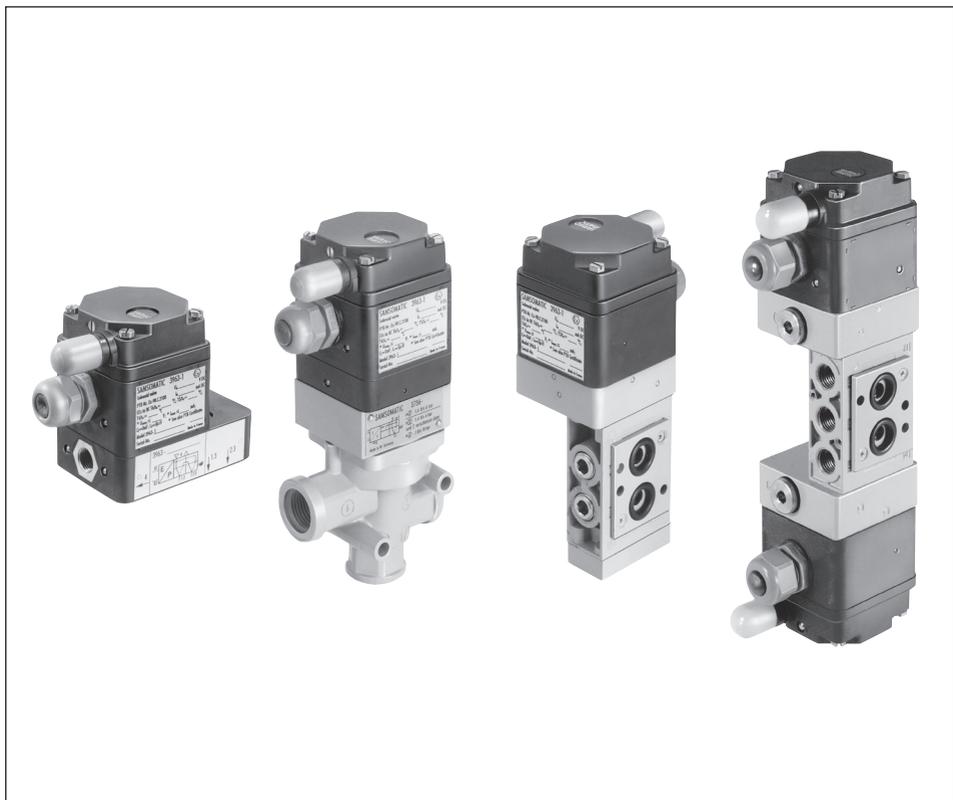


# MOUNTING AND OPERATING INSTRUCTIONS



## EB 3963 EN

Translation of original instructions



## Type 3963 Solenoid Valves

Edition June 2018

**CE** Ex  
certified

## 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](http://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*

<b>1</b>	<b>Safety instructions and measures</b> .....	<b>5</b>
1.1	Notes on possible severe personal injury .....	8
1.2	Notes on possible personal injury .....	9
1.3	Notes on possible property damage .....	9
<b>2</b>	<b>Markings on the device</b> .....	<b>10</b>
2.1	Nameplate .....	10
2.2	Article code .....	11
<b>3</b>	<b>Design and principle of operation</b> .....	<b>14</b>
3.1	Accessories .....	16
3.2	Technical data .....	18
3.3	Dimensions in mm .....	26
<b>4</b>	<b>Measures for preparation</b> .....	<b>40</b>
4.1	Unpacking .....	40
4.2	Storage .....	40
<b>5</b>	<b>Mounting and start-up</b> .....	<b>41</b>
5.1	Installation .....	41
5.2	Rail mounting .....	42
5.2.1	Wall mounting .....	42
5.3	Mounting on rotary actuators with NAMUR interface .....	43
5.3.1	Mounting to linear actuators with NAMUR rib .....	43
5.3.2	Mounting to linear actuators using CrNiMo steel pipe fitting .....	45
5.3.3	Mounting on mounting block for SAMSON Type 3277 Pneumatic Actuator .....	45
5.4	Pneumatic connection .....	47
5.4.1	Sizing of the connecting line .....	47
5.4.2	Compressed air quality .....	47
5.5	Changeover to external air supply over port 9 .....	48
5.6	Exhaust air feedback .....	50
5.7	Restrictors .....	50
<b>6</b>	<b>Electrical connection</b> .....	<b>51</b>
6.1	Switching amplifier according to EN 60079-25 .....	52
6.2	Cable entry with cable gland .....	52
6.3	Connecting the electrical power .....	53

