

MOUNTING AND OPERATING INSTRUCTIONS



EB 3756 EN

Translation of original instructions



Type 3756 Booster Valve

Edition April 2023



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

1	Safety instructions and measures	1-1
1.1	Notes on possible severe personal injury	1-3
1.2	Notes on possible personal injury	1-3
1.3	Notes on possible property damage	1-3
1.4	Warnings on the device.....	1-4
2	Markings on the device	2-1
2.1	Nameplate	2-1
2.2	Article code.....	2-2
3	Design and principle of operation	3-1
3.1	Technical data	3-2
3.1.1	Summary of explosion protection approvals	3-11
3.2	Dimensions in mm.....	3-11
4	Shipment and on-site transport	4-1
4.1	Accepting the delivered goods	4-1
4.2	Removing the packaging from the booster valve	4-1
4.3	Transporting the booster valve.....	4-1
4.4	Storing the booster valve	4-1
5	Installation	5-1
5.1	Installation conditions	5-1
5.2	Preparation for installation	5-1
5.3	Mounting the booster valve	5-1
5.3.1	Attachment to linear actuators.....	5-1
5.3.2	Attachment to rotary actuators	5-2
5.4	Pneumatic connection	5-2
5.4.1	Sizing the connecting line	5-3
5.4.2	Compressed air quality.....	5-3
5.4.3	Supply air	5-3
5.5	Connecting the electrical power supply	5-5
5.6	Mounting accessories	5-6
6	Start-up	6-1
7	Operation	7-1
8	Malfunctions	8-1
8.1	Emergency action	8-1
9	Servicing	9-1
9.1	Periodic inspection and testing of the booster valve.....	9-1

Contents

10	Decommissioning	10-1
11	Removal	11-1
12	Repairs	12-1
12.1	Returning devices to SAMSON	12-1
13	Disposal	13-1
14	Certificates	14-1
15	Annex	15-1
15.1	After-sales service	15-1

1 Safety instructions and measures

Intended use

The Type 3756 Booster Valve is used to control single- and double-acting pneumatic actuators and to boost pneumatic binary signals. The device is designed to operate under exactly defined conditions (e.g. temperature). Therefore, operators must ensure that the booster valve is only used in applications where the operating conditions correspond to the technical data. In case operators intend to use the booster 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 for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse

The Type 3756 Booster Valve is **not** suitable for the following applications:

- Use outside the limits defined during sizing and by the technical data

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

- Use of non-original spare parts
- Performing maintenance activities not described in these instructions

Qualifications of operating personnel

The booster valve must be mounted, started up and serviced 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.

Personal protective equipment

No personal protective equipment is required for the direct handling of the booster valve. Work on the control valve may be necessary when mounting or removing the device.

- ➔ Observe the requirements for personal protective equipment specified in the valve documentation.
- ➔ Check with the plant operator for details on further protective equipment.

Safety instructions and measures

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.

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, especially for installation, start-up and service work.

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 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.

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 documentation

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

- Safety Manual for use of the booster valve in safety-instrumented systems ► SH 3756
- The mounting and operating instructions of the components on which the booster valve is mounted (valve, actuator, valve accessories etc.)

1.1 Notes on possible severe personal injury

DANGER

Risk of injury due to high pressure in the device.

The booster valve is pressurized. Improper removal of the installed booster valve can lead to device components bursting and cause serious injury.

- Depressurize the booster valve before removing it (disconnect the supply air and protect it against unintentional reconnection).

1.2 Notes on possible personal injury

WARNING

Crush hazard arising from moving parts on the valve.

Control valves contain moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- Do not touch any moving valve parts while the control valve is in operation.
- Before performing any mounting or installation work on the booster valve, put the control valve out of operation by disconnecting the supply air and control signal. Protect it against unintentional reconnection.
- Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.

1.3 Notes on possible property damage

NOTICE

Risk of damage to the booster valve due to incorrect mounting position.

The incorrect mounting position may allow dirt or other foreign particles to enter the booster valve and lead to malfunctioning or damage.

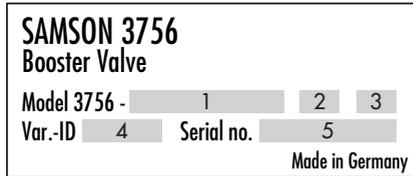
- Install the booster valve in such a way that the vent ports face downward (in cases where this is not possible, mount them in the horizontal position).

1.4 Warnings on the device

Warning	Meaning of the warning
	<p>Warning against sudden loud noise The booster valve mounted onto the control valve can cause the pneumatic actuator to vent. A loud noise may occur during venting. This can cause hearing damage.</p>

2 Markings on the device

2.1 Nameplate



- 1 Article code
- 2 Device index
- 3 Safety approval
- 4 Configuration ID
- 5 Serial number

2.2 Article code

Booster valve	Type 3756-	x	x	x	x	x	x	x	x	x	x	x	x
Actuation													
Pneumatic	0												
Over CNOMO interface	1												
With Type 3963 Solenoid Valve (as spare part)	2												
With Type 3967 Solenoid Valve	3												
Over NAMUR interface ¼ according to VDI/VDE 3845	4												
Over NAMUR interface ¼ according to VDI/VDE 3847	5												
Switching function													
3/2-way function with spring-return mechanism	0												
5/2-way function with spring-return mechanism	1												
5/2-way function with two detent positions	2												
5/3-way function with spring-centered mid-position (ports 2 and 4 closed)	3												
5/3-way function with spring-centered mid-position (ports 2 and 4 supplied with air)	4												
5/3-way function with spring-centered mid-position (ports 2 and 4 vented)	5												
6/2-way function with spring-return mechanism	6												
3/2-way function with spring-return mechanism (open in neutral position)	7												
Redundancy connection (article definition in combination with "Special version" property)	9												
Attachment													
NAMUR interface according to VDI/VDE 3845	0												
Threaded connection	1												
K _{VS} ¹⁾													
1.4	0												
4.3	1												
2.9	2												
2.0	3												
1.9	5												

Connection								
G ¼		0						
¼ NPT		1						
G ½		2						
½ NPT		3						
G 1		6						
Ambient temperature ²⁾								
-20 to +80 °C		0						
-45 to +80 °C		1						
-40 to +80 °C		2						
Material								
Aluminum			0					
Stainless steel			1					
Safety approval								
Without				0				
SIL ³⁾				1				
TÜV ⁴⁾				2				
Special version								
Without						0	0	0
Emergency venting; series connection (1oo2 redundancy)	5 9 0					0	1	0
Emergency air supply; parallel connection (2oo2 redundancy)	5 9 0					0	1	1

1) The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:
 $Q = K_{VS} \times 36.22$ in m^3/h .

