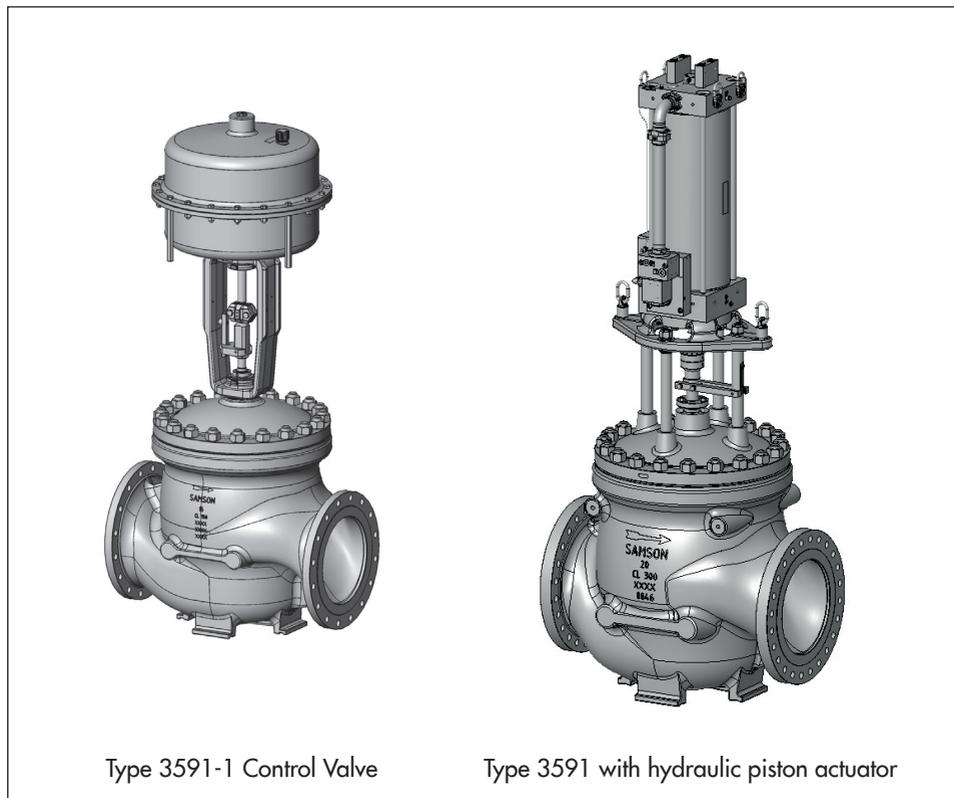




EB 8075 EN

Translation of original instructions



Type 3591-1 Control Valve

Type 3591 with hydraulic piston actuator

Type 3591 Valve

In combination with actuators,
e.g. SAMSON Type 3271 or Type 3277 Pneumatic Actuator
ANSI version

Edition August 2016



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.

- 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 Department (aftersaleservice@samson.de).



The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at www.samson.de > **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 or Type 3277 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 applications 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, SAMSON must be contacted.

SAMSON does not assume any liability for damage resulting from the failure to use the valve 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 in the technical data
- Use outside the limits defined by the valve accessories mounted on the control valve

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

- Use of non-original spare parts
- Performing servicing and repair work not described in these instructions

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 are to 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.

Safety instructions and measures

Personal protective equipment

We recommend wearing the following protective equipment depending on the process medium:

- Protective clothing, gloves and eyewear in applications with hot, cold, and/or corrosive media
 - Wear hearing protection when working near the valve.
- ➔ Check with the plant operator for details on further protective equipment.

Revisions and other modifications

Revisions, conversions or other modifications to 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 devices

Upon supply air or control signal failure, the valve moves to its fail-safe position (see section 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 (see actuator documentation).

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. They must observe all hazard statements, warning and caution notes in these mounting and operating instructions, especially for installation, start-up, and servicing.

Responsibilities of the operator

The operator is responsible for proper operation and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions to the operating personnel and to instruct them in proper operation. Furthermore, operators must ensure that operating personnel or third persons are not exposed to any danger.

Responsibilities of operating personnel

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

Referenced standards 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. This declaration of conformity is included in the Appendix of these instructions (see section 10.2).

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 EN 13463-1: 2009, section 5.2, 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 Part 1).

Referenced documentation

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

- Mounting and operating instructions for mounted actuator, e.g. ▶ EB 8310-X for SAMSON Type 3271 and Type 3277 Actuators
- Mounting and operating instructions for mounted valve accessories (positioner, solenoid valve etc.)
- For oxygen service: Manual ▶ H 01

1.1 Notes on possible severe personal injury

DANGER

Risk of bursting in pressure equipment.

Control valves and pipelines are pressure equipment. Improper opening can lead to valve components bursting.

- Before starting any work on the control valve, depressurize all plant sections concerned and the valve.
- Drain the process medium from all the plant sections concerned as well as the valve.
- Wear personal protective equipment.

1.2 Notes on possible personal injury

WARNING

Crush hazard arising from moving parts.

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

- Do not insert hands or finger into the yoke while the valve is in operation.
- While working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.

Risk of personal injury when the actuator vents.

While the valve is operating, the actuator may vent during closed-loop control or when the valve opens or closes.

- Install the control valve in such a way that the actuator does not vent at eye level.
- Use suitable silencers and vent plugs.
- Wear eye protection when working in close proximity to the control valve.

⚠ WARNING**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.

Piston actuators do not carry any label concerning preloading of the actuator springs.

- 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 process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- If possible, drain the process medium from all the plant sections concerned and the valve.
- Wear protective clothing, gloves, and eyewear.

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 heat up.
- Wear protective clothing and gloves.

1.3 Notes on possible property damage

! NOTICE

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

The plant engineering company is responsible for cleaning the pipelines in the plant.

- Flush the pipelines before start-up.
- Observe the maximum permissible pressure for valve and plant.

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 on tightening control valve components. Excessively tightened torques lead to parts wearing out quicker. 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.

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 the valve surface.

- Only use lubricants approved by SAMSON (see parts list).

2 Markings on the control valve

2.1 Valve nameplate

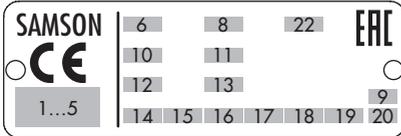
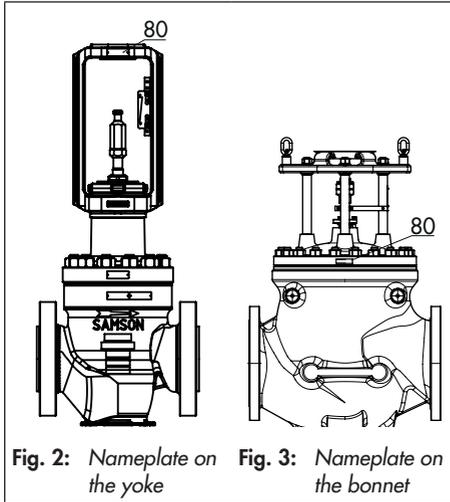


Fig. 1: Valve nameplate

- 1...5 PED (Pressure Equipment Directive), "Art. 4, Abs. 3"
ID of the notified body, fluid group, and category
- 6 Type designation
- 8 Material
- 9 Year of manufacture
- 10 Valve size: NPS
- 11 Pressure rating: CL (Class)
- 12 Order no. with modification index
For after-sales service orders: AA prefix
- 13 Position in order
For after-sales service orders: configuration ID
- 14 Flow coefficient: C_v
- 15 Characteristic:
%: equal percentage
Lin: linear
mod-lin: modified linear
NO/NC: on/off service
- 16 Seat/piston seal:
ME: metal
ST: Stellite® facing
- 17 Seat code (trim material). See section 2.3.
- 18 Pressure balancing: B
- 19 Flow divider/cage:
MHC 1: Multi-Hole Cage 1
CC 1: Combi Cage 1
- 20 Country of origin
- 22 Cage/seat style:
CC: Clamped cage, clamped seat
SF: Suspended cage, flanged seat
FF: Flanged cage, flanged seat

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



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

2.2 Actuator nameplate

See associated actuator documentation.

2.3 Material number

The seat and piston of the valves have an article number written on them. Specifying this article number, you can contact us 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 (17). For more details on the nameplate, see section 2.1.

3 Design and principle of operation

The Type 3591 Globe Valve is preferably combined with a Type 3271 or Type 3277 Pneumatic Actuator or a piston actuator.

The Type 3591 Valve uses a piston (5) moving within a cage (124) as the closing member. The piston is pressure-balanced as standard. The piston rod (36) is connected to the actuator stem by the clamps of the stem connector. A self-adjusting or manually adjustable PTFE or graphite packing (15) seals the piston rod.

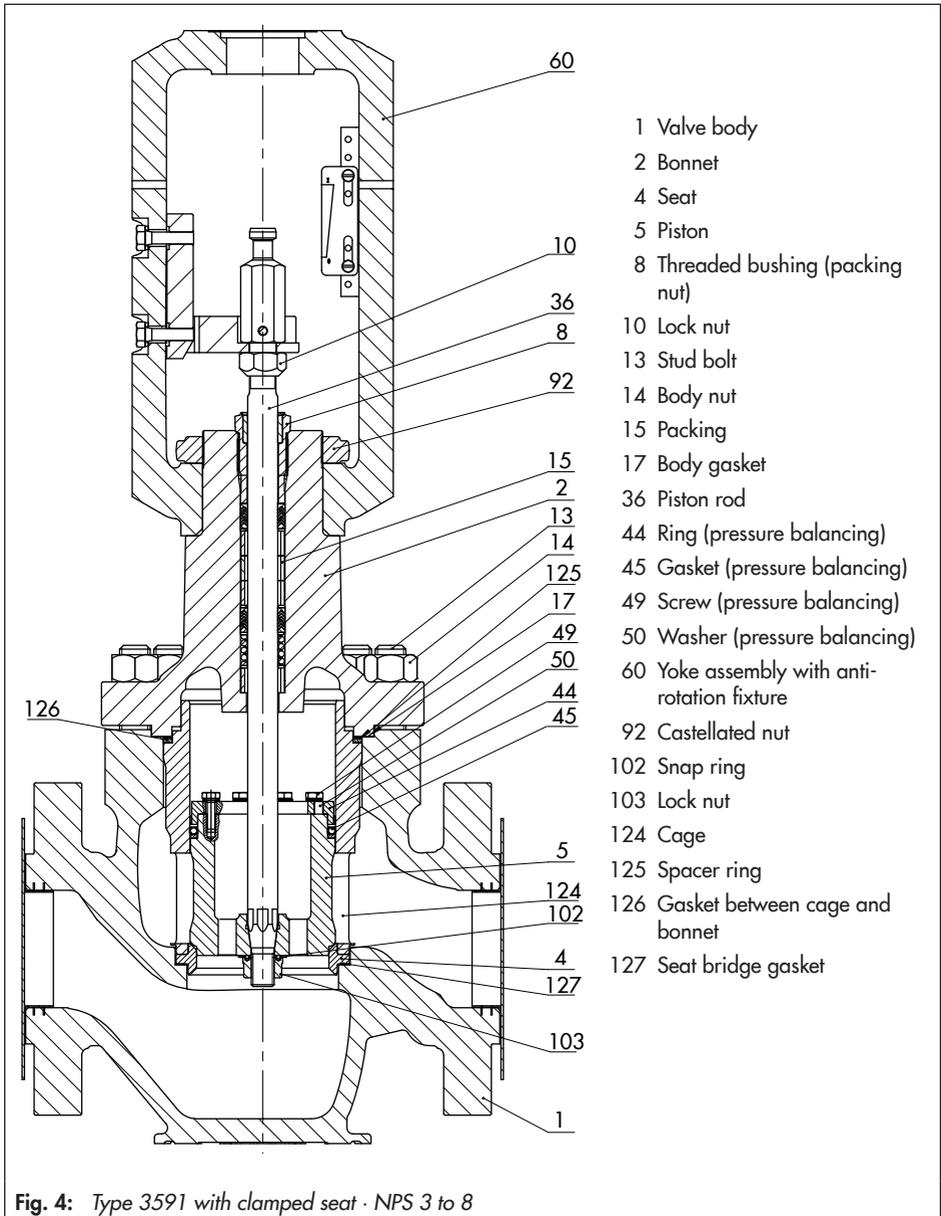
The medium flows through the valve as indicated by the arrow on the body. A change in the signal acting on the actuator causes the piston to move. The piston position and cage shape determine the released cross-section and the flow rate with it.

