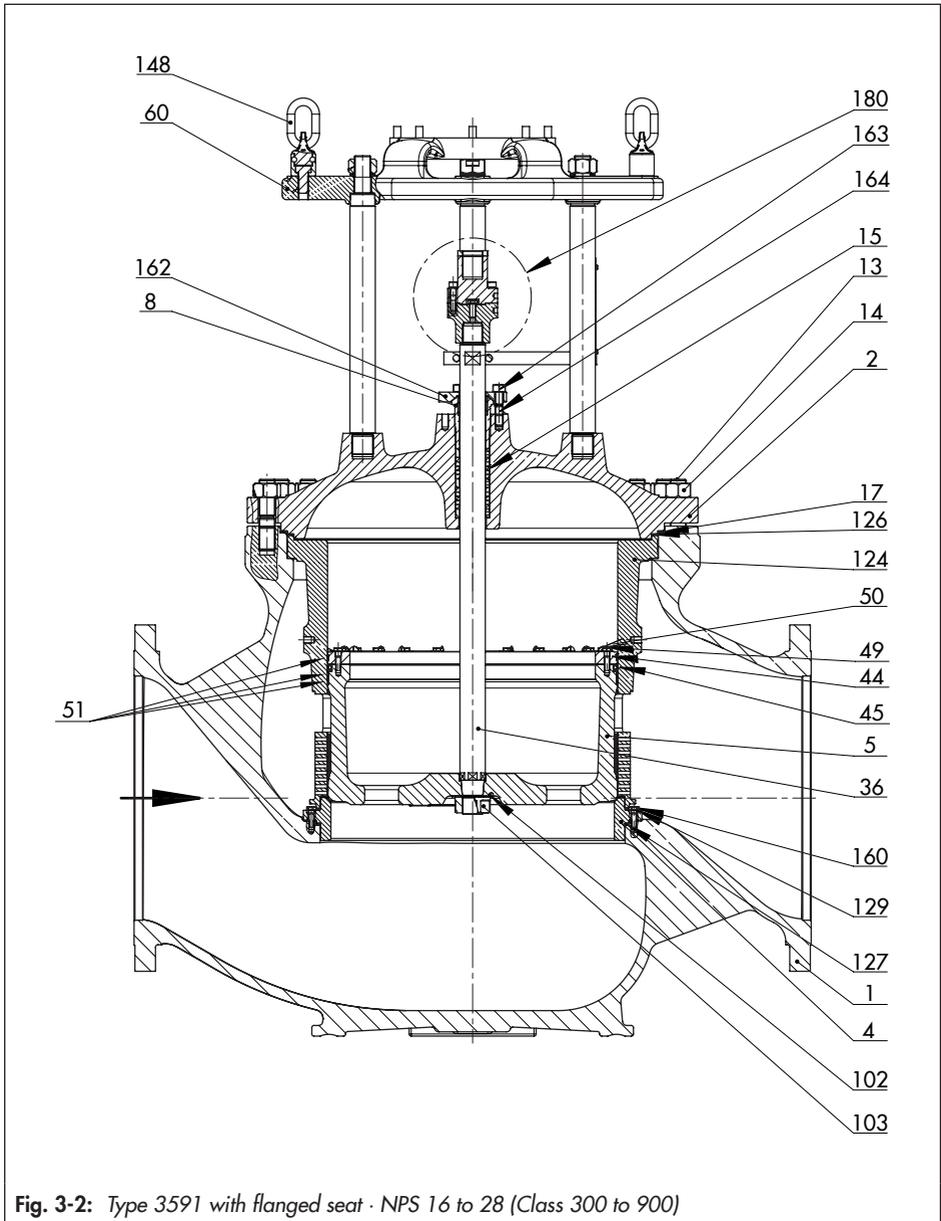


Fig. 3-2: Type 3591 with flanged seat · NPS 16 to 28 (Class 300 to 900)

Design and principle of operation

Legend for Fig. 3-2

1 Body	60 Yoke assembly with anti-rotation fixture (180)
2 Bonnet	102 Snap ring
4 Seat	103 Retaining nut
5 Piston	124 Cage
8 Threaded bushing (packing nut)	126 Gasket between cage and bonnet
13 Stud bolt	127 Seat bridge gasket
14 Body nut	129 Washer
15 Packing	148 Lifting eyelet
17 Body gasket	160 Screw
36 Piston stem	162 Flange for packing gland
44 Ring (pressure balancing)	163 Nut for packing gland
45 Gasket (pressure balancing)	164 Stud for packing gland
49 Screw (pressure balancing)	180 Anti-rotation fixture
50 Washer (pressure balancing)	
51 Guide rings (pressure balancing)	

3.1 Fail-safe action

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 Pneumatic Actuator, the valve has 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 upwards 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*

A double-acting piston actuator does not have a defined fail-safe action as it does not contain a spring assembly.

3.2 Versions

With insulating section/bellows seal

The modular design allows an insulating section or bellows seal to be fitted to the standard valve version.

Actuators

In these instructions, the preferable combination with a Type 3271 Pneumatic Actuator or a piston 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.

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 an actuator with additional handwheel, an electric actuator or an hydraulic piston actuator.

3.3 Additional fittings

Strainers

We recommend installing a SAMSON Type 2 Strainer upstream of the valve. It prevents solid particles in the process medium from damaging the valve.

Design and principle of operation

Bypass and shut-off valves

We recommend installing a shut-off valve both upstream of the strainer and downstream of the 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.

Refer to the instructions in the 'Installation' section.

Test connection

Versions with bellows seal fitted with a test connection (G 1/8) at the top flange allow the sealing ability of the bellows to be monitored.

Particularly for liquids and vapors, we recommend installing a suitable leakage indicator (e.g. a contact pressure gauge, an outlet to an open vessel or an inspection glass).

Safety guard

For operating conditions that require increased safety (e.g. in cases where the 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 piston 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 Accessories

Information Sheet ► T 8350

3.5 Technical data

The nameplates on the valve and actuator provide information on the control valve version. See the 'Markings on the device' section.

i Note

More information is available in Data Sheet ► T 8075.

Temperature range

Depending on the version, the control valve is designed for a temperature range from -10 to $+220$ °C (14 to 428 °F). The use of an insulating section or bellows seal extends the temperature range from -46 to $+500$ °C (-50 to $+932$ °F).

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.

Table 3-1: Technical data · Type 3591

Material	Cast steel			Cast stainless steel
	A352 LCC	A216 WCC	A217 WC6	A351 CF8M
Valve size NPS	10 to 32	10 to 32	10 to 32	10 to 32
Pressure rating	Class 150 to 900			
Type of connection Flange	All ANSI versions			
Welding end	According to ASME B16.25			
Seat-piston seal	Metal seal or high-performance metal seal			
Characteristic	Equal percentage (eq. %) · Linear (lin) · Modified linear (mod. lin) ¹⁾			
Temperature ranges in °C (°F) · Permissible operating pressures acc. to pressure-temperature diagram (see Information Sheet ▶ T 8000-2)				
Body without insulating section	-10 to +220 (14 to 428) ³⁾	-10 to +220 (14 to 428) ³⁾	-10 to +220 (14 to 428) ³⁾	-10 to +220 (14 to 428) ³⁾
Body with Insulating section	-46 to +345 (-50 to +653)	-29 to +425 (-20 to +797)	-29 to +500 (-20 to +932)	-46 to +500 (-50 to +932)
Valve piston, balanced PTFE	-46 to +220 (-50 to +428)			
Graphite	-46 to +500 (-50 to +932)			
Leakage class according to ANSI/FCI 70-2 (1991)				
Valve piston, balanced	Standard: IV (with PTFE or graphite ring) ²⁾			
Compliance				
				

¹⁾ Equivalent to on/off or quick opening

²⁾ High-performance metal seal: leakage class V (only with PTFE ring) on request

³⁾ Up to +350 (662) with high-temperature packing

Design and principle of operation

Dimensions and weights

Table 3-2 and Table 3-3 provide an overview of the dimensions and weights of the standard version of Type 3591 Valve. The lengths and heights in the dimensional drawings are shown on page 3-13.