2) The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

3) SIL according to IEC 61508

4) Emergency release or locking of compressed air supply

3 Design and principle of operation

Function of the switching diaphragm

The booster valve consists of a body with a diaphragm element actuated on one side with return spring.

In the neutral position, the connection from port 4 to port 3 is closed by the spring force acting on the switching element. After applying the necessary control pressure on the switching diaphragm, the booster valve switches to the operating position and opens the connection from port 4 to port 3. This causes port 5 to close. The return spring causes the switching element to switch back to the neutral position after the control pressure is removed.

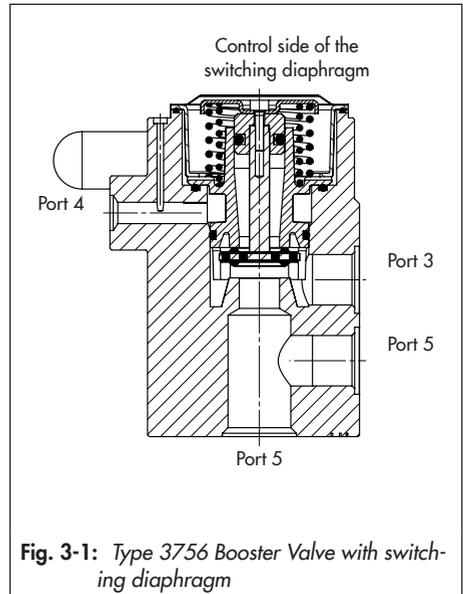


Fig. 3-1: Type 3756 Booster Valve with switching diaphragm

Function of the spool

The booster valve consists of a body with a spool actuated on one side with return spring.

In the neutral position, the connection from port 1 to port 2 and the connection from port 4 to port 5 is open. After applying the necessary control pressure to the control side of the spool, the spool moves to the operating position, opening the connection from port 1 to port 4 and the connection from port 2 to port 3. The return spring causes the spool to be pushed back to the neutral position after the control pressure is removed.

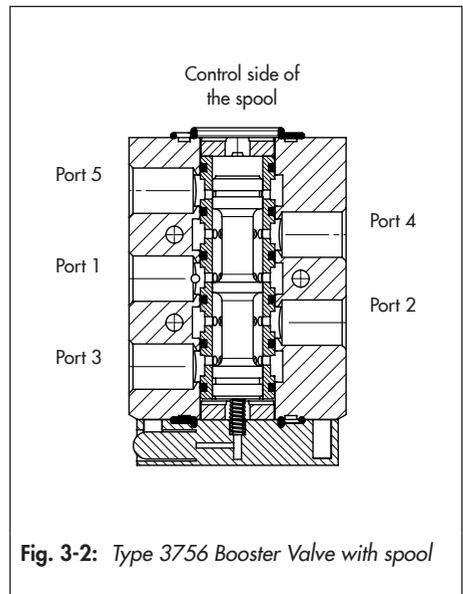


Fig. 3-2: Type 3756 Booster Valve with spool

3.1 Technical data

Booster valve with threaded connection or NAMUR interface, K_{VS} 1.4, actuated on one side		
Switching function	3/2-way function with exhaust air feed-back	5/2-way function
K_{VS} ¹⁾	1.4	
Safety approval	TÜV ²⁾	–
Design	Spool, metal-to-metal seat, zero overlap, with return spring	
Material	Body	Aluminum, powder coated, gray beige RAL 1019 or stainless steel 1.4404
	Seals	Silicone rubber
	Filter	Polyethylene
	Screws	Stainless steel 1.4571
	Springs	Stainless steel 1.4310
Operating medium	Instrument air (free from corrosive substances) or nitrogen, air containing oil or non-corrosive gases	
Compressed air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
Actuation, control pressure, switching points	Pneumatic connection	1.4 to 10 bar
	G 1/8 or 1/4 NPT	≤0.2 bar (switchover to neutral position), ≥1.4 bar (switchover to operating position)
	CNOMO interface	1.4 to 10 bar ³⁾
	Type 3963 Solenoid Valve (as spare part)	1.4 to 6 bar
Type 3967 Solenoid Valve	1.4 to 10 bar	
Max. operating pressure	10.0 bar	
Ambient temperature ⁴⁾	–45 to +80 °C	
Connection	G 1/4 or 1/4 NPT and NAMUR interface 1/4 ⁵⁾	
Approx. weight	0.48 kg	

¹⁾ The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:

$$Q = K_{VS} \times 36.22 \text{ in m}^3/\text{h.}$$

²⁾ Emergency release or locking of compressed air supply

³⁾ The permissible control pressure with the CNOMO interface depends on the pilot valve used.