## Contents

<b>7</b>	<b>Operation .....</b>	<b>53</b>
7.1	Degree of protection.....	53
7.2	Manual override .....	53
<b>8</b>	<b>Servicing.....</b>	<b>54</b>
8.1	Preparation for return shipment.....	54
<b>9</b>	<b>Malfunctions .....</b>	<b>55</b>
9.1	Emergency action .....	55
<b>10</b>	<b>Decommissioning and removal .....</b>	<b>56</b>
10.1	Decommissioning.....	56
10.2	Disposal.....	56
<b>11</b>	<b>Appendix.....</b>	<b>57</b>
11.1	After-sales Service .....	57

# 1 Safety instructions and measures

## Intended use

The Type 3963 Solenoid Valve is mounted onto pneumatic linear or rotary actuators (depending on the version) to control them. Upon failure of the air supply, the solenoid valve vents the actuator, causing the valve to move to the fail-safe position determined by the actuator. The device is designed to operate under exactly defined conditions (e.g. operating pressure, temperature). Therefore, operators must ensure that the solenoid valve is only used in applications where the operating conditions correspond to the technical data. In case operators intend to use the solenoid valve in other applications or conditions than specified, contact SAMSON.

SAMSON does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

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

## Reasonably foreseeable misuse

The solenoid 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 specified

## Qualifications of operating personnel

The solenoid 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.

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

## **Safety instructions and measures**

### **Personal protective equipment**

Personal protective equipment is not required to mount or operate the solenoid valve. Work on the control valve may be necessary when mounting or removing the solenoid valve.

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

### **Revisions and other modifications**

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

### **Warning against residual hazards**

The solenoid valve has a direct effect on the control valve when it has been installed. 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 service work.

### **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 as well as the referenced documents to the operating personnel and to instruct them in proper operation. Furthermore, operators must ensure that operating personnel or third 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 referenced documents and observe the specified hazard statements, warnings and caution notes. Furthermore, the operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

### **Servicing explosion-protected devices**

If a part of the device on which the explosion protection is based needs to be serviced, the device must not be put back into operation until a qualified inspector has assessed it according to explosion protection requirements, has issued an inspection certificate, or given the device a mark of conformity. Inspection by a qualified inspector is not required if the manufacturer performs a routine test on the device before putting it back into operation. Document the passing of the routine test by attaching a mark of conformity to the device. Replace explosion-protected components only with original, routine-tested components by the manufacturer.

Devices that have already been operated outside hazardous areas and are intended for future use inside hazardous areas must comply with the safety requirements placed on serviced devices. Before being operated inside hazardous areas, test the devices according to the specifications for servicing explosion-protected devices.

### **Maintenance, calibration and work on equipment**

- ➔ Only use intrinsically safe current/voltage calibrators and measuring instruments for interconnection with intrinsically safe circuits to check or calibrate the equipment inside or outside hazardous areas.
- ➔ Observe the maximum permissible values specified in the certificates for intrinsically safe circuits.

### **Referenced standards and regulations**

The solenoid valves comply with the requirements of Directives 2014/30/EU and 2014/35/EU for not explosion-protected applications as well as Directive 2014/34/EU for explosion-protected applications. The declaration of conformity includes information about the applied conformity assessment procedure. This declaration of conformity is included in the appendix of these instructions.

### **Referenced documentation**

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

- The mounting and operating instructions of the components on which the solenoid valve is mounted (valve, actuator, valve accessories etc.)
- Safety manual of the solenoid valve ► SH 3963

## 1.1 Notes on possible severe personal injury

### DANGER

#### **Risk of electric shock.**

Before starting up the solenoid valve, electrical installation work must be performed. An electric shock due to incorrect work practices may cause death.

- Before connecting wiring, performing any work on the device or opening the device, disconnect the power supply and protect it against unintentional reconnection.
- For electrical installation, observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use.
- In Germany, observe the VDE regulations and the accident prevention regulations of the employers' liability insurance.