Dimensions in mm/inch · Weights in kg/lbs

Table 3-2: *Dimensions for Type 3591 Valve*

Table 3-2.1: *Overall heights*

Valve	NPS	10	12	16	20	24	28	32	
H2	Class 150	mm	241	281	341	500	560	620	685
		in	9.49	11.06	13.43	19.69	22.05	24.41	26.97
	Class 300	mm	241	281	340	500	565	640	-
		in	9.49	11.06	13.39	19.69	22.24	25.20	
	Class 600	mm	271	301	360	515	595	670	-
		in	10.67	11.85	14.17	20.28	23.43	26.38	
	Class 900	mm	291	331	380	535	615	700	-
		in	11.46	13.03	14.96	21.06	24.21	27.56	
H5	Class 150	mm	203	243	298	350	407.5	Form A: 462.5 Form B: 417.5	Form A: 530 Form B: 470
		in	7.99	9.57	11.73	13.78	16.04	Form A: 18.21 Form B: 16.44	Form A: 20.87 Form B: 18.50
	Class 300	mm	223	260	325	387.5	457.5	Form A: 517.5 Form B: 460	-
		in	8.78	10.24	12.80	15.26	18.01	Form A: 20.37 Form B: 18.11	
	Class 600	mm	255	280	342.5	407.5	470	Form A: 537.5 Form B: 475	-
		in	10.04	11.02	13.48	16.04	18.50	Form A: 21.16 Form B: 18.70	
	Class 900	mm	273	305	705	427.5	520	Form A: 585 Form B: 552.5	-
		in	10.75	12.01	27.76	16.83	20.47	Form A: 23.03 Form B: 21.75	

Valve		NPS	10	12	16	20	24	28	32	
H4	Class 150	mm	485	492	665	877	857	1117	1215	
		in	19.09	19.37	26.18	34.53	33.74	43.98	47.83	
	Class 300	mm	485	492	-	877	857	1117	1215	
		in	19.09	19.37		34.53	33.74	43.98	47.83	
	Class 600	mm	485	492		877	857	1117	1215	
		in	19.09	19.37		34.53	33.74	43.98	47.83	
	Class 900	mm	485	479	724	877	917	1117	-	
		in	19.09	18.86	28.50	34.53	36.10	43.98		
	H8 for actu- ator	175 to 350 cm ²	mm	-	-	-	-	-	-	-
			in	-	-	-	-	-	-	-
355 to 750 cm ²		mm	-	-	-	-	-	-	-	
		in	-	-	-	-	-	-	-	
1000 to 1400-60 cm ²		mm	419	419	-	-	-	-	-	
		in	16.50	16.50						
1400-120 to 2800 cm ² Travel: FA 30 to 75/ FE 30 to 38		mm	504	504	-	-	-	-	-	
		in	19.84	19.84						
1400-120 to 2800 cm ² Travel: FA 90 to 120/ FE 60 to 120		mm	651	651	651	-	-	-	-	
		in	25.63	25.63	25.63					
Type 3271, 1400- 120 cm ² , 2800 cm ² , 2 x 2800 cm ²	mm			695	695	695 ¹⁾ / 785 ²⁾	785	On request		
	in			27.36	27.36	27.36 ¹⁾ / 30.91 ²⁾	30.91			

¹⁾ Class 150

²⁾ Class 300 to 900

Design and principle of operation

Table 3-2.2: Face-to-face dimensions

Valve	NPS	10	12	16	20	24	28	32	
Length L raised face ¹⁾	Class 150	mm	673	737	1016	1267 ³⁾	1600 ³⁾	1854 ³⁾	2100 ³⁾
		in	26.50	29.00	40.00	49.88 ³⁾	62.99 ³⁾	72.99 ³⁾	82.68 ³⁾
	Class 300	mm	708	775	1057	1308 ³⁾	1600 ³⁾	1854 ³⁾	-
		in	27.88	30.50	41.62	51.50 ³⁾	62.99 ³⁾	72.99 ³⁾	
	Class 600	mm	752	819	1108	1372 ³⁾	1676 ³⁾	2100 ³⁾	-
		in	29.62	32.25	43.62	54.02 ³⁾	65.98 ³⁾	82.68 ³⁾	
Class 900	mm	991	1130	1422	1600 ³⁾	1854 ³⁾	2250 ³⁾	-	
	in	39.00	44.50	56.00	62.99 ³⁾	72.99 ³⁾	88.58 ³⁾		
Length L ring type joint ¹⁾	Class 150	mm	686	750	1029	1280	1613	-	-
		in	27.00	29.50	40.50	50.38	63.49		
	Class 300	mm	724	791	1073	1327	1622	1875 ⁴⁾	-
		in	28.50	31.12	42.24	52.25	63.87	73.87 ⁴⁾	
	Class 600	mm	755	822	1111	1378	1686	2111 ⁴⁾	-
		in	29.74	32.37	43.74	54.27	66.36	83.18 ⁴⁾	
Class 900	mm	994	1133	1432	1613	1873	2271 ⁴⁾	-	
	in	39.12	44.62	56.38	63.49	73.74	89.46 ⁴⁾		
Length L welding ends ²⁾	Class 150	mm	752	819	1108	1267 ³⁾	1600 ³⁾	1854 ³⁾	2100 ³⁾
		in	29.62	32.35	43.62	49.88 ³⁾	62.99 ³⁾	72.99 ³⁾	82.68 ³⁾
	Class 300	mm	752	819	1108	1308 ³⁾	1600 ³⁾	1854 ³⁾	-
		in	29.62	32.35	43.62	51.50 ³⁾	62.99 ³⁾	72.99 ³⁾	
	Class 600	mm	752	819	1108	1372 ³⁾	1676 ³⁾	2100 ³⁾	-
		in	29.62	32.35	43.62	54.02 ³⁾	65.98 ³⁾	82.68 ³⁾	
Class 900	mm	991	1130	1422	1600 ³⁾	1854 ³⁾	2250 ³⁾	-	
	in	39.00	44.50	56.00	62.99 ³⁾	72.99 ³⁾	88.58 ³⁾		

¹⁾ Face-to-face dimensions for Class 150 to 600 according to ANSI/ISA 75.08.01 and for Class 900 according to ANSI/ISA 75.08.06

²⁾ Face-to-face dimensions for Class 150 to 900 according to ANSI/ISA 75.08.05

³⁾ Not standardized, SAMSON face-to-face dimensions

⁴⁾ Face-to-face dimensions for flanges form A according to ASME B1 6.47

Table 3-3: Weights for Type 3591 Valve

i Note

The shape and weight of the yoke (60, see H8 in dimensional drawings) vary depending on the intended actuator. The weights specified in Table 3-3 and Table 3-3.2 are based on the weight of the valve and yoke depending on the actuator area.

Table 3-3.1: NPS 10 to 12 and NPS 16 (Class 150) · Without actuator

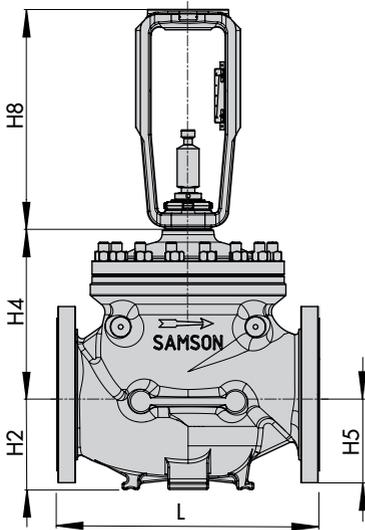
NPS	Actuator		Class 150	Class 300	Class 600	Class 900
10	1000 to 1400-60 cm ²	kg	450	490	680	1000
		lbs	992	1080	1499	2205
	1400-120 to 2800 cm ² Travel: FA 30 to 75/FE 30 to 38	kg	500	540	720	1040
		lbs	1102	1190	1587	2293
	1400-120 to 2800 cm ² Travel: FA 90 to 120/FE 60 to 120	kg	500	540	720	1040
		lbs	1102	1190	1587	2293
12	1000 to 1400-60 cm ²	kg	610	660	890	1340
		lbs	1345	1455	1962	2954
	1400-120 to 2800 cm ² Travel: FA 90 to 120/FE 60 to 120	kg	660	710	940	1390
		lbs	1455	1565	2072	3064
	2800/2 x 2800 cm ² Travel: FA/FE 150	kg	660	710	940	1390
		lbs	1455	1565	2072	3064
16	1000 to 1400-60 cm ²	kg	1120	-	-	-
		lbs	2469			
	1400-120 to 2800 cm ² Travel: FA 90 to 120/FE 60 to 120	kg	1170			
		lbs	2579			
	Piston actuator Travel: FA/FE 200	kg	1170			
		lbs	2579			

Design and principle of operation

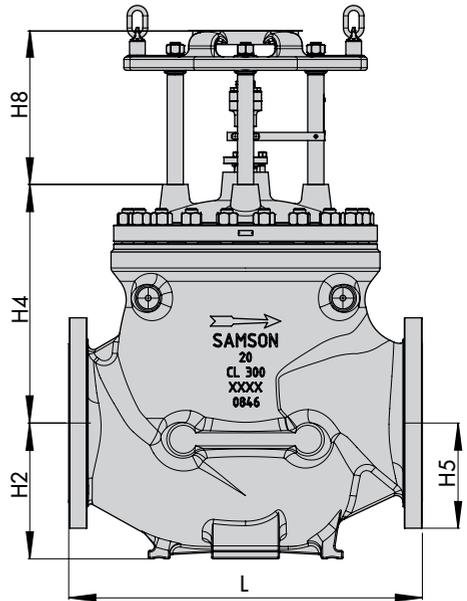
Table 3-3.2: NPS 16 (Class 300 and higher) to 32 · Without actuator

NPS		Class 150	Class 300	Class 600	Class 900	
16	– kg	–	1800	2430	3250	
	– lbs		3968	5357	7165	
20	– kg	2470	3000	3960	5820	
	– lbs	5445	6614	8730	12831	
24	– kg	3180	4420	6050	8580	
	– lbs	7011	9744	13338	18916	
28	ASME B16.47 Flange form A	kg	4890	6280	8740	12440
		lbs	10781	13845	19268	27426
	ASME B16.47 Flange form B	kg	4700	6030	8380	12230
		lbs	10362	13294	18475	26963
32	ASME B16.47 Flange form A	kg	6500	–		
		lbs	14330			
	ASME B16.47 Flange form B	kg	6190			
		lbs	13647			

Dimensional drawings



Type 3591 Valve · NPS 10 to 12 and
NPS 16 (Class 150)



Type 3591 Valve · NPS 16 (Class 300 and
higher) to 32

i Note

Refer to the following data sheet for more dimensions and weights:

▶ T 8075

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

- ▶ T 8310-1 for Type 3271 Actuator with 750 cm² actuator area and larger
- ▶ 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
- ▶ T 8312 for Type 3273 Hand-operated Actuator

4 Shipment and on-site transport

The work described in this section is only to be performed 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 the 'Markings on the device' section for nameplate details.
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, if required. Refer to the transport documents and the 'Technical data' section.