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) (see Fig. 4). 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. 5 to Fig. 8). In valve sizes \geq NPS 10 and pressure ratings \geq Class 300, a pin (223) is used on the cage to prevent it from rotating (see Fig. 7). Table 1 lists the different versions together with their special construction features.

The actuator is connected using a special assembly (60), which varies depending on the mounted actuator. These assemblies are fit-

ted with an external anti-rotation fixture for the piston rod.

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.



Design and principle of operation

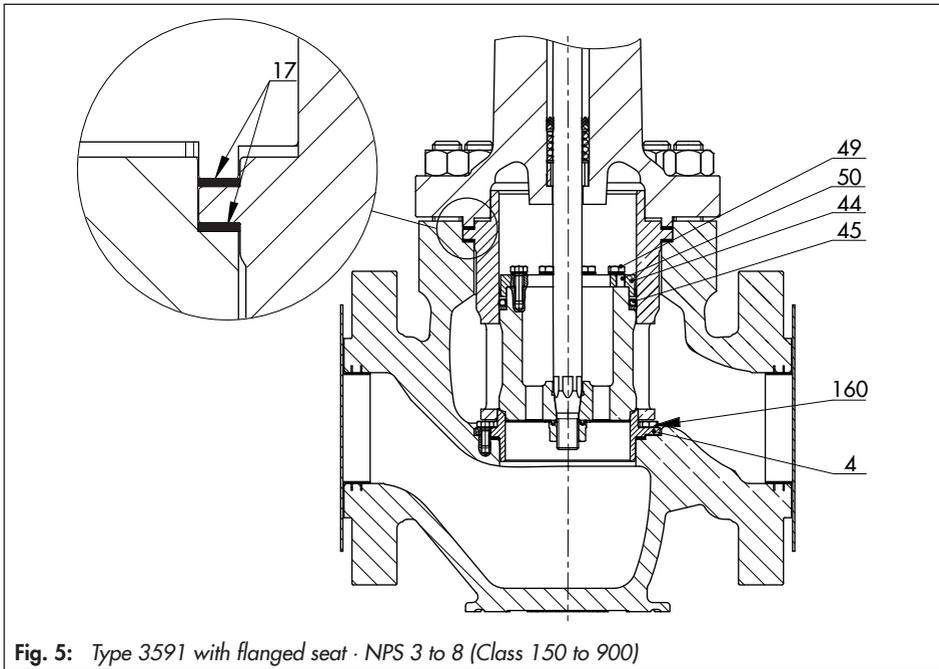


Fig. 5: Type 3591 with flanged seat · NPS 3 to 8 (Class 150 to 900)

Legend for Fig. 5 to Fig. 7

- | | |
|--------------------------------|---|
| 1 Valve body | 50 Washer (pressure balancing) |
| 2 Bonnet | 60 Yoke assembly with anti-rotation fixture |
| 4 Seat | 124 Cage |
| 5 Piston | 126 Gasket between cage and bonnet |
| 17 Body gasket | 160 Screw |
| 44 Ring (pressure balancing) | 223 Pin functioning as anti-rotation fixture on top of the cage (only for valves in \geq NPS 10 and \geq Class 300) |
| 45 Gasket (pressure balancing) | |
| 49 Screw (pressure balancing) | |

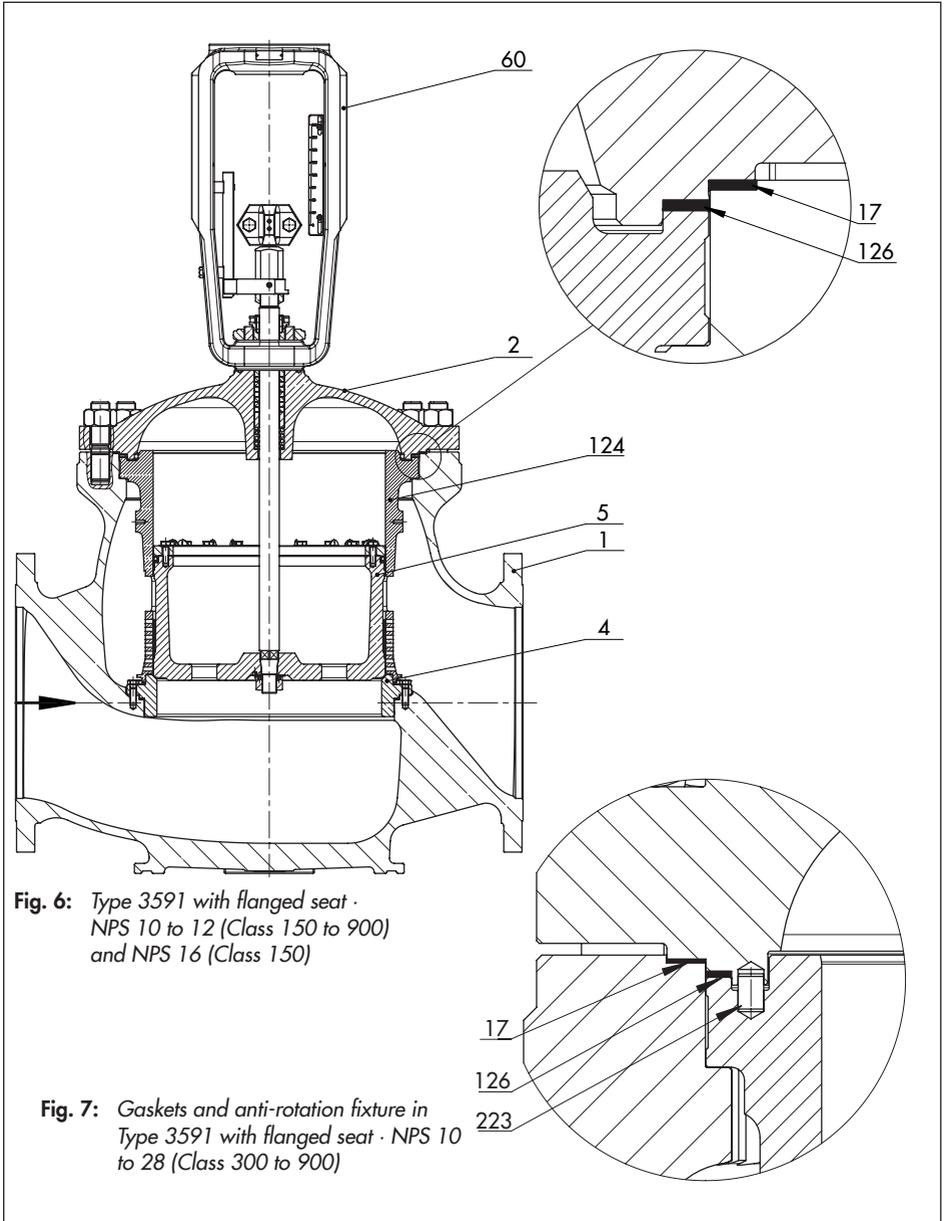
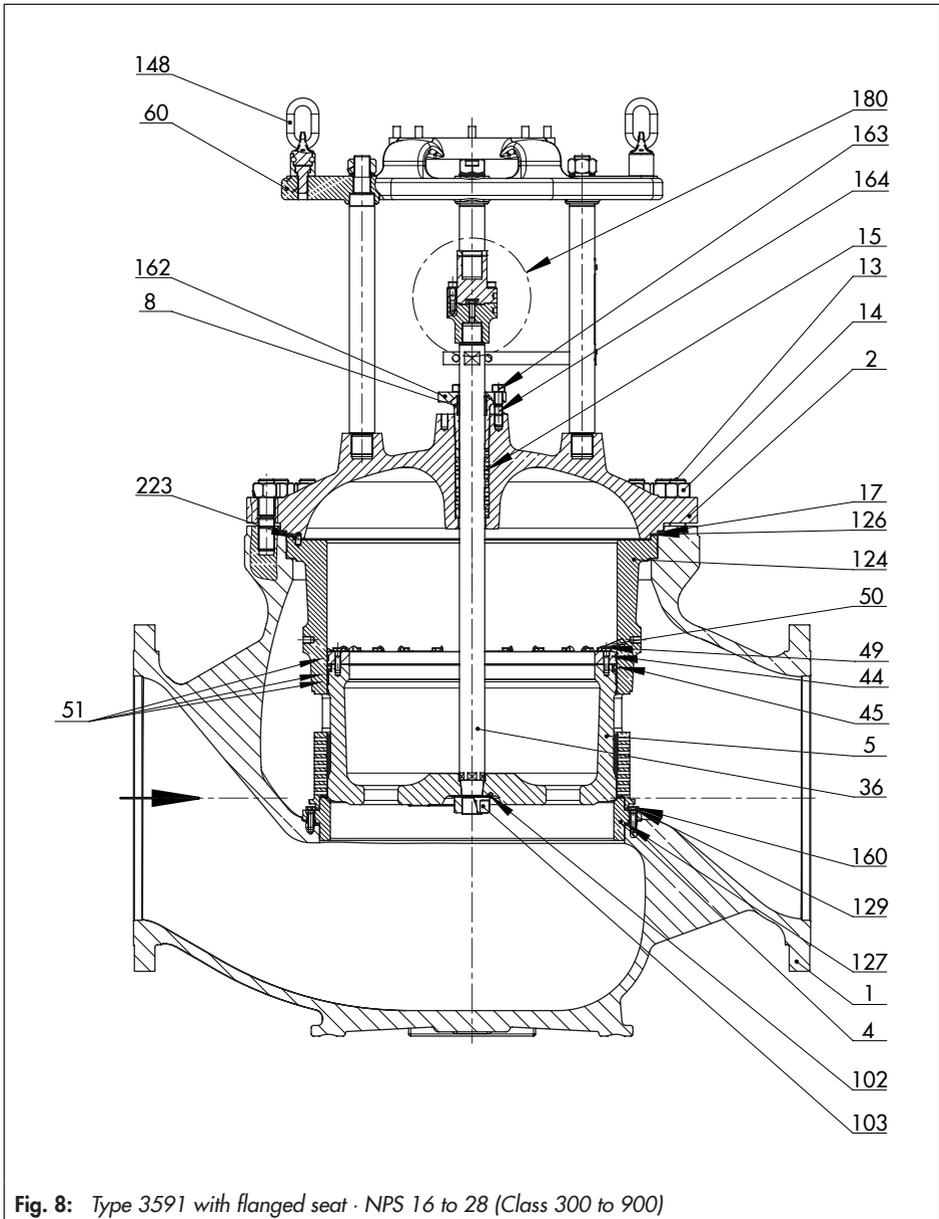