⁴⁾ The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

⁵⁾ NAMUR interface according to VDI/VDE 3845

Booster valve with threaded connection or NAMUR interface, K_{VS} 1.4, actuated on both sides				
Switching function	5/2-way function with two detent positions	5/3-way function with spring-centered mid-position (ports 2 and 4 closed)	5/3-way function with spring-centered mid-position (ports 2 and 4 vented)	5/3-way function with spring-centered mid-position (ports 2 and 4 supplied with air)
K_{VS} ¹⁾	1.4			
Safety approval	TÜV ²⁾	–	TÜV ²⁾	–
Design	Spool, metal-to-metal seat, zero overlap			
Material	Body	Aluminum, powder coated, gray beige RAL 1019 or stainless steel 1.4404		
	Seals	Silicone rubber		
	Filter	Polyethylene		
	Screws	Stainless steel 1.4571		
	Springs	Stainless steel 1.4310		
Operating medium	Instrument air (free from corrosive substances) or nitrogen, air containing oil or non-corrosive gases			
Compressed air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected			
Actuation, control pressure, switching points	Pneumatic connection	1.4 to 10 bar	≤0.2 bar (switchover to neutral position), ≥1.4 bar (switchover to operating position)	
	G 1/8 or 1/8 NPT			
	CNOMO interface	1.4 to 10 bar ³⁾		
	Type 3963 Solenoid Valve (as spare part)	1.4 to 6 bar		
Type 3967 Solenoid Valve	1.4 to 10 bar			
Max. operating pressure	10.0 bar			
Ambient temperature ⁴⁾	–45 to +80 °C			
Connection	G 1/4 or 1/4 NPT and NAMUR interface 1/4 ⁵⁾			
Approx. weight	0.48 kg			

¹⁾ The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:
 $Q = K_{VS} \times 36.22$ in m³/h.

²⁾ Emergency release or locking of compressed air supply

³⁾ The permissible control pressure with the CNOMO interface depends on the pilot valve used.

⁴⁾ The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

⁵⁾ NAMUR interface according to VDI/VDE 3845

Design and principle of operation

Booster valve with threaded connection, K_{VS} 4.3, actuated on one side		
Switching function	3/2-way function (closed in neutral position)	
K_{VS} ¹⁾ (direction of flow)	1.9 (4×3), 1.5 (3×4), 4.3 (3×5), 4.7 (5×3)	
Safety approval	SIL ²⁾ , TÜV ³⁾	
Design	Poppet valve with diaphragm actuator, soft seated, with return spring	
Material	Body	Aluminum, powder coated, gray beige RAL 1019 or stainless steel 1.4404
	Diaphragms	Chloroprene rubber (-20 to +80 °C) or silicone rubber (-45 to +80 °C)
	Seals	Chloroprene rubber (-20 to +80 °C) or silicone rubber (-45 to +80 °C)
	Screws	Stainless steel 1.4571
	Springs	Stainless steel 1.4310
Operating medium	Instrument air (free from corrosive substances) or nitrogen, air containing oil or non-corrosive gases	
Compressed air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
Actuation, control pressure, switching points	Pneumatic connection 1.4 to 3 bar	≤0.2 bar (switchover to neutral position), G ¼ or ¼ NPT ≥1.4 bar (switchover to operating position)
	CNOMO interface	1.4 to 10 bar ⁴⁾
	Type 3963 Solenoid Valve (as spare part)	1.4 to 6 bar
Max. operating pressure	10.0 bar	
Ambient temperature ⁵⁾	-20 to +80 °C -45 to +80 °C	
Connection	G ½ or ½ NPT	
Approx. weight	0.58 kg	

¹⁾ The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:

$$Q = K_{VS} \times 36.22 \text{ in m}^3/\text{h.}$$

²⁾ SIL according to IEC 61508

³⁾ Emergency release or locking of compressed air supply

⁴⁾ The permissible control pressure with the CNOMO interface depends on the pilot valve used.

⁵⁾ The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

Booster valve with threaded connection, K_{VS} 4.3, actuated on one side		
Switching function	3/2-way function (open in neutral position)	
K_{VS} ¹⁾ (direction of flow)	1.9 (4»3), 1.5 (3»4), 4.3 (3»5), 4.7 (5»3)	
Safety approval	–	
Design	Poppet valve with diaphragm actuator, soft seated, with return spring	
Material	Body	Aluminum, powder coated, gray beige RAL 1019
	Diaphragms	Chloroprene rubber (–20 to +80 °C) or silicone rubber (–45 to +80 °C)
	Seals	Chloroprene rubber (–20 to +80 °C) or silicone rubber (–45 to +80 °C)
	Screws	Stainless steel 1.4571
	Springs	Stainless steel 1.4310
Operating medium	Instrument air (free from corrosive substances) or nitrogen, air containing oil or non-corrosive gases	
Compressed air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
Actuation, control pressure, switching points	Pneumatic connection 1.4 to 3 bar ≤ 0.2 bar (switchover to neutral position), G ¼ or ¼ NPT ≥ 1.4 bar (switchover to operating position)	
Max. operating pressure	10.0 bar	
Ambient temperature ²⁾	–20 to +80 °C –45 to +80 °C	
Connection	G ½ or ½ NPT	
Approx. weight	0.58 kg	

¹⁾ The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:

$$Q = K_{VS} \times 36.22 \text{ in m}^3/\text{h.}$$

²⁾ The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

Design and principle of operation

Booster valve with threaded connection, K_{VS} 4.3, actuated on one side		
Switching function	5/2-way function	6/2-way function
K_{VS} ¹⁾ (direction of flow)	1.9 (1.4»1.3 and 2.4»2.3), 1.5 (1.3»1.4 and 2.3»2.4), 4.3 (1.3»1.5 and 2.3»2.5), 4.7 (1.5»1.3 and 2.5»2.3)	
Safety approval	–	
Design	Poppet valve with diaphragm actuator, soft seated, with return spring	
Material	Body	Aluminum, powder coated, gray beige RAL 1019
	Diaphragms	Chloroprene rubber (–20 to +80 °C) or silicone rubber (–45 to +80 °C)
	Seals	Chloroprene rubber (–20 to +80 °C) or silicone rubber (–45 to +80 °C)
	Screws	Stainless steel 1.4571
	Springs	Stainless steel 1.4310
Operating medium	Instrument air (free from corrosive substances) or nitrogen, air containing oil or non-corrosive gases	
Compressed air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
Actuation, control pressure, switching points	Pneumatic connection 1.4 to 3 bar	≤0.2 bar (switchover to neutral position), ≥1.4 bar (switchover to operating position)
	G ¼ or ½ NPT	
	CNOMO interface 1.4 to 10 bar ²⁾	
	Type 3963 Solenoid Valve (as spare part)	1.4 to 6 bar
Max. operating pressure	10.0 bar	
Ambient temperature ³⁾	–20 to +80 °C	
	–45 to +80 °C	
Connection	G ½ or ½ NPT	
Approx. weight	1.1 kg	