4.2 Removing the packaging from the valve

Observe the following sequence:

- Do not open or remove the packaging until immediately before lifting to install the valve 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 valve's center of gravity.
 - Secure the valve against tipping over or turning.
-

NOTICE

Risk of 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 and to the additional lifting eyelets (NPS 16 and larger, Class 300 and higher) bear the entire load.
 - Do not attach load-bearing slings to the actuator, handwheel or any other parts.
 - Observe lifting instructions (see section 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 -20 to $+65$ °C (-4 to $+149$ °F).

i Note

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

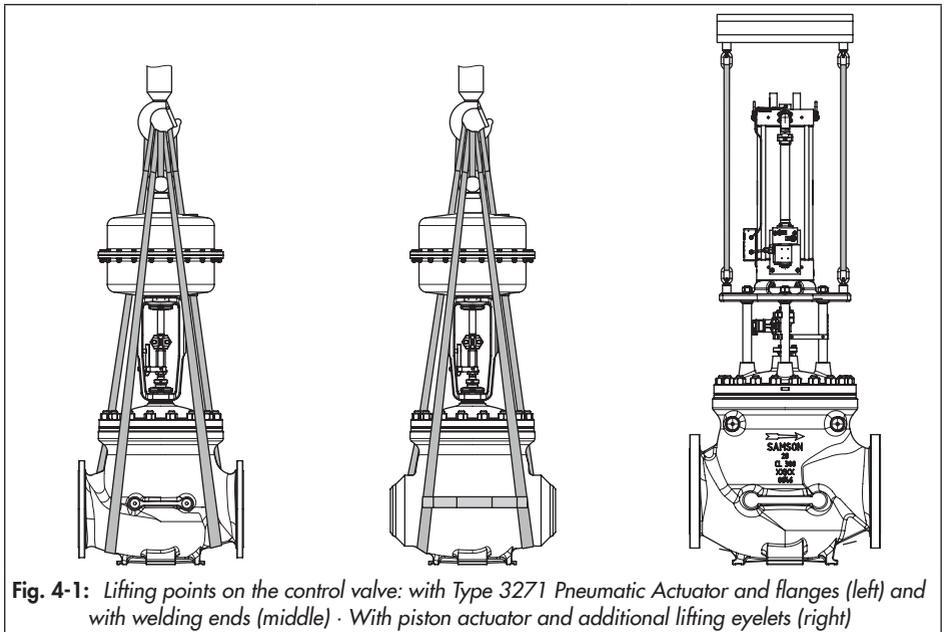


Fig. 4-1: Lifting points on the control valve: with Type 3271 Pneumatic Actuator and flanges (left) and with welding ends (middle) · With piston actuator and additional lifting eyelets (right)

4.3.2 Lifting the valve

⚠ WARNING

Risk of personal injury and valve damage due to incorrect lifting of the valve.

Special lifting conditions apply to valves in Class 900 and higher as well as \geq NPS 24.

→ Contact our after-sales service.

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

Lifting instructions

- Use a hook with safety latch (see Fig. 4-1) 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 valve 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 piston 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 pro-

TECTS the control valve from tilting while being lifted. Before lifting the control valve, tighten the sling.

a) Valves up to NPS 12 and NPS 16 (Class 150)

1. Attach one sling to each flange of the body and to the rigging equipment (e.g. hook) of the crane or forklift (see Fig. 4-1).
2. Attach others sling to the lashing point on the actuator and to the rigging equipment.
3. **Version with welding ends:** secure the slings attached to the body against slipping using a connector.
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 valve into the pipeline (see the 'Installation' section).
7. **Version with flanges:** check whether the flanges are bolted tight and the valve in the pipeline holds.
Version with welding ends: check whether the weld seams hold.
8. Remove slings.

b) Valves in NPS 16 and larger (Class 300)

1. Attach one sling to the lifting eyelets (148) and to the rigging equipment (e.g. hook) of the crossbeam (see Fig. 4-1).
2. Proceed as described for 'Valves up to NPS 12 and NPS 16 (Class 150)' (steps 4 to 8).

c) Valves in NPS 24 and larger (Class 900 and higher)

→ Contact our after-sales service.

4.4 Storing the valve

NOTICE

Risk of valve damage due to improper storage.

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

Note

We recommend regularly checking 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 valve 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 -20 to $+65$ °C (-4 to $+149$ °F). Contact our after-sales service for the storage temperatures of other valve versions.
- Do not place any objects on the control valve.

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.
- We recommend a storage temperature of 15 °C (59 °F) for elastomers.
- Store elastomers away from lubricants, chemicals, solutions and fuels.

Tip

SAMSON's After-sales Service can provide more detailed storage instructions on request.

Shipment and on-site transport

5 Installation

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

5.1 Installation conditions

Work position

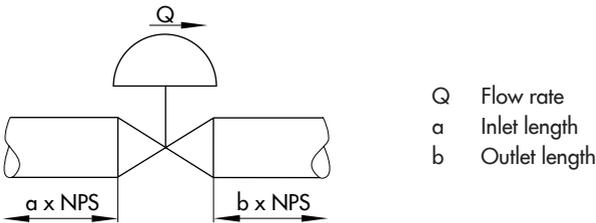
The work position for the control valve is the front view looking onto the operating controls (including valve accessories).

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 5-1) vary depending on several variables and process conditions and are intended as recommendations. Contact SAMSON if the

Table 5-1: *Inlet and outlet lengths*

			
State of process medium	Valve conditions	Inlet length a	Outlet length b
Gas	$Ma \leq 0.3$	2	4
	$0.3 \leq Ma \leq 0.7$	2	10
Vapor	$Ma \leq 0.3$ ¹⁾	2	4
	$0.3 \leq Ma \leq 0.7$ ¹⁾	2	10
	Saturated steam (percentage of condensate > 5 %)	2	20
Liquid	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
Flashing	–	2	20
Multi-phase	–	10	20

¹⁾ No saturated steam

Installation

lengths are significantly shorter than the recommended lengths.

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

- Observe the recommended inlet and outlet lengths (see Table 5-1). Contact SAMSON if the valve conditions or states of the medium process deviate.
- Install the valve free of stress and with the least amount of vibrations as possible. Read information under 'Mounting position' and 'Support or suspension' in this section.
- Install the valve allowing sufficient space to remove the actuator and valve or to perform service and repair work on them.

Mounting position

Generally, we recommend installing the valve with the actuator upright and on top of the valve.

- Contact SAMSON if the mounting position is not as specified above.

Support or 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.

The valve, actuator and pipeline must be supported or suspended to hold the control valve assembly.

We recommend attaching the support or suspension directly to the valve (see Fig. 5-1).

- Contact SAMSON's After-sales Service for additional points of attachment.

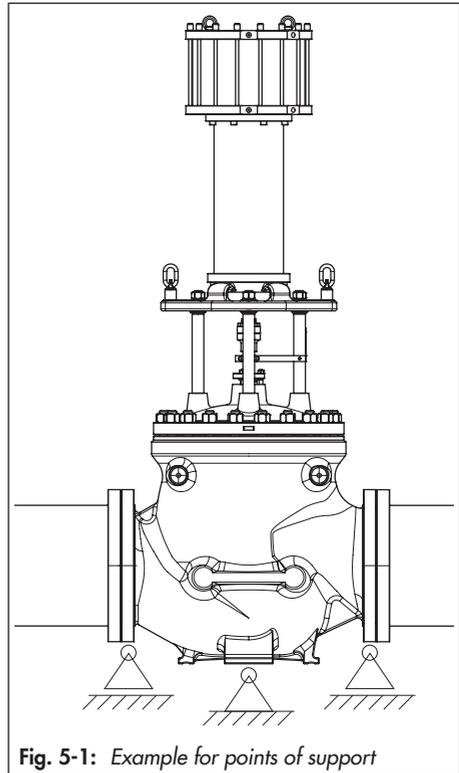


Fig. 5-1: Example for points of support

Valve accessories

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

Vent plugs

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, valve size, material, pressure rating and temperature range) match the plant conditions (size and pressure rating of the pipeline, medium temperature etc.). See the 'Markings on the device' section for nameplate details.
- The requested or required additional pipe fittings (see the 'Additional fittings' section) 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 with insulating section or bellows seal up to the bonnet flange of the valve body for medium temperatures below 0 °C (32 °F) and above 220 °C (428 °F). If the insulating section is insulated, it will not function properly.
-

Proceed as follows:

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

i 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 valve damage due to excessively high or low tightening torques.**

Observe the specified torques when tightening control valve components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

→ *Observe the specified tightening torques.*

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

→ *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 piston stem in some cases. The valve must be closed beforehand.