Fig. 6: Type 3591 with flanged seat ·
 NPS 10 to 12 (Class 150 to 900)
 and NPS 16 (Class 150)

Fig. 7: Gaskets and anti-rotation fixture in
 Type 3591 with flanged seat · NPS 10
 to 28 (Class 300 to 900)

Design and principle of operation



Legend Fig. 8

- 1 Body
- 2 Bonnet
- 4 Seat
- 5 Piston
- 8 Threaded bushing (packing nut)
- 13 Stud bolt
- 14 Body nut
- 15 Packing
- 17 Body gasket
- 36 Piston rod
- 44 Ring (pressure balancing)
- 45 Gasket (pressure balancing)
- 49 Screw (pressure balancing)
- 50 Washer (pressure balancing)
- 51 Guide rings (pressure balancing)
- 60 Yoke assembly with anti-rotation fixture (180)
- 102 Snap ring
- 103 Lock nut
- 124 Cage
- 126 Gasket between cage and bonnet
- 127 Seat bridge gasket
- 129 Washer
- 148 Lifting eyelet
- 160 Screw
- 162 Flange for packing gland
- 163 Nut for packing gland
- 164 Stud for packing gland
- 180 Anti-rotation fixture
- 223 Pin functioning as anti-rotation fixture on top of the cage (Class 300 and higher)

Table 1: Available versions

Valve size	Pressure rating	Seat	Gaskets (17, 126)	Pin (223) functioning as anti-rotation fixture	Fig.
NPS 3 to 8	Class 150 to 900	Clamped	Side by side	–	Fig. 4
NPS 3 to 8	Class 150 to 900	Flanged	One above the other	–	Fig. 5
NPS 10 to 12	Class 150	Flanged	Side by side	–	Fig. 6
NPS 10 to 12	Class 300 to 900	Flanged	Side by side	Yes	Fig. 7
NPS 16	Class 150	Flanged	Side by side	–	Fig. 6
NPS 16	Class 300 to 900	Flanged	Side by side	Yes	Fig. 7, Fig. 8
NPS 20 to 32	Class 150	Flanged	Side by side	–	–
NPS 20 to 28	Class 300 to 900	Flanged	Side by side	Yes	Fig. 7, Fig. 8

3.1 Fail-safe positions

The fail-safe position depends on the actuator's direction of action. Depending on how the compression springs are arranged in the 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 direction of action of the SAMSON actuator can be reversed, if required. Refer to the operating and mounting instructions of the pneumatic actuator, e.g. ► EB 8310-X for Type 3271 and Type 3277.

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

3.2 Versions

Insulating section and bellows seal

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

Actuators

In these instructions, the preferable combination with a Type 3271 or Type 3277 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. See section 3.3.

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

3.3 Technical data

The nameplates on the valve and actuator provide information on the control valve version. See section 2.1 and the associated actuator documentation.

i Note

More information is available in Data Sheet
► T 8075.

Compliance

The Type 3591 Valve bears both the CE and EAC marks of conformity.

**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).

Leakage class

Depending on the version, the following leakage class applies:

Seal (16 on nameplate)	ME, ST
Pressure balancing (18 on nameplate)	B
Leakage class (according to ANSI/FCI 70-2)	IV

Noise emission

SAMSON is unable to make general statements about noise emission as it depends on the valve version, plant facilities and process medium. On request, SAMSON can perform calculations according to IEC 60534, Part 8-3 and Part 8-4 or VDMA 24422 (edition 89).

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Wear hearing protection when working near the valve.

Design and principle of operation

Dimensions and weights

Table 2 to Table 5 provide a summary of the dimensions and weights of the standard version of Type 3591 Valve. The lengths and heights in the dimensional drawings are shown on p. 30.

Dimensions in mm/inch · Weights in kg/lbs

Table 2: *Dimensions of Type 3291 Valve · NPS 3 to 12 and NPS 16 (Class 150)*

Table 2.1: *Overall heights*

Valve	NPS	3	4	6	8	10	12	16		
H2	Class 150	mm	104	161	180	245	241	281	341	
		in	4.09	6.34	7.09	9.65	9.49	11.06	13.43	
	Class 300	mm	105	161	182	245	241	281	-	
		in	4.13	6.34	7.17	9.65	9.49	11.06		
	Class 600	mm	105	161	195	252	271	301		
		in	4.13	6.34	7.68	9.92	10.67	11.85		
	Class 900	mm	110	166	223	260	291	331		
		in	4.33	6.54	8.78	10.24	11.46	13.03		
H5	Class 150	mm	95	115	140	173	203	243		298
		in	3.74	4.53	5.51	6.81	7.99	9.57		11.73
	Class 300	mm	105	128	160	190	223	260	325	
		in	4.13	5.04	6.30	7.48	8.78	10.24	12.80	
	Class 600	mm	105	138	178	210	255	280	342	
		in	4.13	5.43	7.01	8.27	10.04	11.02	13.46	
	Class 900	mm	120	145	190	235	273	305	353	
		in	4.72	5.71	7.48	9.25	10.75	12.01	13.90	
H4	Class 150	mm	269	345	413	511	485	492	665	
		in	10.59	13.58	16.26	20.12	19.09	19.37	26.18	
	Class 300	mm	269	345	413	511	485	492	-	
		in	10.59	13.58	16.26	20.12	19.09	19.37		
	Class 600	mm	269	345	413	511	485	492		
		in	10.59	13.58	16.26	20.12	19.09	19.37		
	Class 900	mm	269	345	413	511	485	479		
		in	10.59	13.58	16.26	20.12	19.09	18.86		

Valve	NPS	3	4	6	8	10	12	16	
H8 for actu- ator	175 to 350 cm ²	mm	241	-	-	-	-	-	-
		in	9.49						
	355 to 750 cm ²	mm	241	481	419	-	-	-	-
		in	9.49	18.94	16.50				
	1000 to 1400-60 cm ²	mm	296	419	419	419	419	419	-
		in	11.65	16.50	16.50	16.50	16.50	16.50	
	1400-120 to 2800 cm ² Travel: FA 30 to 75/ FE 30 to 38	mm	481	504	504	504	504	504	-
		in	18.94	19.84	19.84	19.84	19.84	19.84	
	1400-120 to 2800 cm ² Travel: FA 90 to 120/ FE 60 to 120	mm	-	651	651	651	651	651	651
		in		25.63	25.63	25.63	25.63	25.63	25.63

Design and principle of operation

Table 2.2: Face-to-face dimensions

Valve	NPS	3	4	6	8	10	12	16	
Length L raised face ¹⁾	Class 150	mm	298	352	451	543	673	737	1016
		in	11.75	13.88	17.75	21.38	26.50	29.00	40.00
	Class 300	mm	318	368	473	568	708	775	-
		in	12.50	14.50	18.62	22.38	27.88	30.50	
	Class 600	mm	337	394	508	610	752	819	
		in	13.25	15.50	20.00	24.00	29.62	32.25	
Class 900	mm	441	511	714	914	991	1130		
	in	17.38	20.12	28.12	36.00	39.00	44.50		
Length L ring type joint ¹⁾	Class 150	mm	311	365	464	556	686	750	1029
		in	12.25	14.38	18.25	21.88	27.00	29.50	40.50
	Class 300	mm	334	384	489	584	724	791	-
		in	13.12	15.12	19.24	23.00	28.50	31.12	
	Class 600	mm	340	397	511	613	755	822	
		in	13.37	15.62	20.12	24.12	29.74	32.37	
Class 900	mm	444	514	717	917	994	1133		
	in	17.50	20.24	28.24	36.12	39.12	44.62		
Length L welding ends ²⁾	Class 150	mm	337	394	508	610	752	819	1108
		in	13.25	15.50	20.00	24.00	29.62	32.35	43.62
	Class 300	mm	337	394	508	610	752	819	-
		in	13.25	15.50	20.00	24.00	29.62	32.35	
	Class 600	mm	337	394	508	610	752	819	
		in	13.25	15.50	20.00	24.00	29.62	32.35	
Class 900	mm	460	530	768	832	991	1130		
	in	18.12	20.88	30.25	32.75	39.00	44.50		

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

Table 3: Dimensions of Type 3291 Valve - NPS 16 (Class 300 and higher) to 32

Table 3.1: Overall heights

Valve	NPS	16	20	24	28	32		
H2	Class 150	mm	-	500	560	620	685	
		in		19.69	22.05	24.41	26.97	
	Class 300	mm	340	500	565	640	-	
		in	13.39	19.69	22.24	25.20		
	Class 600	mm	360	515	595	670	-	
		in	14.17	20.28	23.43	26.38		
	Class 900	mm	380	535	615	700	-	
		in	14.96	21.06	24.21	27.56		
H5	Class 150	mm	-	350	407.5	Form A: 462.5 Form B: 417.5	Form A: 530 Form B: 470	
		in		13.78	16.04	Form A: 18.21 Form B: 16.44	Form A: 20.87 Form B: 18.50	
	Class 300	mm	325	387.5	457.5	Form A: 517.5 Form B: 460	-	
		in	12.80	15.26	18.01	Form A: 20.37 Form B: 18.11		
	Class 600	mm	342.5	407.5	470	Form A: 537.5 Form B: 475	-	
		in	13.48	16.04	18.50	Form A: 21.16 Form B: 18.70		
	Class 900	mm	705	427.5	520	Form A: 585 Form B: 552.5	-	
		in	27.76	16.83	20.47	Form A: 23.03 Form B: 21.75		
	H4	Class 150 to 600	mm	-	877	857	1117	1215
			in		34.53	33.74	43.98	47.83
		Class 900	mm	724	877	917	1117	-
			in	28.50	34.53	36.10	43.98	
H8 for actuator	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: Face-to-face dimensions