³⁾ The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:
 $Q = K_{VS} \times 36.22$ in m^3/h .

⁴⁾ The permissible control pressure with the CNOMO interface depends on the pilot valve used.

⁵⁾ The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

Booster valve with NAMUR interface, K_{VS} 2.9 ¹⁾ , actuated on one side		
Switching function	3/2-way function	5/2-way function
K_{VS} ²⁾	2.9	
Safety approval	–	
Design	Spool, metal-to-metal seat, zero overlap, with return spring	
Material	Body	Aluminum, powder coated, gray beige RAL 1019
	Seals	Silicone rubber
	Filter	Polyethylene
	Screws	Stainless steel 1.4571
	Springs	Stainless steel 1.4310
Operating medium	Instrument air (free from corrosive substances) or nitrogen, air containing oil or non-corrosive gases	
Compressed air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
Actuation, control pressure, switching points	CNOMO interface	1.4 to 10 bar ³⁾
	Type 3963 Solenoid Valve (as spare part)	1.4 to 6 bar
	Type 3967 Solenoid Valve	1.4 to 10 bar
Max. operating pressure	10.0 bar	
Ambient temperature ⁴⁾	–45 to +80 °C	
Connection	G ½ or ½ NPT and NAMUR interface ½ ⁵⁾	
Approx. weight	1.76 kg	

1) On request

2) The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:

$$Q = K_{VS} \times 36.22 \text{ in m}^3/\text{h.}$$

3) The permissible control pressure with the CNOMO interface depends on the pilot valve used.

4) The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

5) NAMUR interface according to VDI/VDE 3845

Design and principle of operation

Booster valve with NAMUR interface, K_{VS} 2.9¹⁾, actuated on both sides		
Switching function	5/2-way function with two detent positions	
K_{VS} ²⁾	2.9	
Safety approval	–	
Design	Spool, metal-to-metal seat, zero overlap, with return spring	
Material	Body	Aluminum, powder coated, gray beige RAL 1019
	Seals	Silicone rubber
	Screws	Stainless steel 1.4571
	Springs	Stainless steel 1.4310
Operating medium	Instrument air (free from corrosive substances) or nitrogen, air containing oil or non-corrosive gases	
Compressed air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
Actuation, control pressure, switching points	CNOMO interface	1.4 to 10 bar ³⁾
	Type 3963 Solenoid Valve (as spare part)	1.4 to 6 bar
	Type 3967 Solenoid Valve	1.4 to 10 bar
Max. operating pressure	10.0 bar	
Ambient temperature ⁴⁾	–45 to +80 °C	
Connection	G ½ or ½ NPT and NAMUR interface ½ ⁵⁾	
Approx. weight	1.76 kg	

1) On request

2) The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:

$$Q = K_{VS} \times 36.22 \text{ in m}^3/\text{h}.$$

3) The permissible control pressure with the CNOMO interface depends on the pilot valve used.

4) The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

5) NAMUR interface according to VDI/VDE 3845

Booster valve with NAMUR interface, K_{VS} 2.0 or 4.3, actuated on one side		
Switching function	3/2-way function	
K_{VS} ¹⁾ (direction of flow)	1.1 (4»3) 2.0 (3»5)	1.9 (4»3) 4.3 (3»5)
Safety approval	SIL ²⁾ , TÜV ³⁾	
Design	Poppet valve with diaphragm actuator, soft seated, with return spring	
Material	Body	Aluminum, powder coated, gray beige RAL 1019 or stainless steel 1.4404
	Diaphragms	Chloroprene rubber (-20 to +80 °C) or silicone rubber (-45 to +80 °C)
	Seals	Chloroprene rubber (-20 to +80 °C) or silicone rubber (-45 to +80 °C)
	Screws	Stainless steel 1.4571
	Springs	Stainless steel 1.4310
Operating medium	Instrument air (free from corrosive substances) or nitrogen, air containing oil or non-corrosive gases	
Compressed air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
Actuation, control pressure, switching points	Pneumatic connection	1.4 to 3 bar ≤0.2 bar (switchover to neutral position), G ¼ or ¼ NPT ≥1.4 bar (switchover to operating position)
	CNOMO interface	1.4 to 10 bar ⁴⁾
	Type 3963 Solenoid Valve (as spare part)	1.4 to 6 bar
	Type 3967 Solenoid Valve	1.4 to 10 bar
Max. operating pressure	10.0 bar	
Ambient temperature ⁵⁾	-20 to +80 °C -45 to +80 °C	
Conne- ction	Supply	G ¼ or ¼ NPT and NAMUR interface ¼ ⁶⁾ with G ¾ (¾ NPT)
	Exhaust	G ½ or ½ NPT and NAMUR interface ¼ ⁶⁾ with G ¾ (¾ NPT)
Approx. weight	1.38 kg	1.5 kg

1) The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:

$$Q = K_{VS} \times 36.22 \text{ in m}^3/\text{h.}$$

2) SIL according to IEC 61508

3) Emergency release or locking of compressed air supply

4) The permissible control pressure with the CNOMO interface depends on the pilot valve used.