For SAMSON Type 3271 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.

a) Versions up to NPS 16 (Class 150)

See Fig. 5-2 and Fig. 5-3

1. Insert ball bearings (310) into the recesses in the bonnet.
2. Place the yoke (3) on the bonnet in such a way that the ball bearings fit into the recesses of the yoke.
3. Fasten the yoke (3) using the castellated nut (92).
4. Fasten the hanger (83) and warning label (255), if applicable, to the yoke using the screws (82).
5. Position the travel indicator scale (84) on the hanger (83) with the screws (85) according to Table 5-3.
6. Use a soft-faced hammer or lever press to press the sliding washers (309) with their beveled part first (without using any lubricant) into the recesses of the clamps (301) as far as they will go. Remove any excess material.
7. 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.**

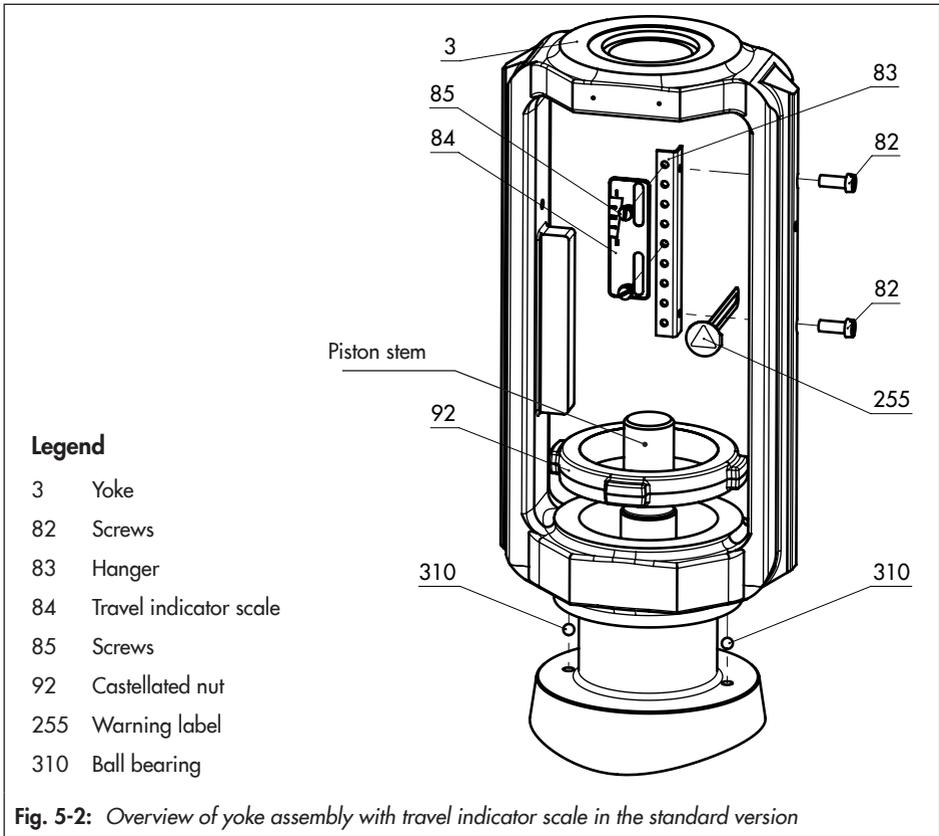
→ *Do not apply any lubricant to the threads of the clamps (301) or the plug stem.*

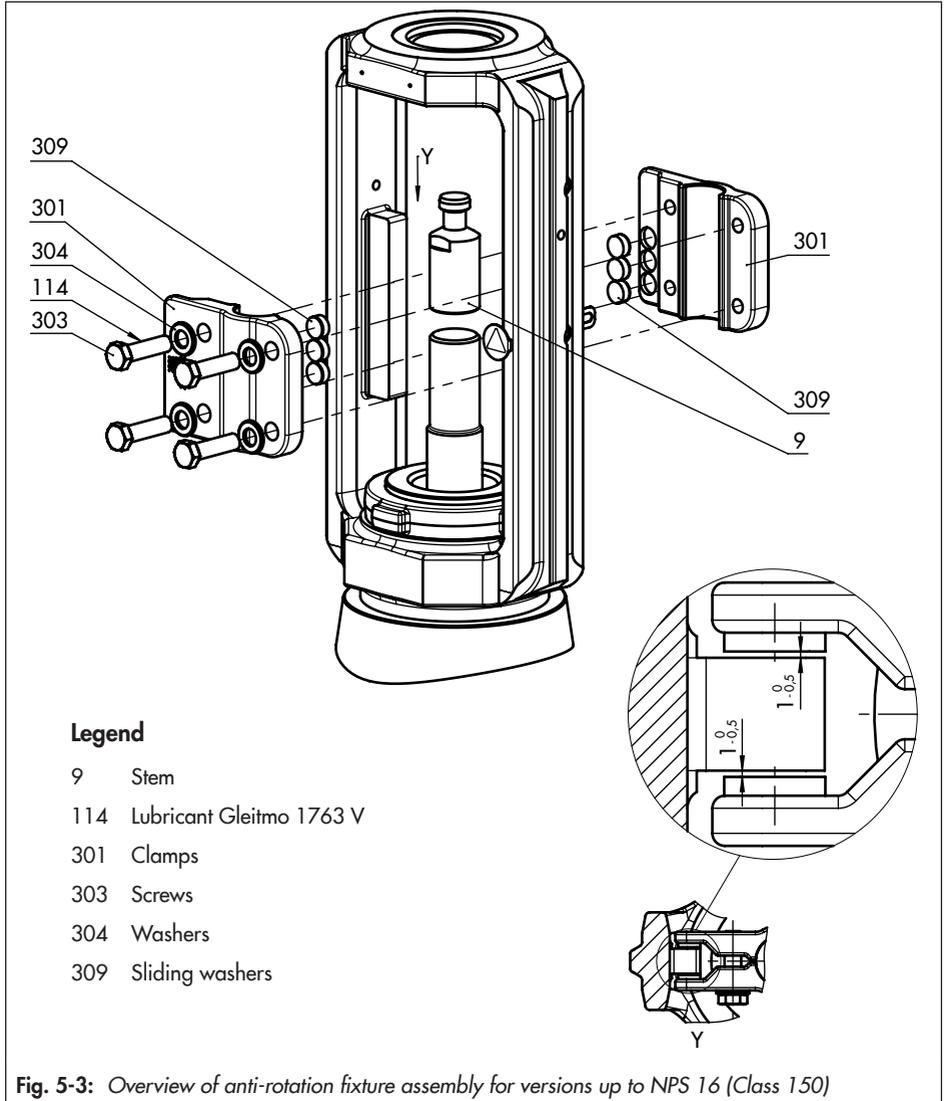
8. Position the clamps (301) and stem (9) on the piston stem according to Table 5-3 and tighten screws (303) and washers (304) by hand.
9. Mount the actuator. See section 5.3.2.
10. Thread the stem (9) upwards until the head of the stem rests on the extended actuator stem.
11. Retract the actuator stem to relieve the stem (9).
12. Gradually tighten the screws (303) in a crisscross pattern. Observe the tightening torques specified in Table 5-2.

Table 5-2: *Tightening torques*

Screw size	Tightening torque [Nm]
M12	50
M16	121

13. 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. 5-3).
 - The anti-rotation fixture does not get stuck on the yoke and can move freely in the direction of travel.
14. Extend the actuator stem again and mount the stem connector clamps.