Valve		NPS	16	20	24	28	32
Length L raised face ¹⁾	Class 150	mm	–	1267 ³⁾	1600 ³⁾	1854 ³⁾	2100 ³⁾
		in		49.88 ³⁾	62.99 ³⁾	72.99 ³⁾	82.68 ³⁾
	Class 300	mm	1057	1308 ³⁾	1600 ³⁾	1854 ³⁾	–
		in	41.62	51.50 ³⁾	62.99 ³⁾	72.99 ³⁾	
	Class 600	mm	1108	1372 ³⁾	1676 ³⁾	2100 ³⁾	–
		in	43.62	54.02 ³⁾	65.98 ³⁾	82.68 ³⁾	
	Class 900	mm	1422	1600 ³⁾	1854 ³⁾	2250 ³⁾	–
		in	56.00	62.99 ³⁾	72.99 ³⁾	88.58 ³⁾	
Length L ring type joint ¹⁾	Class 150	mm	–	1280	1613	–	–
		in		50.38	63.49		
	Class 300	mm	1073	1327	1622	1875 ⁴⁾	–
		in	42.24	52.25	63.87	73.87 ⁴⁾	
	Class 600	mm	1111	1378	1686	2111 ⁴⁾	–
		in	43.74	54.27	66.36	83.18 ⁴⁾	
	Class 900	mm	1432	1613	1873	2271 ⁴⁾	–
		in	56.38	63.49	73.74	89.46 ⁴⁾	
Length L welding ends ²⁾	Class 150	mm	–	1267 ³⁾	1600 ³⁾	1854 ³⁾	2100 ³⁾
		in		49.88 ³⁾	62.99 ³⁾	72.99 ³⁾	82.68 ³⁾
	Class 300	mm	1108	1308 ³⁾	1600 ³⁾	1854 ³⁾	–
		in	43.62	51.50 ³⁾	62.99 ³⁾	72.99 ³⁾	
	Class 600	mm	1108	1372 ³⁾	1676 ³⁾	2100 ³⁾	–
		in	43.62	54.02 ³⁾	65.98 ³⁾	82.68 ³⁾	
	Class 900	mm	1422	1600 ³⁾	1854 ³⁾	2250 ³⁾	–
		in	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 to 2500 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 B16.47

Table 4: Weights of Type 3591 Valve · NPS 3 to 12 and NPS 16 (Class 150) · Without actuator

i Note

The shape and weight of the yoke (60, see H8 in dimension diagrams) vary depending on the intended actuator. The weights specified in Table 4 and Table 5 are based on the weight of the valve and yoke depending on the actuator area.

NPS	Actuator		Class 150	Class 300	Class 600	Class 900
3	175 to 350 cm ²	kg	61	68	74	112
		lbs	134	150	163	247
	355 to 750 cm ²	kg	61	68	74	112
		lbs	134	150	163	247
	1000 to 1400-60 cm ²	kg	68	75	81	119
		lbs	150	165	179	262
	1400-120 to 2800 cm ² Travel: FA 30 to 75/FE 30 to 38	kg	94	101	107	145
		lbs	207	223	236	320
4	355 to 750 cm ²	kg	128	140	163	204
		lbs	282	309	359	450
	1000 to 1400-60 cm ²	kg	128	140	163	204
		lbs	282	309	359	450
	1400-120 to 2800 cm ² Travel: FA 30 to 75/FE 30 to 38	kg	150	162	185	226
		lbs	331	357	408	498
	1400-120 to 2800 cm ² Travel: FA 90 to 120/FE 60 to 120	kg	176	188	211	252
		lbs	388	414	465	556
6	355 to 750 cm ²	kg	223	253	298	413
		lbs	492	558	657	911
	1000 to 1400-60 cm ²	kg	223	253	298	413
		lbs	492	558	657	911
	1400-120 to 2800 cm ² Travel: FA 30 to 75/FE 30 to 38	kg	245	275	320	435
		lbs	540	606	705	959
	1400-120 to 2800 cm ² Travel: FA 90 to 120/FE 60 to 120	kg	271	301	346	461
		lbs	597	664	763	1016

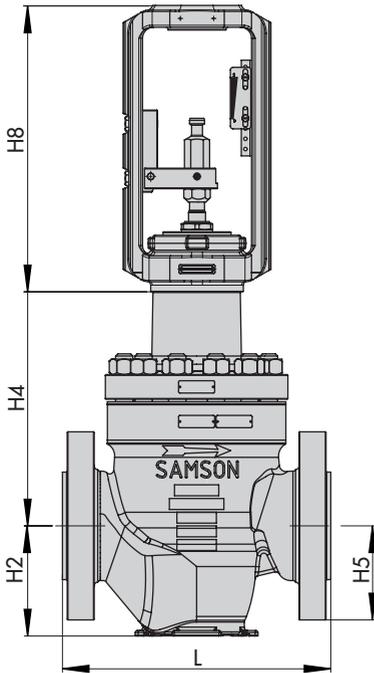
Design and principle of operation

NPS	Actuator		Class 150	Class 300	Class 600	Class 900
8	1000 to 1400-60 cm ²	kg	366	412	488	708
		lbs	807	908	1076	1561
	1400-120 to 2800 cm ² Travel: FA 30 to 75/FE 30 to 38	kg	388	434	510	730
		lbs	855	957	1124	1609
	1400-120 to 2800 cm ² Travel: FA 90 to 120/FE 60 to 120	kg	414	460	536	756
		lbs	913	1014	1182	1667
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			

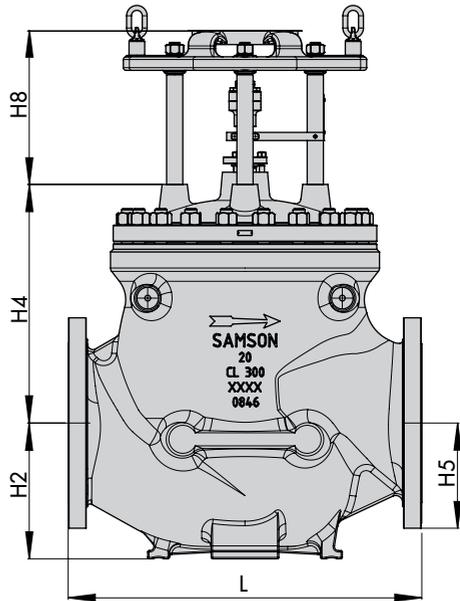
Table 5: Weights of Type 3291 Valve · NPS 16 (Class 300 and higher) to 32 · Without actuator

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 3 to 12 and
NPS 16 (Class 150)



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

i Note

For more dimensions and weights refer to the Data Sheet ► T 8075.

The associated actuator documentation applies to actuators, e.g. for SAMSON 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
- T 8312 for Type 3273 Hand-operated Actuator

Preparation

4 Preparation

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Compare the shipment received against the delivery note.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).

4.1 Unpacking

Note

Do not remove the packaging until immediately before installing the valve into the pipeline.

Proceed as follows to lift and install the valve:

1. Remove the packaging from the valve.
2. Dispose of the packaging in accordance with the valid regulations.

NOTICE

Risk of valve damage due to foreign particles entering the valve.

The protective caps fitted on the valve's inlet and outlet prevent foreign particles from entering the valve and damaging it.

Do not remove the protective caps until immediately before installing the valve into the pipeline.

4.2 Transporting and lifting

DANGER

*Hazard due to suspended loads falling.
Stay clear of suspended or moving loads.*

WARNING

Risk of lifting equipment tipping 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, if applicable).
- Refer to section 3.3 or Data Sheet  T 8075 for weights.

WARNING

Risk of personal injury due to control valve tipping.

- 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 welded-on lifting eyelet on SAMSON actuators is only intended for mounting and removing the actuator as well as lifting the actuator without valve. Do not use this lifting eyelet 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 4.2.2).*

Tip

SAMSON's After-sales Service department can provide more detailed transport and lifting instructions on request.

4.2.1 Transporting

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). Remove any damage immediately.
- 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).

Note

Contact SAMSON's After-sales Service department for the transportation temperatures of other valve versions.

4.2.2 Lifting

WARNING

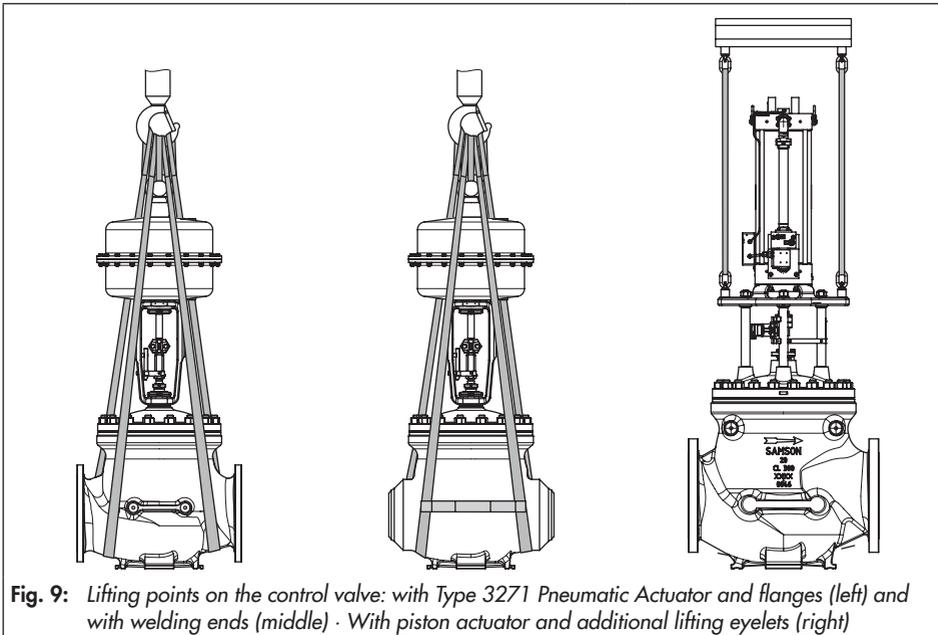
Risk of personal injury and valve damage due to incorrect lifting of the valve. Special lifting conditions apply to valves in Class 900 and higher as well as \geq NPS 24. Contact SAMSON's After-sales Service department.

Preparation

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

Lifting instructions

- 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.
 - 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 rod is always vertical.
 - Make sure that the additional sling between the lifting eyelet and rigging equipment (hook, shackle etc.) does not bear any load when lifting valves larger than NPS 6. The sling only protects the control valve from tilting while being lifted. Before lifting the control valve, tighten the sling.



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

1. Attach one sling to each flange or welding end of the body and to the rigging equipment (e.g. hook) of the crane or forklift (see Fig. 9).
2. Attach another sling to the lifting eyelet 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 section 5.4.3).
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.

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. 9).
2. Proceed as described for Valves up to NPS 12 and NPS 16 (Class 150) (steps 4 to 8).

**Tip**

We recommend using a hook with safety latch (see Fig. 9). The safety latch prevents the slings from slipping during lifting and transporting.

4.3 Storage

NOTICE

Risk of valve damage due to improper storage.

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

Note

We recommend regularly checking the control valve and the prevailing storage conditions during long storage times.

Storage instructions

- Protect the control valve against external influences (e.g. impact).
- Do not damage the corrosion protection (paint, surface coatings). Remove 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).

Note

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

4.4 Preparation for installation

Proceed as follows:

- Flush the pipelines.

Note

The plant engineering company is responsible for cleaning the pipelines in the plant.

- Check the valve to make sure it is clean.
- Check the valve for damage.