5) The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

6) NAMUR interface according to VDI/VDE 3845

Design and principle of operation

Booster valve with NAMUR interface, K_{VS} 1.9, actuated on both sides (redundancy)		
Switching function	3/2-way function (series connection · emergency venting)	3/2-way function (parallel connection · emergency supply)
K_{VS} ¹⁾	1.9	
Safety approval	SIL ²⁾	
Design	Poppet valve with diaphragm actuator, soft seated, with return spring	
Material	Body	Aluminum, powder coated, gray beige RAL 1019 or stainless steel 1.4404
	Diaphragms	Chloroprene rubber (-20 to +80 °C) or silicone rubber (-45 to +80 °C)
	Seals	Chloroprene rubber (-20 to +80 °C) or silicone rubber (-45 to +80 °C)
	Screws	Stainless steel 1.4571
	Springs	Stainless steel 1.4310
Operating medium	Instrument air (free from corrosive substances) or nitrogen, air containing oil or non-corrosive gases	
Compressed air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
Actuation, control pressure, switching points	Type 3963 Solenoid Valve (as spare part)	1.4 to 6 bar
	Type 3967 Solenoid Valve	1.4 to 10 bar
Max. operating pressure	10.0 bar	
Ambient temperature ³⁾	-20 to +80 °C	
	-45 to +80 °C	
Connection	G 1/2 or 1/2 NPT and NAMUR interface 1/2 ⁴⁾	
Approx. weight	2.2 kg	

¹⁾ The air flow rate when $p_1 = 2.4$ bar and $p_2 = 1.0$ bar is calculated using the following formula:

$$Q = K_{VS} \times 36.22 \text{ in m}^3/\text{h.}$$

²⁾ SIL according to IEC 61508

³⁾ The maximum permissible ambient temperature depends on the permissible ambient temperature of the components, type of protection and temperature class.

⁴⁾ NAMUR interface according to VDI/VDE 3845

3.1.1 Summary of explosion protection approvals

SIL	Details in Safety Manual: ► SH 3756
TÜV	Contents: Mounted on control valves according to DIN 3394-1, DIN EN 161, DIN 32725, DIN EN 264 and DIN 32730 Number: S 284 2013 E2 rev. 01 Date: 2014-01-16

3.2 Dimensions in mm

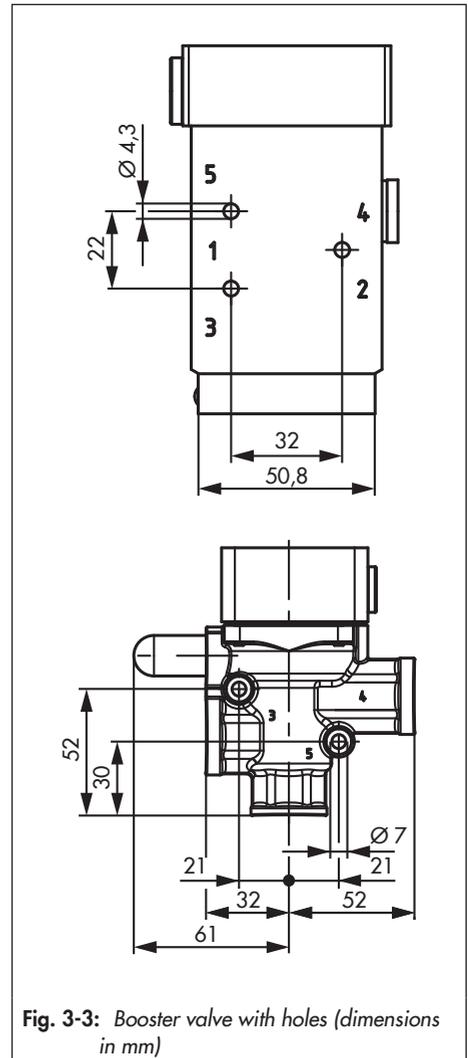


Fig. 3-3: Booster valve with holes (dimensions in mm)

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 nameplate of the booster valve 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).

4.2 Removing the packaging from the booster valve

Observe the following sequence:

- Do not remove the packaging until immediately before installation of the booster valve.
- Dispose and recycle the packaging in accordance with the local regulations.

4.3 Transporting the booster valve

- Pack the booster valve properly to comply with terms of transportation.

Transport instructions

- Protect the booster valve against external influences (e.g. impact).
- Protect the booster valve against moisture and dirt.
- Observe transport temperature depending on the permissible ambient temperature (see the 'Design and principle of operation' section).

4.4 Storing the booster valve

! NOTICE

Risk of damage to the booster valve due to improper storage.

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

! Note

We recommend regularly checking the prevailing storage conditions during long storage periods.

Shipment and on-site transport

Storage instructions

- Protect the booster valve against external influences (e.g. impact, shocks, vibration).
- Do not damage the corrosion protection (coating).
- Protect the booster valve against moisture and dirt. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Observe storage temperature depending on the permissible ambient temperature (see the 'Design and principle of operation' section).
- Do not place any objects on the booster valve.

5 Installation

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

⚠ WARNING

Crush hazard arising from moving parts on the valve.

Control valves contain moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- *Do not touch any moving valve parts while the control valve is in operation.*
- *Before performing any mounting or installation work on the booster valve, put the control valve out of operation by disconnecting the supply air and control signal. Protect it against unintentional reconnection.*
- *Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.*

5.1 Installation conditions

Mounting orientation

Any mounting position may be used. The following applies concerning the installation:

- Install the booster valve in such a way that the vent ports face downward (in cases where this is not possible, mount them in the horizontal position).

5.2 Preparation for installation

Before installation, make sure the following conditions are met:

- The booster valve is not damaged.
- The connections of the booster valve are clean.

Proceed as follows:

- Lay out the necessary material and tools to have them ready during mounting.