#### **Risk of fatal injury due to the formation of an explosive atmosphere.**

Incorrect installation, operation or maintenance of the solenoid valve in potentially explosive atmospheres may lead to ignition of the atmosphere and cause death.

- The following regulations apply to installation in hazardous areas: EN 60079-14: 2008 (VDE 0165, Part 1).
- Installation, operation or maintenance of the solenoid valve must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.
- Observe the type of protection and the conditions for control specific to the type of protection according to the EC type examination certificate.

## 1.2 Notes on possible personal injury

### WARNING

#### **Risk of personal injury due to moving parts on the valve.**

During operation and when the solenoid valve is triggered, the actuator stem moves through its entire travel range. Injury to hands or fingers is possible if they are inserted into the valve.

- While the valve moves, do not insert hands or fingers into the valve yoke and do not touch any moving valve parts.

## 1.3 Notes on possible property damage

### NOTICE

#### **Risk of damage to the solenoid valve due to incorrect mounting position.**

- Do not mount the solenoid valve with the vent opening facing upward.
- Do not seal the vent opening when the device is installed on site.

#### **Risk of damage to the solenoid valve due to impermissible pressures.**

- Do not connect a supply pressure to the solenoid valve that exceeds the maximum supply pressure.

#### **Incorrect assignment of the terminals will damage the solenoid valve and will lead to malfunction.**

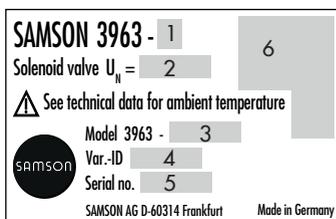
For the solenoid valve to function properly, the prescribed terminal assignment must be observed.

- Connect the electrical wiring to the solenoid valve according to the prescribed terminal assignment.

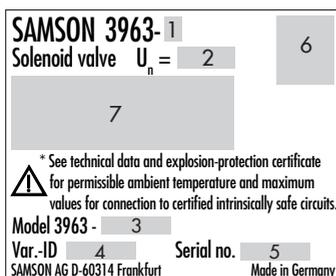
## 2 Markings on the device

### 2.1 Nameplate

#### Versions without explosion protection (example)



#### Versions with explosion protection (example)



- 1 Product designation
- 2 Nominal signal
- 3 Model no.
- 4 Configuration ID
- 5 Serial number
- 6 Compliance
- 7 Type of protection (for explosion-protected devices)

## 2.2 Article code

Solenoid valve		Type 3963- x x x x x x x x x x x x x x x x									
<b>Type of protection</b>											
No explosion protection	SIL 0										
II 2G Ex ia IIC T6 Gb (ATEX) <sup>1)</sup>	SIL 1										
Ex ia (CSA/FM)	SIL 3										
II 3G Ex nA II T6 Gc/II 3G Ex ic IIC Gc (ATEX) <sup>2)</sup>	SIL 8										
<b>Nominal signal</b>											
6 V DC	SIL 1										
12 V DC	SIL 2										
24 V DC	SIL 3										
230 V AC	SIL 5										
115 V AC	SIL 6										
<b>Manual override</b>											
Without	SIL 0										
Pushbutton underneath the enclosure cover	SIL 1										
External pushbutton (accessible using a pin)	2										
External switch (accessible using a screwdriver)	3										
<b>Switching function</b>											
3/2-way function with spring-return mechanism	SIL 0										
5/2-way function with spring-return mechanism (SIL with $K_{VS}$ 0.16)	1										
5/2-way function with spring-return mechanism with detented positions	2										
5/2-way function with spring-centered mid-position (ports 2 and 4 closed)	3										
5/2-way function with spring-centered mid-position (ports 2 and 4 vented)	5										
6/2-way function with spring-return mechanism	8										

<sup>1)</sup> EC type examination certificate PTB 01 ATEX 2085

<sup>2)</sup> Statement of conformity PTB 01 ATEX 2086 X

(continued on page 12)