- Check to make sure that the type designation, valve size, material, pressure rating and temperature range of the valve match the plant conditions (size and pressure rating of the pipeline, medium temperature etc.).
- For steam applications, make sure that the pipelines are dry. Moisture will damage the inside of the valve.
- Check any mounted pressure gauges to make sure they function.
- When the valve and actuator are already assembled, check the tightening torques of the bolted joints. Components may loosen during transport.

5 Mounting and start-up

SAMSON valves are delivered ready for use. In special cases, the valve and actuator are delivered separately and must be assembled on site. The procedure to mount and start up the valve are described in the following.

! NOTICE

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

Observe the specified torques on tightening control valve components. Excessively tightened torques lead to parts wearing out quicker. Parts that are too loose may cause leakage.

Observe the specified tightening torques.

5.1 Mounting the external anti-rotation fixture

Before mounting the actuator, the external anti-rotation fixture must be mounted on the piston rod in some cases.

5.1.1 Versions up to NPS 16 (Class 150)

→ See Fig. 10

1. Place slip washers (60.17) onto the anti-rotation fixture (60.1).
2. Place the anti-rotation fixture (60.1) together with the stem connector nut (9) onto the piston rod.
3. To fasten the holder (60.2), guide the hexagon screws (60.12 and 60.13) with washer (60.14) through the yoke (60) and bushings (60.10 and 60.11) and screw tight. Observe tightening torques.

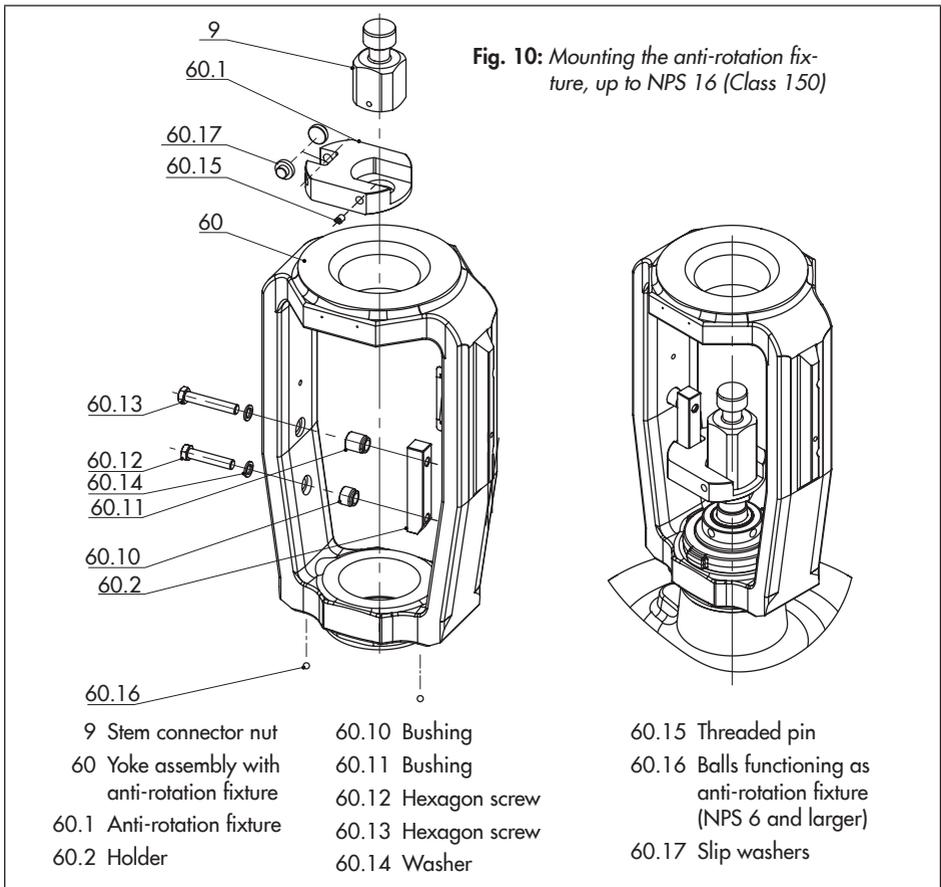
i Note

For actuators with ≤ 60 mm actuator travel, the bushings (60.10 and 60.11) are not required. The holder (60.2) is fastened using two screws (60.12) of the same type.

4. Screw the threaded pin (60.15) through the stem connector nut (9) into the piston rod and fix it in place.
5. Tighten lock nut.

Tightening torques

Number within drawing	Valve size/actuator travel	
	≤NPS 4/ 15 to 30 mm	≥NPS 6/ ≥60 mm
60.12	48	84
60.13	–	84



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

→ See Fig. 11

1. Screw the adapter (180.3) onto the piston rod (36).
2. Screw the hexagon screw (180.5) with washer (180.4) into the piston rod (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) to the piston rod (36) using the hexagon 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

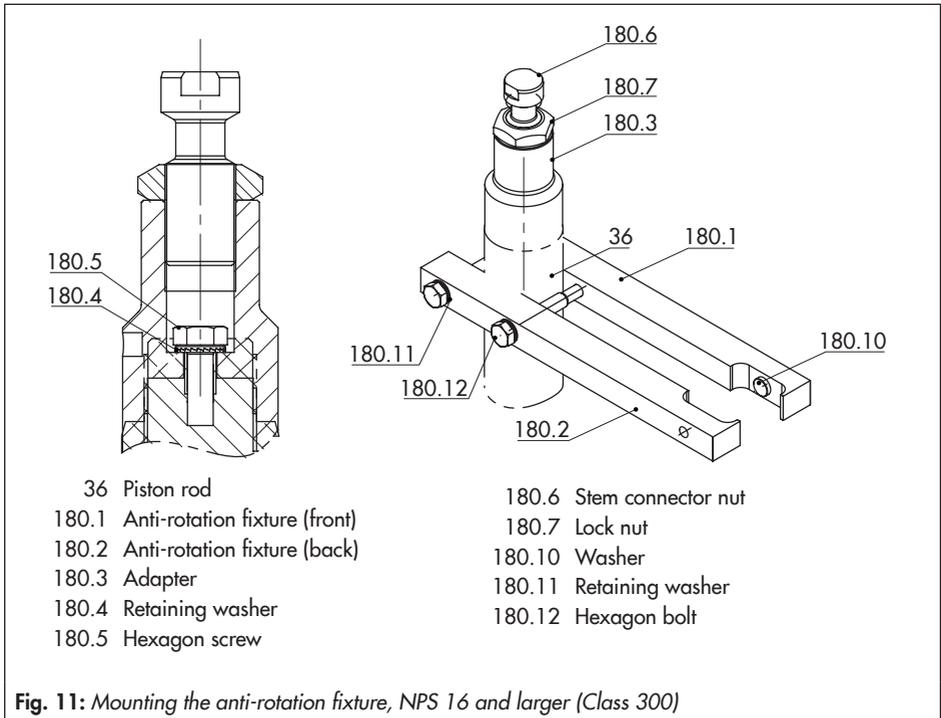
Number within drawing	Piston rod diameter	
	60 mm	80 mm
Tightening torque [Nm]		
180.5	45	100
180.12	120	120

5.2 Mounting the actuator onto the valve

Proceed as described in the actuator documentation if the valve and actuator have not been assembled by SAMSON.

i Note

- Remove the mounted actuator before mounting the other actuator (see associated actuator documentation).
 - Preloading the actuator springs increases the thrust of a pneumatic actuator and reduces the travel range of the actuator (see associated actuator documentation).
-



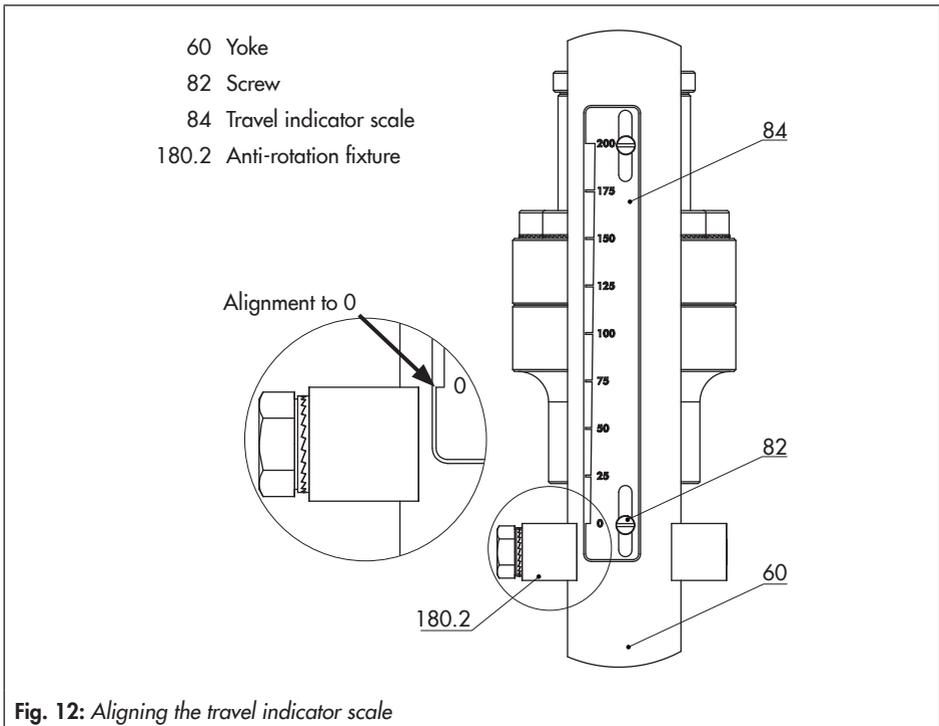
5.3 Aligning the travel indicator scale

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

After mounting the actuator (see section 5.2) the travel indicator scale must be aligned. To do so, align the '0' on the scale with the top of the anti-rotation fixture (see Fig. 12).

1. Move the valve to the closed position.
2. Loosen the screws (82) on the travel indicator scale (84).

3. Align the travel indicator scale (84). To do so, align the '0' on the scale so that it is at the same level as the top of the anti-rotation fixture (180.2).
4. Fix the travel indicator scale (84) into place using the screws (82).



5.4 Installing the valve into the pipeline

5.4.1 Checking the installation conditions

Pipeline routing

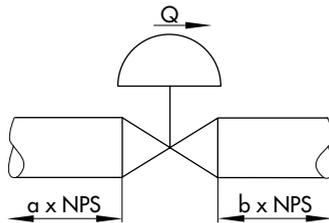
The inlet and outlet lengths vary depending on the process medium. To ensure the control valve functions properly, follow the installation instructions given below:

- ➔ Observe the inlet and outlet lengths (see Table 6). Contact SAMSON if the valve conditions or states of the medium process deviate.
- ➔ Install the valve free of stress and so that vibrations are absorbed. Read instructions in Mounting position and Support or suspension.
- ➔ Install the 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

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



Q Flow rate
a Inlet length
b Outlet length

Mounting and start-up

Mounting position

Generally, we recommend installing the valve with the actuator in the upright position on top of the valve (see Fig. 13).

→ For other mounting positions, contact SAMSON's After-sales Service department.