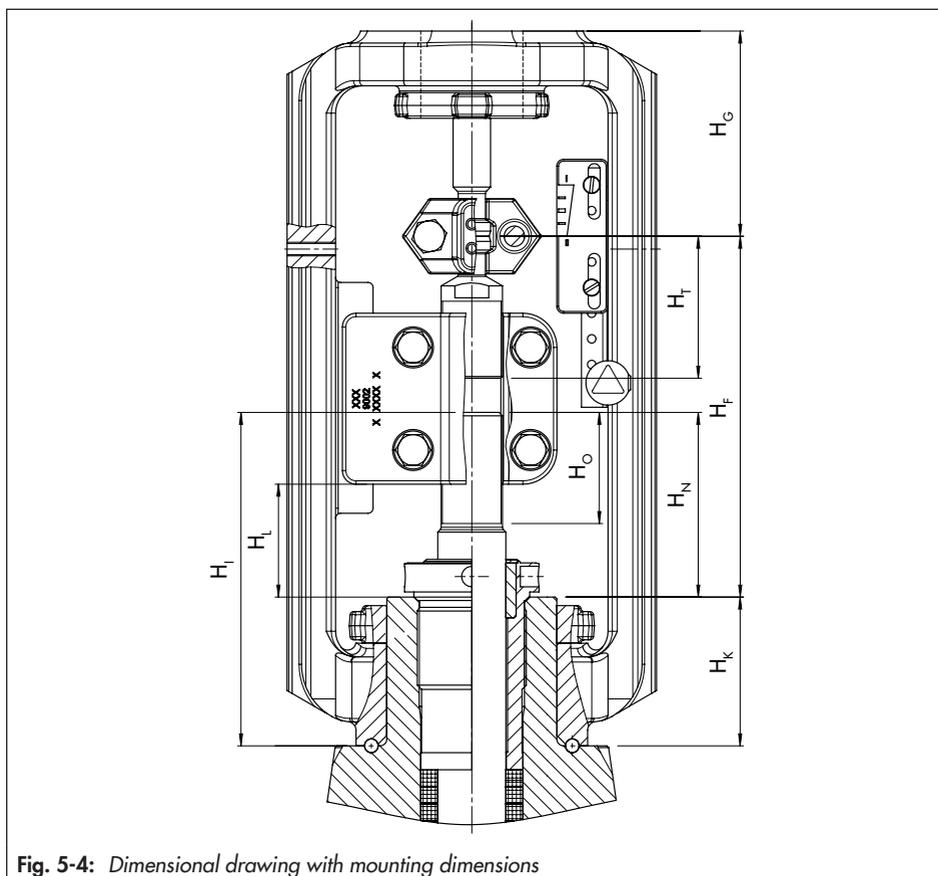




Installation

Table 5-3: Mounting dimensions for Type 3271 Pneumatic Actuator

Actuator [cm ²]	Travel [mm]	Actuator preloading		Dimension when the valve is closed [mm]												
		[%]	[mm]	H _F	H _G	H _I	H _K	H _L	H _N	H _O	H _T					
Versions up to NPS 10, seat bore 200																
355 700 750	30	0	0	241	90	195	87	61	108	65	120					
1000 1400-60	30	0	0	211	120						66	83				
	30	75	45	211	120						66	83				
	60	0	0	166	165						52	55				
	60	25	15	181	150						52	55				
1400-120	15	87.5	105	236	180						61	115				
	30	0	0	191	225						48	76				
	30	75	90	221	195						61	100				
	60	0	0	308	255						61	185				
	60	50	60	191	225						48	76				
2800 5600	30	0	0	191	225						48	76				
	30	100	120	221	195						61	100				
	60	0	0	308	255						61	185				
	60	75	90	191	225						48	76				
Versions in NPS 10 and larger, seat bore 250																
1000 1400-60	30	0	0	281	135						237	87	100	150	110	121
	30	75	45	296	120	135										
	60	0	0	251	165	91										
	60	25	15	266	150	91										
1400-120	60	0	0	308	255	145										
	60	50	60	338	225	175										
	120	0	0	278	285	FA=115 FE=86										
2800 5600	60	0	0	308	255	145										
	60	75	90	338	225	175										
	120	0	0	248	315	FE=86										
	120	25	30	278	285	115										



b) Versions in NPS 16 and larger (Class 300 and higher)

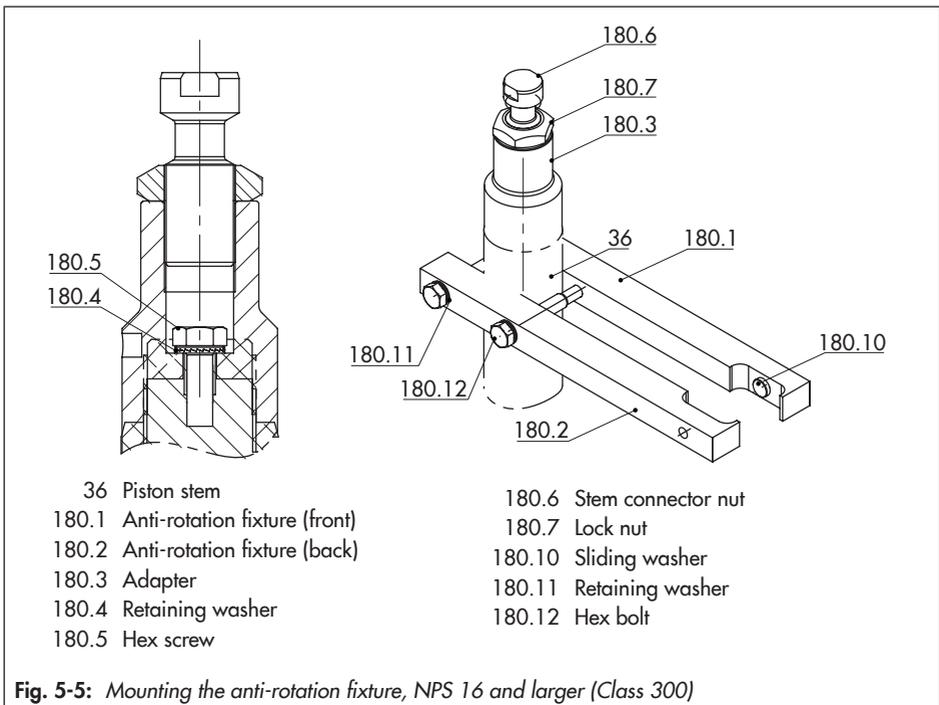
See Fig. 5-5

1. Screw the adapter (180.3) onto the piston stem (36).
2. Screw the hex screw (180.5) with washer (180.4) into the piston stem (36). Observe tightening torques.
3. Loosely screw the lock nut (180.7) and stem connector nut (180.6) onto the adapter (180.3).
4. Fasten the front anti-rotation fixture (180.1) and back anti-rotation fixture (180.2) using the hex screws (180.12) and washers (180.11). Mount the anti-rotation fixtures (180.1 and 180.2) in such a way that they surround the column of the yoke to which the travel indicator scale is attached. Observe tightening torques.

(180.2) to the piston stem (36) using the hex screws (180.12) and washers (180.11). Mount the anti-rotation fixtures (180.1 and 180.2) in such a way that they surround the column of the yoke to which the travel indicator scale is attached. Observe tightening torques.

Tightening torques

Item no.	Piston stem diameter	
	60 mm	80 mm
180.5	45	100
180.12	120	120



5.3.2 Mounting the actuator onto the valve

⚠ WARNING

Risk of personal injury due to preloaded springs.

Actuators with preloaded springs are under tension. They can be identified by the long bolts protruding from the bottom of the actuator.

- Before starting any work on the actuator, 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 (valves up to NPS 16/Class 150).

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).
- First remove the actuator from the valve or ensure it cannot transmit any forces to the actuator stem before removing the anti-rotation fixture on 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.

a) Mounting the actuator

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

b) Aligning the travel indicator scale

After mounting the actuator, the travel indicator scale must be aligned.

Versions up to NPS 16 (Class 150)

The '0' on the travel indicator scale must be aligned with the tip of the stem connector clamp (see Fig. 5-6).

Versions in NPS 16 (Class 300 to 900) and NPS 20 (Class 150 to 900) to 32 (Class 150)

The '0' on the scale must be aligned with the top of the anti-rotation fixture (180.2) (see Fig. 5-6).

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.

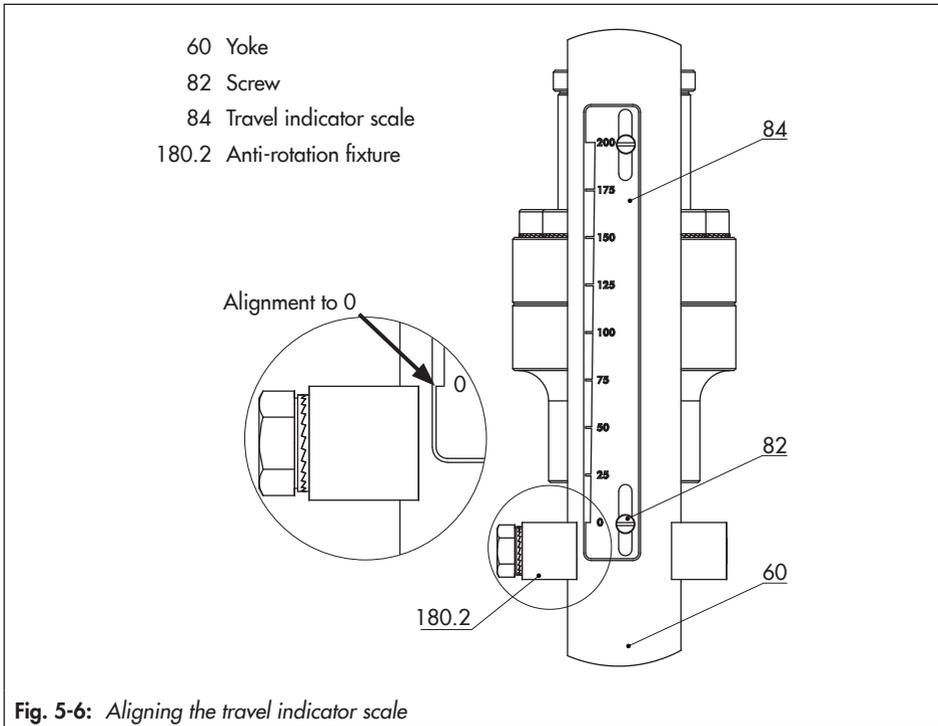


Fig. 5-6: Aligning the travel indicator scale

5.3.3 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.