5.3 Mounting the booster valve

The booster valve is suitable for attachment to linear and rotary actuators.

5.3.1 Attachment to linear actuators

- See section 5.6 for required accessories

Type 3756-xx1: attachment using mounting bracket

- Mount the booster valve by inserting screws through the holes to fasten the device on a mounting bracket (0300-1444).

Type 3756-xx0: attachment on a NAMUR rib (IEC 60534-6) using an adapter plate

If the booster valve is configured for attachment according to IEC 60534-6 (NAMUR rib), steps 1 and 2 are not required.

1. Check the seating of the O-rings on the NAMUR interface.
2. Fasten the booster valve to the adapter plate using two screws.

Installation

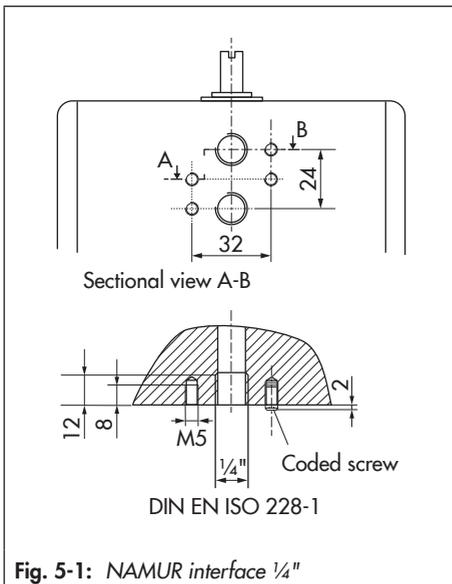
3. Use a cap screw to fasten the booster valve to the yoke/support.

5.3.2 Attachment to rotary actuators

→ See section 5.6 for required accessories

Type 3756-00

1. Check the seating of the O-rings on the NAMUR interface and that of the coded screw. Use a coded screw to determine the direction of action of the rotary actuator at the connecting flange.
2. Fasten the booster valve to the rotary actuator using two screws.



5.4 Pneumatic connection

The air connections are designed as threaded holes with G 1/8 (1/8 NPT), G 1/4 (1/4 NPT), G 1/2 (1/2 NPT) or G 1 (1 NPT) threads depending on the device version.

- Run and attach the connecting lines and screw joints according to good professional practice.
- Check the connecting lines and screw joints for leaks and damage at regular intervals and repair them.
- The K_{VS} coefficient of an upstream pressure reducing valve must be at least 1.6 times larger than the K_{VS} coefficient of the device.

Port labeling K_{VS} 2.0 and 4.3

Inscription	Function
4	Supply air
8	Control pressure (with pneumatic actuation only)
9	External pilot supply (only when a pilot valve is used)
3/5	Output

Port labeling K_{Vs} 1.4 and 2.9

Inscription	Function
1	Supply air
14/12	Control pressure (with pneumatic actuation only)
9	External pilot supply (only when a pilot valve is used)
2/4 and 3/5	Output

Port labeling K_{Vs} 10

Inscription	Function
1	Supply air
9	External pilot supply (only when a pilot valve is used)
2/3	Output

5.4.1 Sizing the connecting line

→ Refer to the table below for the minimum required nominal size of the connecting line at the port **4/1** of the body.

For pilot-actuated booster valves, these specifications apply to a connecting line shorter than 2 m. Use a larger nominal size for lines longer than 2 m.

Port	8/9/12/14	4/1
Pipe ¹⁾	6x1 mm	12x1 mm
Hose ²⁾	4x1 mm	9x3 mm

¹⁾ Outside diameter x Wall thickness

²⁾ Inside diameter x Wall thickness

5.4.2 Compressed air quality

Compressed air quality according to ISO 8573-1		
Particle size and quantity	Oil content	Pressure dew point
Class 4	Class 3	Class 3
$\leq 5 \mu\text{m}$ and $1000/\text{m}^3$	$\leq 1 \text{ mg}/\text{m}^3$	$-20 \text{ }^\circ\text{C}/10 \text{ K}$ below the lowest ambient temperature to be expected

5.4.3 Supply air

Air must be supplied to the pilot-actuated booster valve.

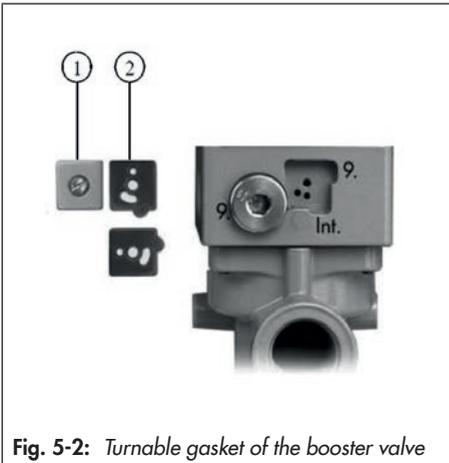
In the delivered state, the supply air is fed internally over port **4/1**, if not specified otherwise.

→ On mounting the pilot-actuated booster valve to rotary or linear actuators fitted with positioners, the pilot supply must be changed to an external pilot supply over port **9**.

To change to an external supply over port **9**, proceed as follows:

a) K_{VS} 1.4, 2.0, 2.9 and 4.3

- Loosen the cap screw on the connection plate and remove plate 1 and turnable gasket 2.
- Turn the turnable gasket 2 by 90°. The tip of gasket 2 must rest in the plate cut-out marked '9'.
- Fasten plate 1 and turnable gasket 2 to the connection plate.



b) K_{VS} 10

When the control pressure at port 9 is higher than the operating pressure at port 1, a check valve in these devices automatically switches the pilot supply from internal to external.