Support or suspension

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

- Valves that are not installed with the actuator in the upright position on top of the valve.
- Valves in sizes NPS 6 or larger or weighing more than 250 kg
- Valves with insulating section or bellows seal
- Actuators weighing more than 70 kg (also when installed in the upright position)

We recommend attaching the support or suspension directly to the valve as shown in Fig. 13.

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

i Note

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

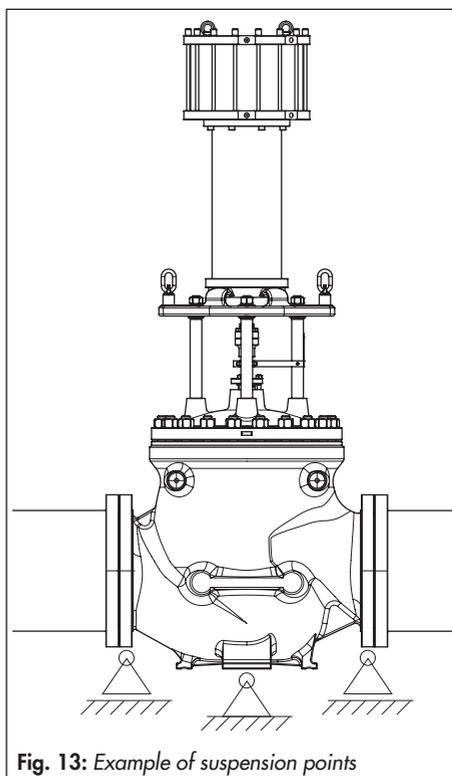


Fig. 13: Example of suspension points

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 workplace of operating personnel.

- On mounting valve accessories, make sure that they can be operated from the workplace of the operating personnel.

i Note

The workplace of operating personnel is the location from which the valve, actuator and any mounted valve accessories can be accessed to operate them.

5.4.2 Additional fittings

Strainer

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

Bypass and shut-off valves

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

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).

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).

! WARNING

Risk of personal injury due to components under pressure and process medium escaping under pressure.

Do not loosen the screw of the test connection while the valve is in operation.

Safety guard

To reduce the crush hazard arising from moving parts (actuator and piston rod), a safety guard can be installed.

5.4.3 Installing the control valve

Version with flanges

1. Close the shut-off valve in the pipeline while the valve is being installed.
2. Remove the protective caps from the valve ports before installing the valve.
3. Lift the valve using suitable lifting equipment to the site of installation (see section 4.2.2). Observe the flow direction through the valve. The arrow on the valve indicates the direction of flow.
4. Make sure that the correct flange gaskets are used.
5. Bolt the pipe to the valve free of stress.

Mounting and start-up

- Depending on the field of application, allow the valve to cool down or heat up to reach ambient temperature before start up.
- Slowly open the shut-off valves in the pipeline after the valve has been installed.

! NOTICE

Risk of valve damage due to a sudden pressure increase and resulting high flow velocities.

Slowly open the shut-off valves in the pipeline during start-up.

- Check the valve to ensure it functions properly.

Version with welding ends

- Proceed as described for Version with flanges (steps 1 to 3).
- Completely retract the actuator stem to protect the piston from sparks during welding.
- Weld the valve free of stress into the pipeline.
- Proceed as described for Version with flanges (steps 6 to 8).

5.5 Quick check

SAMSON valves are delivered ready for use. To test the valve's ability to function, the following quick checks can be performed:

Tight shut-off

- Close the valve.
- Slowly open the shut-off valve in the pipeline.

! NOTICE

Risk of valve damage due to a sudden pressure increase and resulting high flow velocities.

Slowly open the shut-off valve in the pipeline during start-up.

- Check the valve for leakage (visual inspection).

Travel motion

The movement of the actuator stem must be smooth.

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

Fail-safe position

- Shut off the signal pressure line.
- Check whether the valve moves to the fail-safe position.

Adjustable packing

NOTICE

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

A special tool is required for Form HT packings. Contact SAMSON's After-sales Service department.

Tip

A label on the bonnet (2) or yoke (60) indicates whether an adjustable packing is installed.

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 150 and higher): tighten the nuts on the packing gland in a crisscross pattern (by turning them clockwise) until the packing seals the valve.

NOTICE

Risk of valve damage due to the threaded bushing tightened too far.

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

2. Open and close the valve several times.
3. Check the valve for leakage to the atmosphere (visual inspection).
4. Repeat steps 1 and 2 until the packing completely seals the valve.

Note

If the adjustable packing does not seal properly, contact SAMSON's After-sales Service department.

Pressure test

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 valve and plant.

Note

The plant engineering company is responsible for performing the pressure test. SAMSON's After-sales Service department can support you to plan and perform a pressure test for your plant.

6 Operation

Immediately after completing mounting and start-up (see section 5), the valve is ready for use.

WARNING

*Crush hazard arising from moving parts (actuator stem and piston rod).
Do not insert hands or finger into the yoke while the valve is in operation.*

WARNING

*Risk of personal injury when the actuator vents.
Wear eye protection when working in close proximity to the control valve.*

NOTICE

*Operation disturbed by a blocked actuator stem or piston rod.
Do not impede the movement of the actuator stem or piston rod by inserting objects into their path.*

6.1 Working in manual mode

Valves fitted with actuators with a handwheel can be manually closed or opened in case of supply air failure.

→ For normal closed-loop operation, move the handwheel to the neutral position.

7 Servicing

The control valve is subject to normal wear, especially at the seat, piston, and packing.

NOTICE

Risk of valve damage due to incorrect servicing or repair.

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

Tip

SAMSON's After-sales Service department can support you to draw up an inspection plan for your plant.

Note

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

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

7.1 Preparation for return shipment

Defective valves can be returned to SAMSON for repair.

Proceed as follows to return valves to SAMSON:

1. Put the control valve out of operation (see section 9).
2. Decontaminate the valve. Remove any residual process medium.
3. Fill in the Declaration on Contamination, which can be downloaded from our website at ► www.samson.de > Services > Check lists for after sales service > Declaration on Contamination.
4. Send the valve together with the filled-in form to your nearest SAMSON subsidiary. SAMSON subsidiaries are listed on our website at ► www.samson.de > Contact.

7.2 Ordering spare parts and operating supplies

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

Spare parts

Details on spare parts are available on request.

Lubricant

Details on suitable lubricants can be found in the parts list.

Tools

Details on suitable tools are available on request.

8 Malfunctions

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



Tip

SAMSON's After-sales Service department can support you to draw up an inspection plan for your plant.

8.1 Troubleshooting

Malfunction	Possible reasons	Recommended action
Actuator stem/piston rod does not move on demand.	Actuator blocked	Check attachment. Unblock the actuator.
	Signal pressure too low	Check the signal pressure. Check the signal pressure line for leakage.
Actuator stem/piston rod does not stroke through the whole range.	Signal pressure too low	Check the signal pressure. Check the signal pressure line for leakage.
The valve leaks to the atmosphere (fugitive emissions).	The packing is defective.	Contact SAMSON's After-sales Service department.
	Version with adjustable packing ¹⁾ : packing not tightened correctly.	See section 5.5, Adjustable packing. Contact SAMSON's After-sales Service department when it continues to leak.
	Flange joint loose or gasket worn out.	Check the flange joint. Contact SAMSON's After-sales Service department.

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.	Contact SAMSON's After-sales Service department.
	Gasket underneath the seat bridge is worn out.	Contact SAMSON's After-sales Service department.
	Gasket at the cage is worn out.	Contact SAMSON's After-sales Service department.

1) A label on the bonnet (2) or yoke (60) indicates whether an adjustable packing is installed.

i Note

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

8.2 Emergency action

Upon supply air or control signal failure, the valve moves to its fail-safe position (see section 3.1).

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. Check the valve for damage. If necessary, contact SAMSON's After-sales Service department.

Putting the valve back into operation after a malfunction

- Slowly open the shut-off valves. Allow the process medium to flow into the valve slowly.

9 Decommissioning and disassembly

DANGER

Risk of bursting in pressure equipment. Control valves and pipelines are pressure equipment. Improper opening can lead to bursting of the valve.

- Before starting any work on the control valve, depressurize all plant sections concerned and the valve.
 - Drain the process medium from all the plant sections concerned as well as the valve.
 - Wear personal protective equipment.
-

WARNING

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

While working on the valve, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

Wear protective clothing, gloves, and eye-wear.

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 heat up.
 - Wear protective clothing and gloves.
-

9.1 Decommissioning

To decommission the control valve for service and repair work or disassembly, 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. If necessary, allow the pipeline and valve components to cool down or heat up.

9.2 Removing the valve from the pipeline

Version with flanges

1. Put the control valve out of operation (see section 9.1).
2. Unbolt the flange joint.
3. Remove the valve from the pipeline (see section 4.2).

Version with welding ends

1. Put the control valve out of operation (see section 9.1).
2. Cut the pipeline in front of the weld seam.
3. Remove the valve from the pipeline (see section 4.2).

9.3 Removing the actuator from the valve

See associated actuator documentation.

9.4 Disposal

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

10 Appendix

10.1 After-sales service

Contact SAMSON's After-sales Service department for support concerning servicing or repair work or when malfunctions or defects arise.

E-mail

You can reach the After-sales Service Department at aftersaleservice@samson.de.

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives, and service facilities worldwide can be found on the SAMSON website, in all SAMSON product catalogs or on the back of these Mounting and Operating Instructions.

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 cu.ft./min or m³/h
- Type and bench range of the actuator (e.g. 0.2 to 1 bar)
- Is a strainer installed?
- Installation drawing

10.2 Certificates

SMART IN FLOW CONTROL.