⚠ NOTICE

Premature wear and leakage due to insufficient support or suspension.

→ Support or suspend the valve sufficiently at suitable points.

a) 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 the 'Lifting the valve' section). 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 supports or suspensions.

b) Version with welding ends

1. Proceed as described for 'Version with flanges' (steps 1 to 4).
2. Completely retract the actuator stem to protect the piston from sparks during welding.
3. Weld the valve free of stress into the pipeline.
4. Attach supports or suspensions.

5.4 Testing the installed valve

DANGER

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

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 working on the control valve:

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

WARNING

Risk of personal injury due to pressurized components and process medium being discharged.

- ➔ Do not loosen the screw of the test connection while the valve is pressurized.

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 ac-

Installation

cessories not fitted with noise-reducing fittings. Both can damage hearing.

- Wear hearing protection when working near the valve.

WARNING

Crush hazard arising from moving parts (actuator and piston stem).

- Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- Before working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- Do not impede the movement of the actuator and piston stem by inserting objects into the yoke.
- Before unblocking the actuator and piston 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.

While the valve is operating, air is vented from the actuator, for example, during closed-loop operation or when the valve opens or closes.

- Wear eye protection when working in close proximity to the control valve.

WARNING

Risk of personal injury due to preloaded springs.

Actuators with preloaded springs are under tension. They can be identified by the long bolts protruding from the bottom of the actuator.

- Before starting any work on the actuator, 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:

5.4.1 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. 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.
3. Open the valve.
4. Apply the required test pressure.

5. Check the valve for leakage to the atmosphere.
6. Depressurize the pipeline section and valve.
7. Rework any parts that leak (see information below under 'Adjusting the packing') and repeat the leak test.

Adjusting the packing

A label on the yoke indicates whether an adjustable packing is installed (see the 'Markings on the device' section).

NOTICE

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

A special tool is required for form HT packings.

→ *Contact our after-sales service.*

NOTICE

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

→ *Make sure that the piston stem can still move smoothly after the threaded bushing has been tightened.*

1. **Up to NPS 16 (Class 150):** tighten the threaded bushing gradually (by turning it clockwise) until the packing seals the valve.

NPS 16 and larger (Class 300 and higher): tighten the nuts on the packing gland in a crisscross pattern (by turning

them clockwise) until the packing seals the valve.

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.

5.4.2 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.

5.4.3 Fail-safe position

- Shut off the signal pressure line.
- Check whether the valve moves to the fail-safe position (see the 'Design and principle of operation' section).

5.4.4 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.

Installation

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

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

6 Start-up

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

⚠ WARNING

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

Valve components and the pipeline may become very hot or cold. Risk of burn injuries.

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

⚠ WARNING

Risk of personal injury due to pressurized components and process medium being discharged.

- Do not loosen the screw of the test connection while the valve is pressurized.

⚠ 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 brief loud noise may occur through the sudden venting of the pneumatic actuator (see 'Fail-safe position') or pneumatic valve accessories not fitted with noise-reducing fittings. Both can damage hearing.

- Wear hearing protection when working near the valve.

⚠ WARNING

Crush hazard arising from moving parts (actuator and piston stem).

- Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- Before working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- Do not impede the movement of the actuator and piston stem by inserting objects into the yoke.
- Before unblocking the actuator and piston 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.

While the valve is operating, air is vented from, for example, the actuator during closed-loop operation or when the valve opens or closes.

- Wear eye protection when working in close proximity to the control valve.

Start-up

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

- The valve is properly installed into the pipeline (see the 'Installation' section).
- The leak and function tests have been completed successfully (see the 'Testing the installed valve' section).
- The prevailing conditions in the plant section concerned meet the valve sizing requirements (see information under 'Intended use' in the 'Safety instructions and measures' section).

Start-up/putting the valve 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 can 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 pipeline.

Valve components and the pipeline may become very hot or cold. Risk of burn injuries.

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

⚠ WARNING

Risk of personal injury due to pressurized components and process medium being discharged.

- Do not loosen the screw of the test connection while the valve is pressurized.

⚠ 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 fittings. Both can damage hearing.

- Wear hearing protection when working near the valve.

⚠ WARNING

Crush hazard arising from moving parts (actuator and piston stem).

- Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- Before working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- Do not impede the movement of the actuator and piston stem by inserting objects into the yoke.
- Before unblocking the actuator and piston 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.

While the valve is operating, air is vented from, for example, the actuator during closed-loop operation or when the valve opens or closes.

- Wear eye protection when working in close proximity to the control valve.

Operation

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 case of supply air failure.

8 Malfunctions

Read hazard statements, warnings and caution notes in the 'Safety instructions and measures' section.

8.1 Troubleshooting

Malfunction	Possible reasons	Recommended action
Actuator and piston stem does not move on demand.	Actuator is blocked.	Check attachment. Remove the blockage. WARNING! A blocked actuator 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 or piston 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.
	Signal pressure too low	Check the signal pressure. Check the signal pressure line for leakage.
Jolting movement of the actuator and piston stem	Version with adjustable packing ¹⁾ : packing not tightened correctly	Tighten the packing correctly (see information under 'Adjusting the packing' in the 'Testing the installed valve' section).
Actuator and piston stem does not stroke through the entire range.	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.

Malfunctions

Malfunction	Possible reasons	Recommended action
Increased flow through closed valve (seat leakage)	Dirt or other foreign particles deposited between the seat and piston	Shut off the section of the pipeline and flush the valve.
	Valve trim is worn out.	Contact our after-sales service.
	Gasket underneath the seat bridge is worn out.	Contact our after-sales service.
	Gasket at the cage is worn out.	Contact our after-sales service.
The valve leaks to the atmosphere (fugitive emissions).	Defective packing	Contact our after-sales service.
	Version with adjustable packing ¹⁾ : packing not tightened correctly	Adjust the packing (see information under 'Adjusting the packing' in the 'Testing the installed valve' section). Contact our after-sales service when it continues to leak.
	Version with bellows seal: the bellows seal is defective.	Contact our after-sales service.
	Flange joint loose or gasket worn out	Check the flange joint. Contact our after-sales service.

¹⁾ See the 'Markings on the device' section

i Note

Contact our after-sales service for malfunctions not listed in the table.

8.2 Emergency action

The plant operator is 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 section 8.1).
3. Rectify those malfunctions that can be remedied based on the instructions provided here. Contact our after-sales service in all other cases.

Putting the valve back into operation after a malfunction

See the 'Start-up' section.

9 Servicing

NOTICE

Risk of valve damage due to incorrect servicing.

- Do not perform any service work on the valve on your own.
- Contact our after-sales service to have service work performed.

9.1 Periodic testing

Depending on the operating conditions, check the 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.

Note

The control valve was checked by SAMSON before it left the factory.

- *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.*

9.2 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

Details on spare parts are available on request.

Lubricant

Details on suitable lubricants are available on request (see bill of materials).

Tools

Details on suitable tools are available on request.

10 Decommissioning

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

⚠ DANGER

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

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 working on the control valve:

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

⚠ WARNING

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

Valve components and the pipeline may become very hot or cold. Risk of burn injuries.

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

⚠ WARNING

Risk of personal injury due to pressurized components and process medium being discharged.

- Do not loosen the screw of the test connection while the valve is pressurized.

⚠ 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 fittings. Both can damage hearing.

- Wear hearing protection when working near the valve.

⚠ WARNING

Crush hazard arising from moving parts (actuator and piston stem).

- Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- Before working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- Do not impede the movement of the actuator and piston stem by inserting objects into the yoke.

Decommissioning

→ Before unblocking the actuator and piston 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.

While the valve is operating, air is vented from, for example, the actuator during closed-loop operation or when the valve opens or closes.

→ Wear eye protection when working in close proximity to the control valve.

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.

→ Wear protective clothing, safety gloves, respiratory protection and eye protection.

To decommission the control valve 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 section is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ WARNING

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

Valve components and the pipeline may become very hot or cold. Risk of burn injuries.