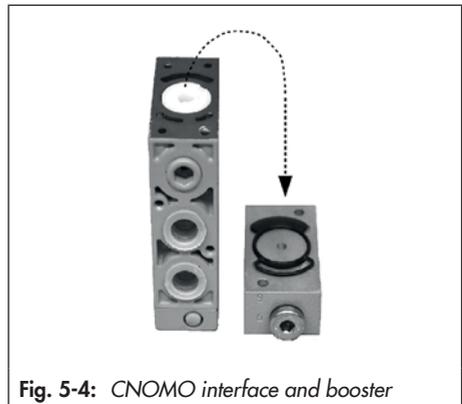
c) K_{VS} 1.4

Type 3756-1

- Undo the two hexagonal socket head screws (Fig. 5-3) and carefully remove the CNOMO interface.



Make sure that the gaskets on the booster valve and CNOMO interface do not get damaged.



Internal supply:

Do not seal the marked hole with the black turnable gasket (Fig. 5-5, left).

External supply:

Seal the marked hole with the black turnable gasket (Fig. 5-5, right).



Fig. 5-5: *CNOMO interface: location of the turnable gasket for internal supply (left) and for external supply (right)*

→ Carefully place the CNOMO interface onto the booster valve. Make sure that all gaskets are seated properly on the booster valve.

Observe direction on installation:

The port 9 (external pilot supply) of the CNOMO interface must be located on the same side as port 1 (supply) or port 3 (exhaust) of the booster valve.

→ Use the two hexagonal socket head screws to fasten the CNOMO interface (Fig. 5-3).

5.5 Connecting the electrical power supply

The device does not have any electrical connection. To use the booster valves with a pilot valve, the specifications written in the mounting and operating instructions of the pilot valve apply for the electrical connection.

5.6 Mounting accessories

Designation	Order no.
Filter made of polyethylene, G ¼ connection, degree of protection IP 54	8504-0066
Filter made of polyethylene, G ½ connection, degree of protection IP 54	8504-0068
Silencer G 1, male thread	1136-0208
Adapter plate, paint-coated aluminum, for NAMUR interface ¼ on NAMUR rib/threaded connection (G ¼)	1400-9598
Adapter plate, paint-coated aluminum, for NAMUR interface ¼ on NAMUR rib/threaded connection (¼ NPT)	1400-9599
Adapter plate, stainless steel 1.4404, for NAMUR interface ¼ on NAMUR rib/threaded connection (G ¼)	1400-9600
Adapter plate, stainless steel 1.4404, for NAMUR interface ¼ on NAMUR rib/threaded connection (¼ NPT)	1400-9601
Adapter plate, paint-coated aluminum, for NAMUR interface ½ on NAMUR rib/threaded connection (G ½)	1402-0827
Adapter plate, paint-coated aluminum, for NAMUR interface ½ on NAMUR rib/threaded connection (½ NPT)	1402-0829
Adapter plate, stainless steel 1.4404, for NAMUR interface ½ on NAMUR rib/threaded connection (G ½)	1402-0828
Adapter plate, stainless steel 1.4404, for NAMUR interface ½ on NAMUR rib/threaded connection (½ NPT)	1402-0830
Adapter plate, paint-coated aluminum, for NAMUR interface ¼ on rotary actuator ½	1380-1652
Adapter plate, stainless steel 1.4404, for NAMUR interface ¼ on rotary actuator ½	1380-1797
Adapter plate, paint-coated aluminum, for NAMUR interface ½ on rotary actuator ¼	1380-1795
Adapter plate, stainless steel 1.4404, for NAMUR interface ½ on rotary actuator ¼	1380-1796

6 Start-up

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

WARNING

Crush hazard arising from moving parts on the valve.

Control valves contain moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- *Do not touch any moving valve parts while the control valve is in operation.*
 - *Before performing any mounting or installation work on the booster valve, put the control valve out of operation by disconnecting the supply air and control signal. Protect it against unintentional reconnection.*
 - *Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.*
-

Before start-up, make sure the following conditions are met:

- The booster valve is properly mounted according to the instructions.
- The air supply has been properly connected.

Start-up

- Switch on the air supply.

7 Operation

⚠ WARNING

Crush hazard arising from moving parts on the valve.

Control valves contain moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- ➔ *Do not touch any moving valve parts while the control valve is in operation.*
 - ➔ *Before performing any mounting or installation work on the booster valve, put the control valve out of operation by disconnecting the supply air and control signal. Protect it against unintentional reconnection.*
 - ➔ *Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.*
-

After start-up, the booster valve controls the pneumatic actuator and amplifies the pneumatic binary signals. No operation is necessary.

8 Malfunctions

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

DANGER

Risk of injury due to high pressure in the device.

The booster valve is pressurized. Improper removal of the installed booster valve can lead to device components bursting and cause serious injury.

- *Depressurize the booster valve before removing it (disconnect the supply air and protect it against unintentional reconnection).*

WARNING

Crush hazard arising from moving parts on the valve.

Control valves contain moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- *Do not touch any moving valve parts while the control valve is in operation.*
- *Before performing any mounting or installation work on the booster valve, put the control valve out of operation by disconnecting the supply air and control signal. Protect it against unintentional reconnection.*
- *Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.*

Proceed as follows in the event of a malfunction:

- Check attachment.
- Check the pneumatic connection.
- Check ports (supply air, control pressure, external pilot supply (when a pilot valve is used) and output) and connecting lines.
- Check the control valve to ensure it functions.

8.1 Emergency action

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

Tip

Emergency action in the event of valve failure is described in the associated valve documentation.

9 Servicing

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

⚠ DANGER

Risk of injury due to high pressure in the device.

The booster valve is pressurized. Improper removal of the installed booster valve can lead to device components bursting and cause serious injury.

- *Depressurize the booster valve before removing it (disconnect the supply air and protect it against unintentional reconnection).*

⚠ WARNING

Crush hazard arising from moving parts on the valve.