SAMSON

EU-KONFORMITÄTSERKLÄRUNG EU DECLARATION OF CONFORMITY

Modul/Module H / N° CE-PED-H-SAM 001-13-DEU

SAMSON erklärt in alleiniger Verantwortung für folgende Produkte/explains in sole responsibility for the following products:

Geräte/Devices	Bauart/Series	Typ/Type	Ausführung/Version
Durchgangsventil/Globe Valve	240	3241	DIN, Gehäuse GG/Cast iron-Body ab/from DN150, Gehäuse GGG/Sph. gr. iron-Body ab/from DN100, Fluide/Fluids G2, L1, L2 ¹⁾
			DIN/ANSI, Geh. Stahl u.a./Body Steel etc., alle Fluide/all Fluids
Dreivehventil/Three-way Valve	240	3244	DIN, Gehäuse GG ab DN150/Cast iron-Body from DN150, Gehäuse GGG ab DN100/Sph. gr. iron-Body from DN100, Fluide/Fluids G2, L1, L2 ¹⁾
			DIN/ANSI, Geh. Stahl u.a./Body Steel etc., alle Fluide/all Fluids
Tiefemperaturventil/Cryogenic Valve	240	3248	DIN/ANSI, alle Fluide/all Fluids
Durchgangsventil/Globe Valve	250	3251	DIN/ANSI, alle Fluide/all Fluids
Dreivehventil/Three-way Valve	250	3253	DIN/ANSI, Geh. Stahl u.a./Body Steel etc., alle Fluide/all Fluids
Durchgangsventil/Globe Valve	250	3254	DIN/ANSI, alle Fluide/all Fluids
Eckventil/Angle Valve	250	3256	DIN/ANSI, alle Fluide/all Fluids
Split-Body-Ventil/Split-Body-Valve	250	3258	DIN, alle Fluide/all Fluids
IG-Eckventil/IG-Angle Valve	250	3259	DIN, alle Fluide/all Fluids
Dampfumformventil/ Steam-converting Valve	280	3281	DIN/ANSI, alle Fluide/all Fluids
		3284	DIN/ANSI, alle Fluide/all Fluids
		3286	DIN/ANSI, alle Fluide/all Fluids
		3288	DIN, alle Fluide/all Fluids
Durchgangsventil/Globe Valve	V2001	3321	DIN, Geh. Stahl u.a./Body Steel etc., alle Fluide/all Fluids ANSI, alle Fluide/all Fluids
Dreivehventil/Three-way Valve	V2001	3323	DIN, Geh. Stahl u.a./Body Steel etc., alle Fluide/all Fluids ANSI, alle Fluide/all Fluids
Schrägsitzventil/Bevel-Valve	---	3353	DIN, Geh. Stahl/Body Steel, alle Fluide/all Fluids
Drosselschaldämpfer/Silencer	3381	3381-1	DIN/ANSI, alle Fluide/all Fluids, Einzeldrosselscheibe mit Anschweißende/ Single attenuation plate with welding end
		3381-3	DIN/ANSI, alle Fluide/all Fluids
		3381-4	DIN/ANSI, alle Fluide/all Fluids, Einzeldrosselscheibe mehrstufig mit Anschweißende/Single attenuation plate multi-stage with welding end
Durchgangsventil/Globe Valve	240	3241	ANSI, Gehäuse GG C125 ab 5"/Cast iron-Body C125 from 5", Fluide/Fluids G2, L1, L2 ¹⁾
Tiefemperaturventil/ Cryogenic Valve	240	3246	DIN/ANSI, alle Fluide/all Fluids
Dreivehventil/Three-way Valve	250	3253	DIN, Gehäuse GG ab DN200 PN16/Cast iron-Body from DN200 PN16, Fluide/Fluids G2, L1, L2 ¹⁾
Durchgangsventil/Globe Valve	290	3291	ANSI, alle Fluide/all Fluids
Eckventil/Angle Valve	290	3296	ANSI, alle Fluide/all Fluids
Durchgangsventil/Globe Valve	590	3591	ANSI, alle Fluide/all Fluids
Eckventil/Angle Valve	590	3596	ANSI, alle Fluide/all Fluids

¹⁾ Gase nach Art. 4 Abs. 1 Pkt. c.i zweiter Gedankenstrich/Gases acc. to Article 4, Section 1 Subsection c.i. second indent Flüssigkeiten nach Art. 4 Abs. 1 Pkt. c.ii/Liquids acc. to Article 4, Section 1 Subsection c.ii

die Konformität mit nachfolgender Anforderung/we declare conformity with the demands of the:

Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Druckgeräten auf dem Markt/Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment/Siehe auch Artikel 41 und 48/See also Article 41 and 48	2014/68/EU	vom/of 15.05.2014
Angewandtes Konformitätsbewertungsverfahren/ Applied Conformity Assessment Procedure für Fluide nach Art. 4 Abs. 1 für fluids acc. to Article 4, Section 1	Modul H/ Module H	durch/by Bureau Veritas 0062

Das Qualitätssicherungssystem des Herstellers wird von folgender benannten Stelle überwacht/The Manufacturer's Quality Assurance System is monitored by following Notified Body:
Bureau Veritas S. A. n° 0062 67/7.1, boulevard du Château, 92200 Neuilly-sur-Seine, France

Angewandte technische Spezifikation/Technical Standards used: DIN EN12516-2; DIN EN12516-3; ASME B16.34

Hersteller/Manufacturer: SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt

Frankfurt, 19.07.2016

i. V. Klaus Hörtschen

Klaus Hörtschen
Zentralabteilungsleiter / Head of Central Department
Entwicklung Ventile und Antriebe / R&D Valves and Actuators

Günther Scherer

Günther Scherer
Zentralabteilungsleiter / Head of Central Department
Qualitätsmanagement / Total Quality Management

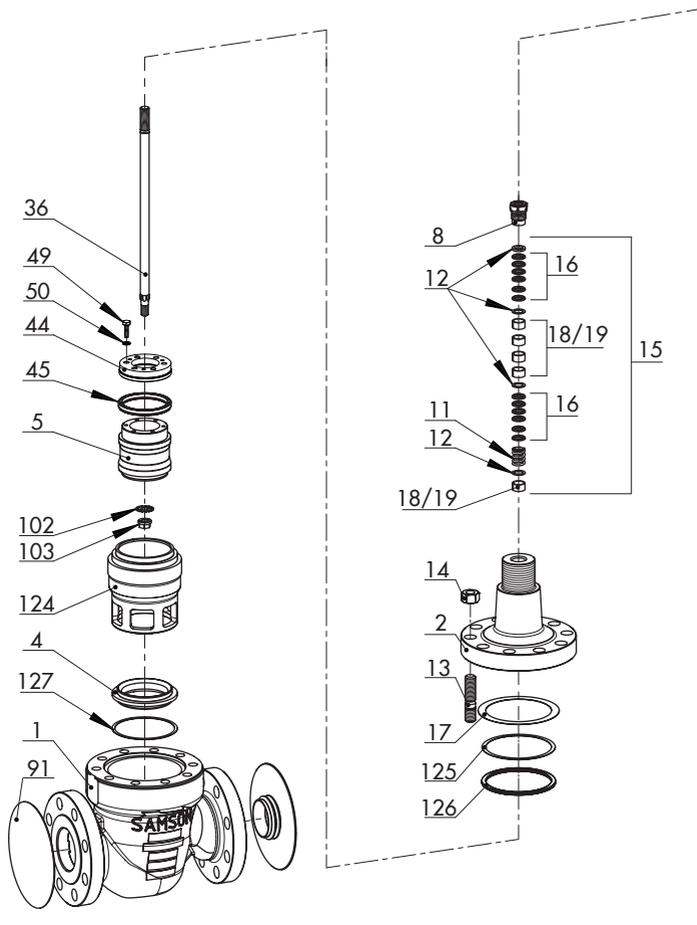
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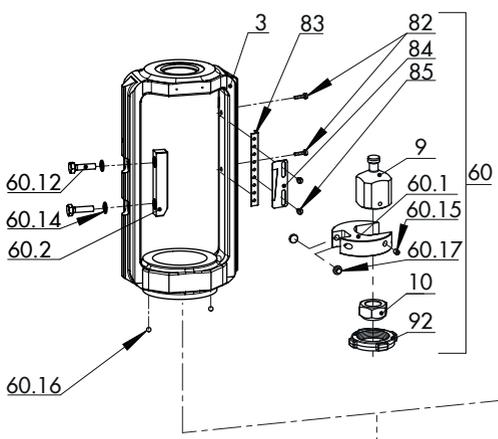
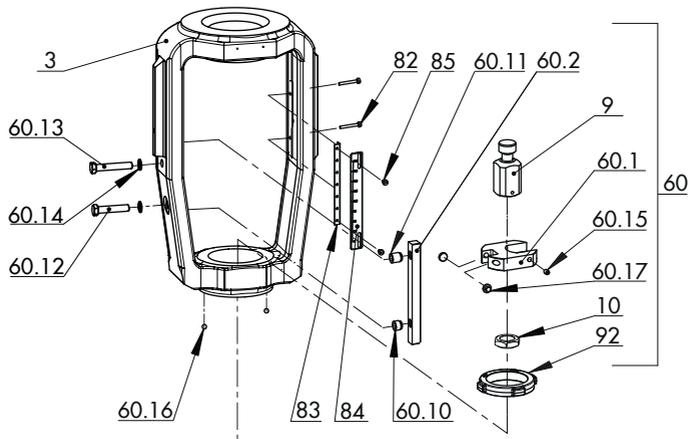
10.3 Spare parts

Legend

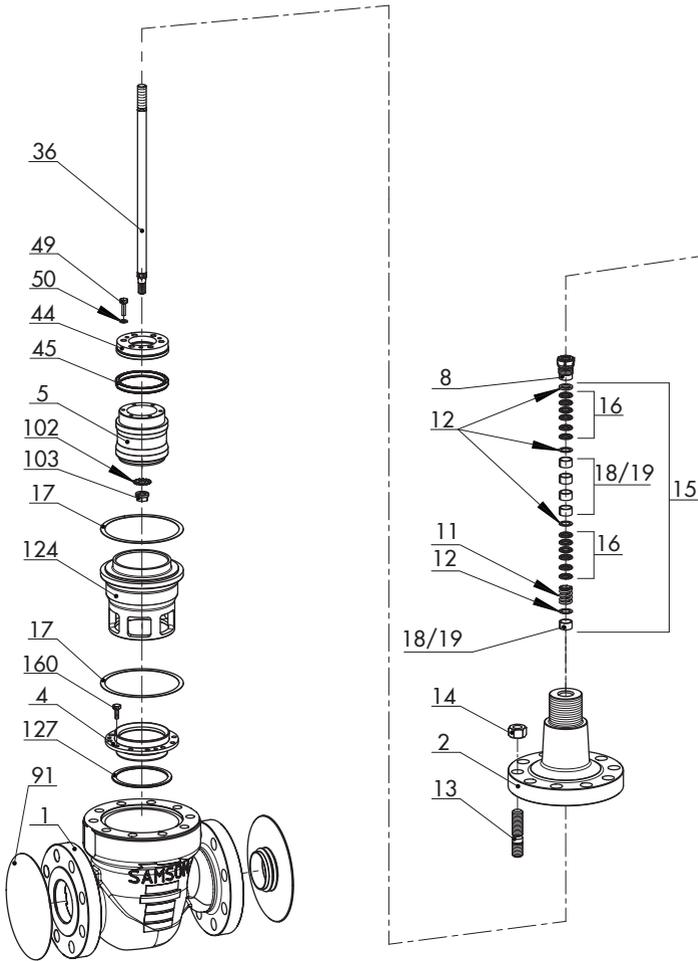
1	Body	60.17	Slip washers
2	Bonnet	82	Screw
3	Yoke	83	Hanger
4	Seat	84	Travel indicator scale
5	Piston	85	Screw
8	Threaded bushing (packing nut)	91	Protective cap
9	Stem connector nut	92	Castellated nut
10	Lock nut	102	Snap ring
11	Spring	103	Lock nut
12	Washer	124	Cage
13	Stud bolt	125	Spacer ring
14	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	160	Screw
18/19	Bushing	223	Pin functioning as anti-rotation fixture on top of the cage (Class 300 and higher)
36	Piston rod		
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)		
60	Yoke assembly		
60.1	Anti-rotation fixture		
60.2	Holder		
60.10	Bushing		
60.11	Bushing		
60.12	Hexagon screw		
60.13	Hexagon screw		
60.14	Washer		
60.15	Threaded pin		
60.16	Balls functioning as anti-rotation fixture (NPS 6 and larger)		