- 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 (actuator and piston stem).

- Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- Before working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- Do not impede the movement of the actuator and piston stem by inserting objects into the yoke.
- Before unblocking the actuator and piston 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.

- Wear protective clothing, safety gloves, respiratory protection and eye protection.

⚠ WARNING

Risk of personal injury due to preloaded springs.

Actuators with preloaded springs are under tension. They can be identified by the long bolts protruding from the bottom of the actuator.

- Before starting any work on the actuator, relieve the compression from the preloaded springs.

⚠ WARNING

Risk of personal injury due to incorrect removal of the anti-rotation fixture under tension (valves up to NPS 16/Class 150).

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

Removal

springs is transmitted to the actuator stem and the stem (9).

- *First remove the actuator from the valve or ensure it cannot transmit any forces to the actuator stem before removing the anti-rotation fixture on the plug stem.*
-

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

- The control valve is put out of operation (see the 'Decommissioning' section).

11.1 Removing the valve from the pipeline

a) Version with flanges

1. Support the valve to hold it in place when separated from the pipeline (see the 'Shipment and on-site transport' section).
2. Unbolt the flange joint.
3. Remove the valve from the pipeline (see the 'Shipment and on-site transport' section).

b) Version with welding ends

1. Support the valve to hold it in place when separated from the pipeline (see the 'Shipment and on-site transport' section).
2. Cut the pipeline in front of the weld seam.

3. Remove the valve from the pipeline (see the 'Shipment and on-site transport' section).

11.2 Removing the actuator from the valve

See associated actuator documentation.

12 Repairs

If the 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 repair work.

- ➔ Do not perform any repair work on your own.
- ➔ Contact SAMSON's After-sales Service for 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 & Support > After-sales Service.
2. Send an e-mail
 - ▶ retouren@samsongroup.com to register the return shipment including the following information:
 - Type
 - Article no.
 - Configuration ID
 - Original order

- Completed Declaration on Contamination, which can be downloaded from our website at
 - ▶ www.samsongroup.com > Service & Support > After-sales Service.

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.

i Note

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

- ▶ www.samsongroup.com > Service & Support > After-sales Service.

13 Disposal

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

14 Certificates

The declaration of conformity in accordance with Pressure Equipment Directive 2014/68/EU is provided on the next page.

The certificate shown was up to date at the time of publishing. The latest certificates can be found on our website:

► www.samsongroup.com > *Products & Applications* > *Product selector* > *Valves* > *3591*

Other optional certificates are available on request.

EU DECLARATION OF CONFORMITY TRANSLATION



Module H / N° CE-0062-PED-H-SAM 001-20-DEU-rev-A

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

Devices	Series	Type	Version
Globe valve	240	3241	DIN, body of cast iron from DN 150, body of spheroidal-graphite iron, from DN 100, fluids G2, L1, L2 ¹⁾ DIN/ANSI, body of steel, etc., all fluids
Three-way valve	240	3244	DIN, body of cast iron from DN 150, body of spheroidal-graphite iron, from DN 100, fluids G2, L1, L2 ¹⁾ DIN/ANSI, body of steel, etc., all fluids
Cryogenic valve	240	3248	DIN/ANSI, all fluids
Globe valve	250	3251	DIN/ANSI, all fluids
Globe valve	250	3251-E	DIN/ANSI, all fluids
Three-way valve	250	3253	DIN/ANSI, body of steel, etc., all fluids
Globe valve	250	3254	DIN/ANSI, all fluids
Angle valve	250	3256	DIN/ANSI, all fluids
Split-body valve	250	3258	DIN, all fluids
Angle valve (IG standards)	250	3259	DIN, all fluids
Steam-converting valve	280	3281	DIN/ANSI, all fluids
		3284	DIN/ANSI, all fluids
		3286	DIN/ANSI, all fluids
		3288	DIN, all fluids
Globe valve	V2001	3321	DIN, body of steel, etc., all fluids ANSI, all fluids
Three-way valve	V2001	3323	DIN, body of steel, etc., all fluids ANSI, all fluids
Angle seat valve	---	3353	DIN, body of steel, etc., all fluids
Silencer	3381	3381-1	DIN/ANSI, single attenuation plate with welding ends, all fluids
		3381-3	DIN/ANSI, all fluids
		3381-4	DIN/ANSI, single attenuation plate multi-stage with welding ends, all fluids
		3381-4	DIN/ANSI, single attenuation plate multi-stage with welding ends, all fluids
Globe valve	240	3241	ANSI, body of cast iron, Class 125, from NPS 5, fluids G2, L1, L2 ¹⁾
Cryogenic valve	240	3246	DIN/ANSI, all fluids
Three-way valve	250	3253	DIN, body of cast iron from DN200 PN16, fluids G2, L1, L2 ¹⁾
Globe valve	290	3291	ANSI, all fluids
Angle valve	290	3296	ANSI, 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	---	3595	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	by Bureau Veritas 0062

The manufacturer's quality management system is monitored by the following notified body:
Bureau Veritas Services SAS, 8 Cours du Triangle, 92800 PUTEAUX - LA DEFENSE
Technical standards applied: DIN EN12516-2, DIN EN12516-3, ASME B16.34

Manufacturer: SAMSON AG, Weismuellerstrasse 3, 60314 Frankfurt am Main, Germany
Frankfurt am Main, 7 April 2021


Dr. Andreas Wild
Chief Executive Officer (CEO)


Dr. Thomas Steckenreiter
Chief Technology Officer (CTO)

Revision 08

Classification: Public · SAMSON AKTIENGESELLSCHAFT · Weismuellerstrasse 3 · 60314 Frankfurt am Main, Germany

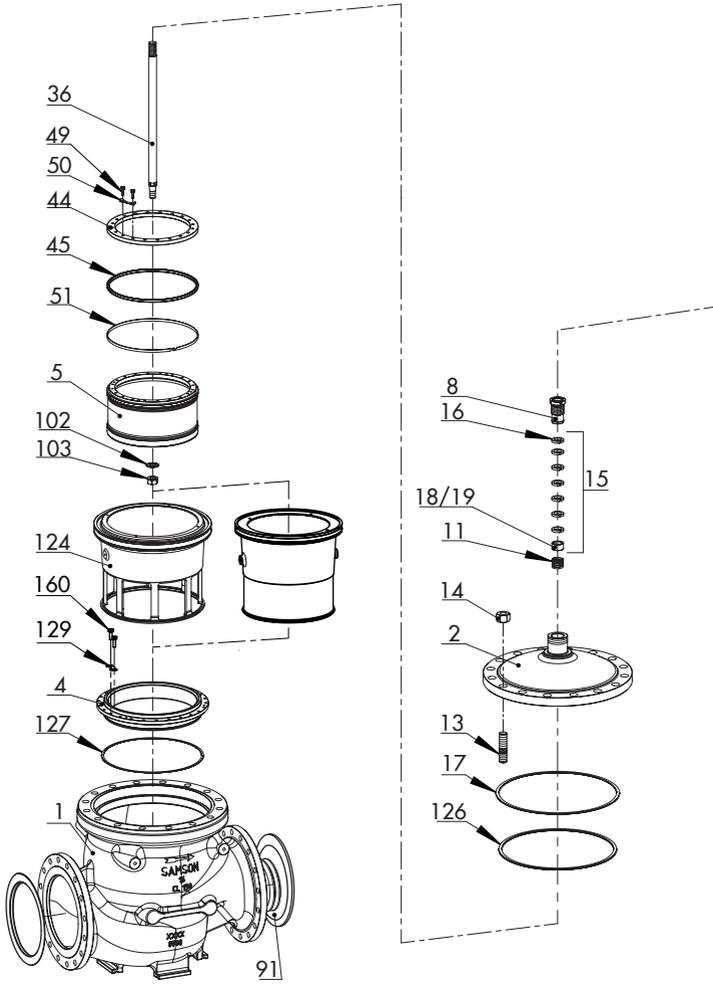
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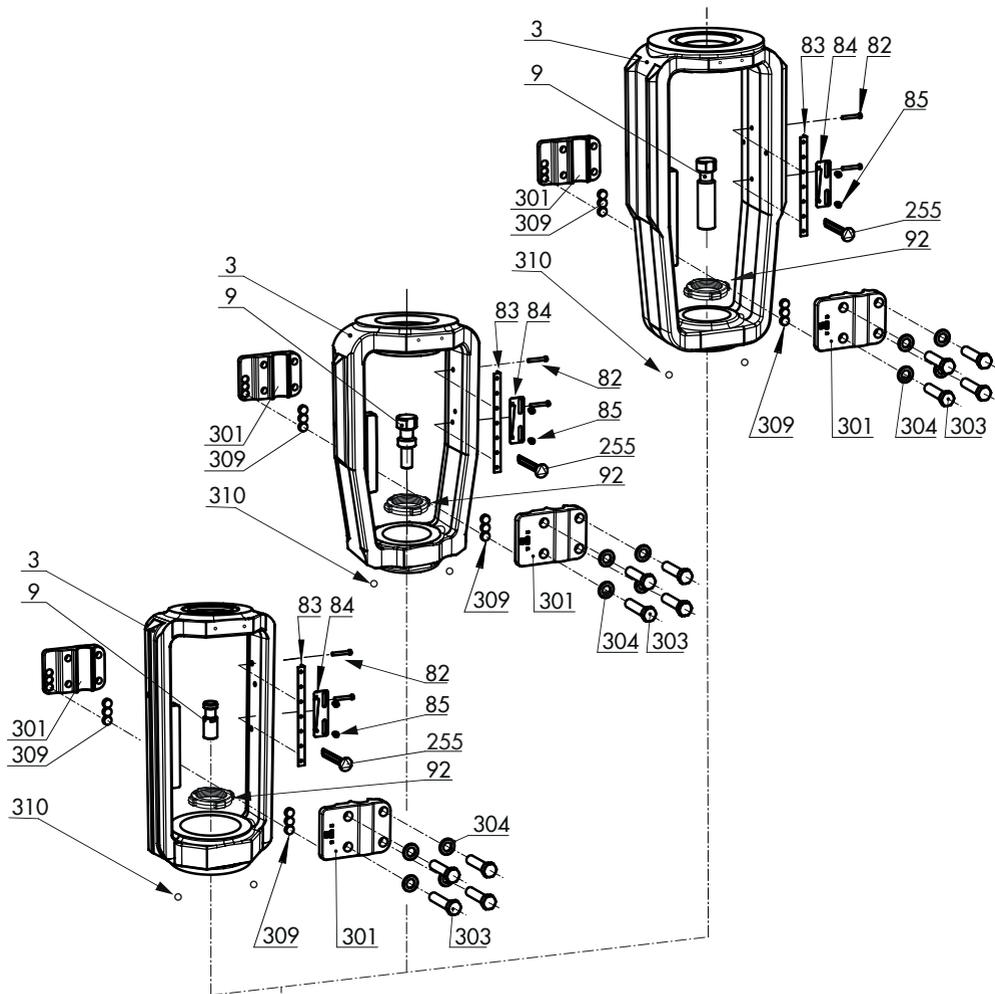
15 Annex