Control valves contain moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- *Do not touch any moving valve parts while the control valve is in operation.*
- *Before performing any mounting or installation work on the booster valve, put the control valve out of operation by disconnecting the supply air and control signal. Protect it against unintentional reconnection.*
- *Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.*

i Note

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

- *The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON's After-sales Service.*
- *Only use original spare parts by SAMSON, which comply with the original specifications.*

9.1 Periodic inspection and testing of the booster valve

We recommend inspection and testing according to Table 9-1 at the minimum.

Servicing

Table 9-1: *Recommended inspection and testing*

Inspection and testing	Action to be taken in the event of a negative result
Check the markings, labels and nameplates on the booster valve for their readability and completeness.	Contact SAMSON when nameplates or labels are damaged, missing or incorrect to renew them.
	Clean any inscriptions that are covered with dirt and are illegible.
Check the booster valve to ensure it is mounted firmly.	Tighten the any loose mounting screws.
Check air lines.	Tighten any loose connections.
	Renew damaged lines.

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 injury due to high pressure in the device.

The booster valve is pressurized. Improper removal of the installed booster valve can lead to device components bursting and cause serious injury.

- *Depressurize the booster valve before removing it (disconnect the supply air and protect it against unintentional reconnection).*
-

WARNING

Crush hazard arising from moving parts on the valve.

Control valves contain moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- *Do not touch any moving valve parts while the control valve is in operation.*
 - *Before performing any mounting or installation work on the booster valve, put the control valve out of operation by disconnecting the supply air and control signal. Protect it against unintentional reconnection.*
 - *Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.*
-

Decommissioning

- *Disconnect the supply air and protect it against unintentional reconnection.*

11 Removal

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

WARNING

Crush hazard arising from moving parts on the valve.

Control valves contain moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- *Do not touch any moving valve parts while the control valve is in operation.*
 - *Before performing any mounting or installation work on the booster valve, put the control valve out of operation by disconnecting the supply air and control signal. Protect it against unintentional reconnection.*
 - *Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.*
-

1. Put the booster valve out of operation (see the 'Decommissioning' section).
2. Remove the connecting lines.
3. To remove the booster valve, loosen the fastening screws.

12 Repairs

A defective booster valve must be repaired or replaced.

! NOTICE

Risk of damage to the booster valve due to incorrect service or 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 booster valves can be returned to SAMSON for repair.

Proceed as follows to return devices to SAMSON:

1. Put the booster valve out of operation (see the 'Decommissioning' section).
2. Remove the booster valve (see the 'Removal' section).
3. Proceed as described on the Returning goods page of our website
 - ▶ www.samsongroup.com > Service & Support > After-sales Service > Returning goods

13 Disposal



SAMSON is a producer registered at the following European institution
▶ <https://www.ewrn.org/national-registers/national-registers>.
WEEE reg. no.: DE 62194439/
FR 02566

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



On request, we can appoint a service provider to dismantle and recycle the product.

14 Certificates

TR CU

The following certificates are included on the next pages:

- Negative decision TR CU 010/2011
- Negative decision TR CU 032/2013

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

▶ www.samsunggroup.com > Products & Applications > Product selector > Valve accessories > Type 3756

SIL

The SIL certificate (see the 'Design and principle of operation' section) is included in the ▶ SH 3756.

TÜV

The TÜV certificate (see the 'Design and principle of operation' section) is available on request.

УТВЕРЖДАЮ

Руководитель (заместитель руководителя)
органа по сертификации



Ю.Н. Иванов
инициалы, фамилия

РЕШЕНИЕ ПО ЗАЯВКЕ
(отрицательное)

№ 00013 /ТРТС от 05.02.2020

В результате рассмотрения заявки:

№ 00013/ТРТС от 03.02.2020 г., содержащей ниже указанные данные:

Заявитель: Общество с ограниченной ответственностью "САМСОН КОНТРОЛС", Основной государственный регистрационный номер: 1037700041026.

Место нахождения и адрес места осуществления деятельности: 109544, город Москва, бульвар Энтузиастов, дом 2, этаж 5, комната 11, Российская Федерация, Телефон: +7 (495) 777-4545, адрес электронной почты: samson@samson.ru.

Продукция:

- клапаны быстросрабатывающие, тип 3711
- пневматические блокировочные реле, тип 3709
- пневматические реверсивные усилители, тип 3710
- пневматические бустерные усилители, типы: 3755, 3756
- пневматические задатчики, тип 3759
- пневматические преобразователи давления, тип 3804
- пневматические преобразователи температуры, тип 812 (3812)
- термостаты, типов 2403К, 2430К, 2439, 2212, 2213, 2231, 2232, 2233, 2234, 2235.

на проведение обязательной сертификации продукции требованиям технического (-их) регламента (-ов) Таможенного союза:

Технического регламента Таможенного союза ТР ТС 032/2013 «О безопасности оборудования, работающего под избыточным давлением»

Код ТН ВЭД ЕАЭС

8479 89 970 8, 8481 10 190 8, 8481 90 000 0, 9032 10 890 0

Изготовитель продукции:

"SAMSON AG Mess- und Regeltechnik"

Место нахождения и адрес места осуществления деятельности по изготовлению продукции: Weismullerstrasse 3, 60314 Frankfurt am Main, Федеративная Республика Германия.

И в результате анализа документов, представленных заявителем в Орган по сертификации продукции принято решение:

1. Отказать в проведении обязательной сертификации заявленной продукции на соответствие требованиям Технического регламента Таможенного союза ТР ТС 032/2013 «О безопасности оборудования, работающего под избыточным давлением»

2. На основании:

Неразпространение действия требований Технического регламента Таможенного союза ТР ТС 032/2013 «О безопасности оборудования, работающего под избыточным давлением» на заявленную продукцию.

Эксперт

Д.Г. Кременчуцкий
инициалы, фамилия

15 Annex

15.1 After-sales service

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

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

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found 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, serial number, firmware version, device version

EB 3756 EN



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