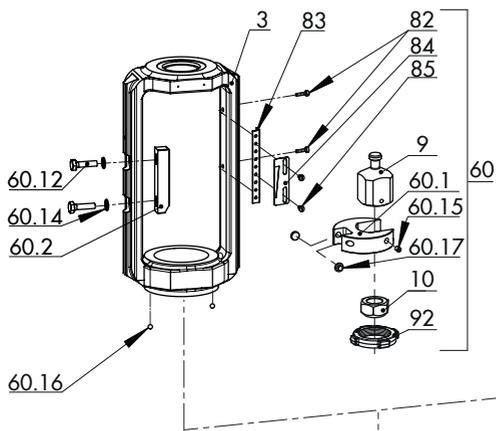
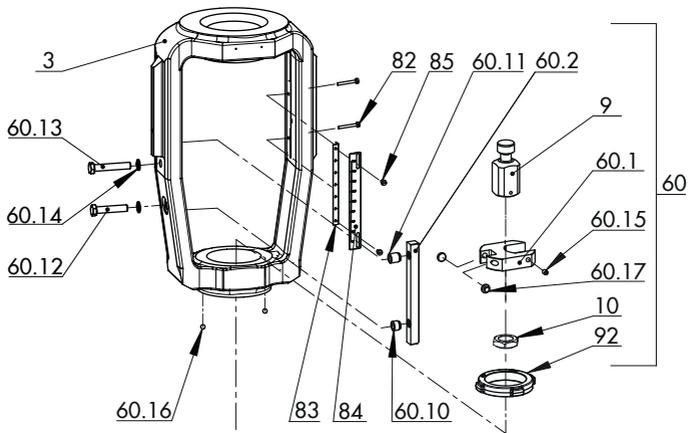
Type 3591 · Clamped seat · NPS 3 to 8



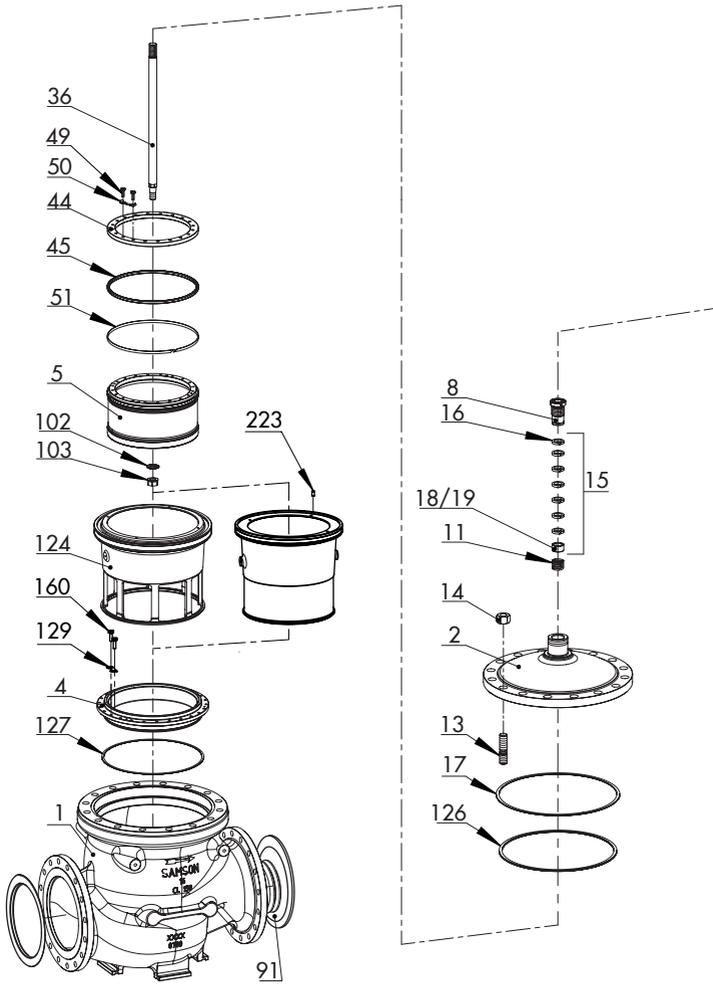


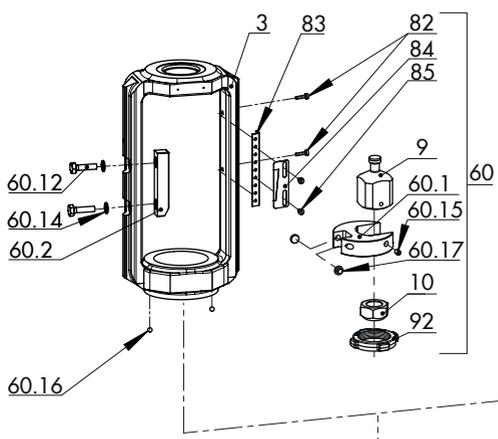
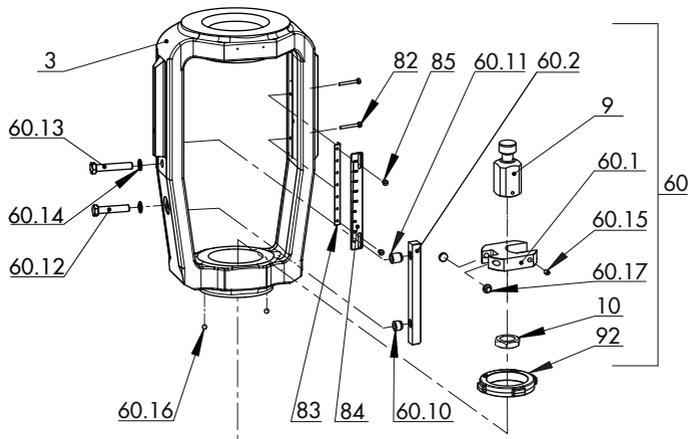
Type 3591 · Flanged seat · NPS 3 to 8





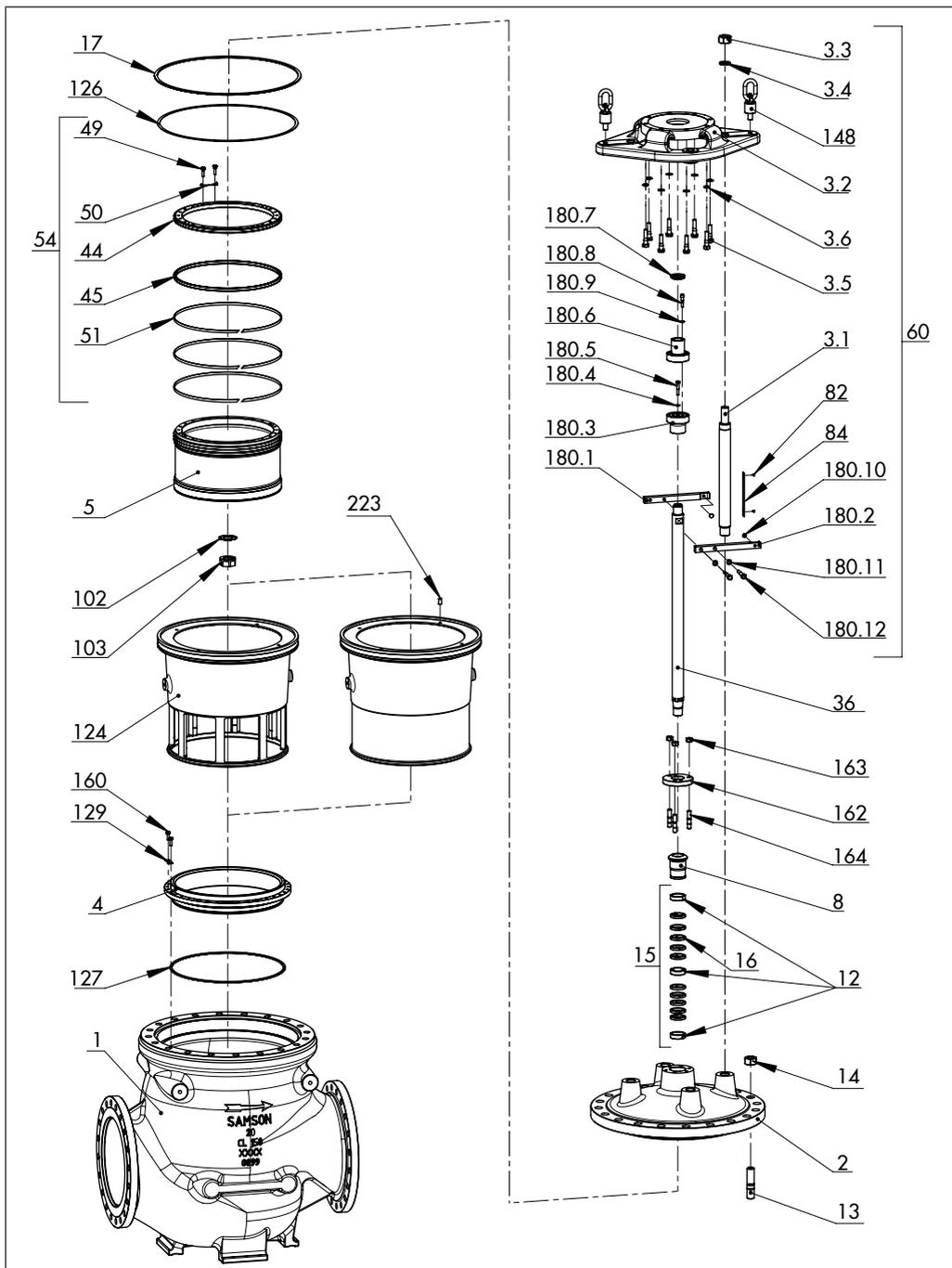
Type 3591 · Flanged seat · NPS 10 to 16 (Class 150)





Type 3591 · Flanged seat · NPS 16 (Class 300) to 28 and NPS 32 (Class 150)

1	Body	180.12	Hexagon screw
2	Bonnet	82	Screw
3	Yoke	84	Travel indicator scale
3.1	Rod	85	Screw
3.2	Plate	92	Castellated nut
3.3	Nut	102	Snap ring
3.4	Retaining washer	103	Lock nut
3.5	Screw	124	Cage
3.6	Washer	125	Spacer ring
4	Seat	126	Gasket between cage and bonnet
5	Piston	127	Seat bridge gasket
8	Threaded bushing (packing nut)	129	Washer (Class 300 and higher)
11	Spring	148	Lifting eyelet
12	Washer	160	Screw
13	Stud bolt	162	Flange for packing gland
14	Body nut	163	Nut for packing gland
15	Packing	164	Stud for packing gland
16	V-ring packing	180	Actuator connection assembly with anti-rotation fixture
17	Body gasket	223	Pin functioning as anti-rotation fixture on top of the cage (Class 300 and higher)
18/19	Bushing		
36	Piston rod		
39	Gasket		
44	Ring (pressure balancing)		
45	Gasket (pressure balancing)		
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	Hexagon screw		
180.6	Stem connector nut		
180.7	Lock nut		
180.8	Screw		
180.9	Washer		
180.10	Washer		
180.11	Retaining washer		



EB 8075 EN



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