15.1 Spare parts for Type 3591, NPS 10 to 16 (Class 150)

1	Body	160	Screw
2	Bonnet	255	Warning label
3	Yoke	301	Clamps
4	Seat	303	Screws
5	Piston	304	Washers
8	Threaded bushing (packing nut)	309	Slider disks
9	Stem	310	Ball bearing
11	Spring		
13	Stud bolt		
14	Body nut		
15	Packing		
16	V-ring packing		
17	Body gasket		
18/19	Bushing		
36	Piston stem		
44	Ring (pressure balancing)		
45	Gasket (pressure balancing)		
49	Screw (pressure balancing)		
50	Washer (pressure balancing)		
51	Guide ring (several guides only for version with graphite seal)		
82	Screw		
83	Hanger		
84	Travel indicator scale		
85	Screw		
91	Protective cap		
92	Castellated nut		
102	Snap ring		
103	Retaining nut		
124	Cage		
126	Gasket between cage and bonnet		
127	Seat bridge gasket		
129	Washer (Class 300 and higher)		

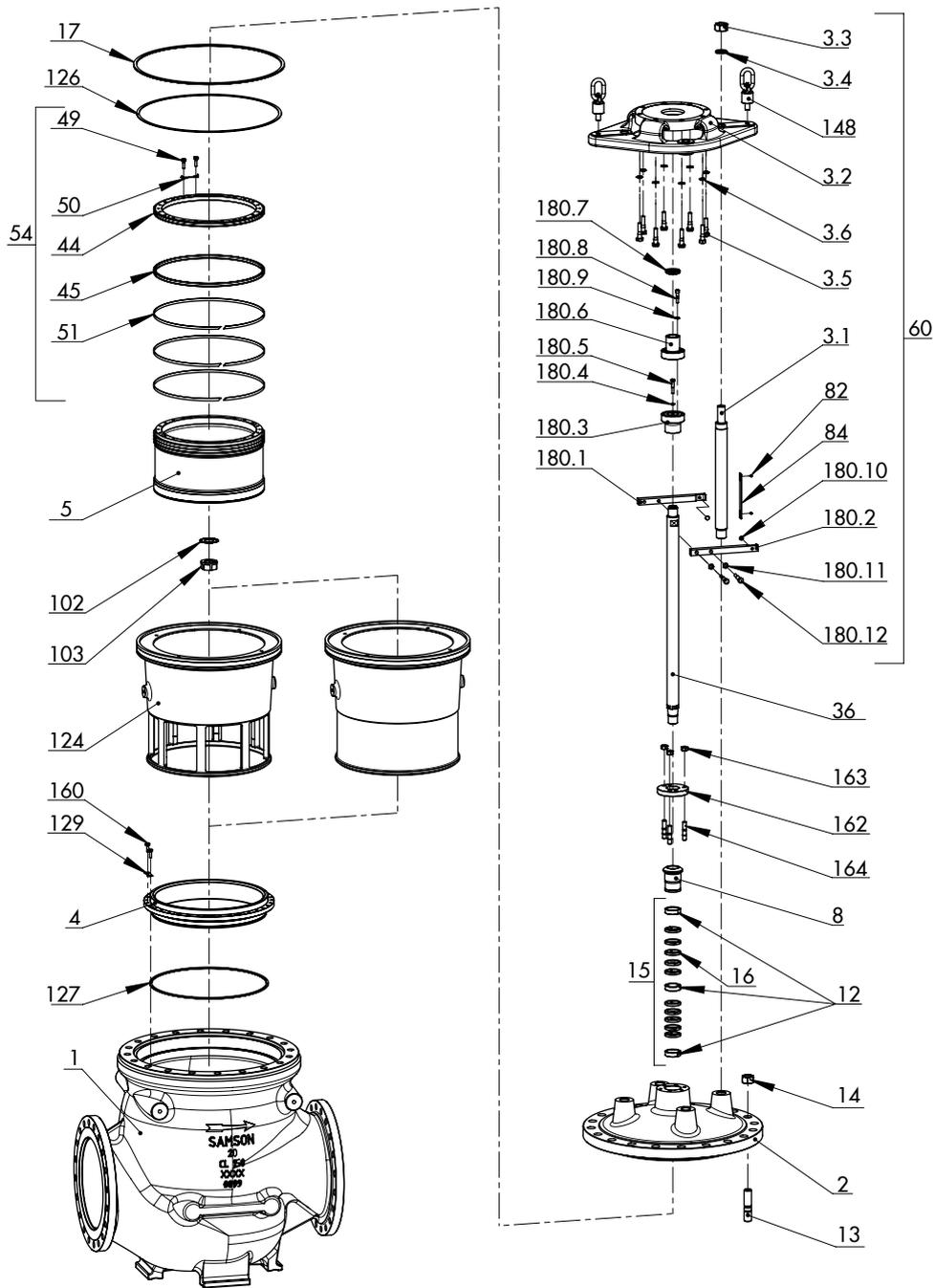
Type 3591 · Flanged seat · NPS 10 to 16 (Class 150)





15.2 Spare parts for Type 3591, NPS 16 (Class 300) to 28 and NPS 32 (Class 150)

1	Body	180.6	Stem connector nut
2	Bonnet	180.7	Lock nut
3	Yoke	180.8	Screw
3.1	Rod	180.9	Washer
3.2	Plate	180.10	Slider disk
3.3	Nut	180.11	Retaining washer
3.4	Retaining washer	180.12	Hex screw
3.5	Screw	82	Screw
3.6	Washer	84	Travel indicator scale
4	Seat	85	Screw
5	Piston	92	Castellated nut
8	Threaded bushing (packing nut)	102	Snap ring
11	Spring	103	Retaining nut
12	Washer	124	Cage
13	Stud bolt	125	Spacer ring
14	Body nut	126	Gasket between cage and bonnet
15	Packing	127	Seat bridge gasket
16	V-ring packing	129	Washer (Class 300 and higher)
17	Body gasket	148	Lifting eyelet
18/19	Bushing	160	Screw
36	Piston stem	162	Flange for packing gland
39	Gasket	163	Nut for packing gland
44	Ring (pressure balancing)	164	Stud for packing gland
45	Gasket (pressure balancing)	180	Actuator connection assembly with anti-rotation fixture
49	Screw (pressure balancing)		
50	Washer (pressure balancing)		
51	Guide rings		
54	Pressure balancing assembly		
60	Yoke assembly		
180.1	Anti-rotation fixture (front)		
180.2	Anti-rotation fixture (back)		
180.3	Adapter		
180.4	Retaining washer		
180.5	Hex screw		



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 address

You can reach our after-sales service at aftersaleservice@samsongroup.com.

Addresses of SAMSON AG and its subsidiaries

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

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
- Direction of flow
- Bench range of the actuator (e.g. 0.2 to 1 bar)
- Is a strainer installed?
- Installation drawing

EB 8075 EN



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