## Markings on the device

Solenoid valve		Type 3963- x x x x x x x x x x x x x x x x x									
<b>Restrictors</b>											
Without	SIL 0										
1 exhaust air restrictor	1										
2 exhaust air restrictors	2										
1 supply/exhaust air restrictor	3										
<b>Attachment</b>											
NAMUR interface according to VDI/VDE 3845	SIL 0										
Threaded connection for rail, wall or pipe mounting	SIL 1										
NAMUR ribs according to IEC 60534-6-1	SIL 2										
Mounting block for Type 3277 Linear Actuator	SIL 3										
Connection diagram of Type 3963 (as spare part)	SIL 4										
<b>K<sub>vs</sub><sup>1)</sup></b>											
0.16	SIL 1										
0.32	SIL 2										
1.4	3										
4.3	SIL 4										
0.01 (as spare part)	5										
2.9	6										
2.0	SIL 7										
<b>Pneumatic connection</b>											
G ¼	SIL 0										
¼ NPT	SIL 1										
G ½	SIL 2										
½ NPT	SIL 3										
Without (as spare part)	4										
<b>Air supply</b>											
Internal (for actuators for on/off service or mounting block)	SIL 0										
External (actuators for throttling service)	SIL 1										

<sup>1)</sup> 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  $m^3/h$ .

(continued on page 13)

Solenoid valve		Type 3963- x x x x x x x x x x x x x x x									
<b>Electrical connection</b>											
Blanking plug M20x1.5	SIL 0 0										
Cable gland M20x1.5 made of black polyamide	SIL 0 1										
Cable gland M20x1.5 made of blue polyamide	SIL 1 1										
Adapter M20x1.5 to ½ NPT (aluminum)	SIL 1 2										
Cable gland M20x1.5 (CEAG) made of black polyamide	SIL 1 3										
Cable gland M20x1.5, nickel-plated brass	SIL 1 4										
Cable gland M20x1.5, nickel-plated brass, blue	SIL 1 5										
Cable gland M20x1.5 (CEAG) made of blue polyamide	SIL 1 6										
Cable gland M20x1.5 (Jacob) made of blue polyamide	SIL 1 7										
Device connector according to DIN EN 175301-803, black polyamide <sup>1)</sup>	SIL 2 3										
Device connector with LED according to DIN EN 175301-803, black polyamide <sup>2)</sup>	SIL 2 5										
Adapter M20x1.5 to ½ NPT (stainless steel)	SIL 2 6										
<b>Degree of protection</b>											
IP 54 with polyethylene filter	SIL 0										
IP 65 with filter check valve made of polyamide	SIL 1										
IP 65 with filter check valve made of stainless steel	SIL 2										
NEMA 4 with filter check valve made of polyamide	SIL 4										
NEMA 4 with filter check valve made of stainless steel	SIL 5										
<b>Ambient temperature <sup>3)</sup></b>											
-20 to +80 °C (+60 °C in temperature class T6)	SIL 0										
-45 to +80 °C (+60 °C in temperature class T6)	SIL 2										
<b>Safety function</b>											
Without								0			
SIL <sup>4)</sup>								SIL 1			
TÜV <sup>5)</sup>								2			
<b>Special version</b>											
Without								SIL 0 0 0			
Connecting plate/booster valve made of 1.4404								SIL 0 0 1			
Further special versions on request											

- <sup>1)</sup> The cable socket is not included in the scope of delivery.
- <sup>2)</sup> The cable socket with LED is included in the scope of delivery.
- <sup>3)</sup> The maximum permissible ambient temperature of the solenoid valve depends on the permissible ambient temperature of the components, type of protection and temperature class.
- <sup>4)</sup> SIL according to IEC 61508
- <sup>5)</sup> Emergency release or locking of compressed air supply

### 3 Design and principle of operation

#### Solenoid valves actuated on one side

The solenoid valves consist of an electro-pneumatic binary converter (A) with (optional) manual override (B) and a booster valve (C) actuated on one side with return spring (Fig. 1).

The air supply for the electropneumatic binary converter (A) is routed internally through the booster valve (C) (delivered state). The so-

lenoid valve can be converted to accept an external air supply at port 9 by turning a gasket.

The pressure reducer (5) reduces the supply air pressure to 1.4 bar.

In the idle position, the flapper (2) is lifted off the outlet nozzle by the spring (3). As a result, a pressure lower than the deactivation pressure of the booster valve (C) builds up in the pressure divider, which consists of the restrictor (6) and outlet nozzle (1).

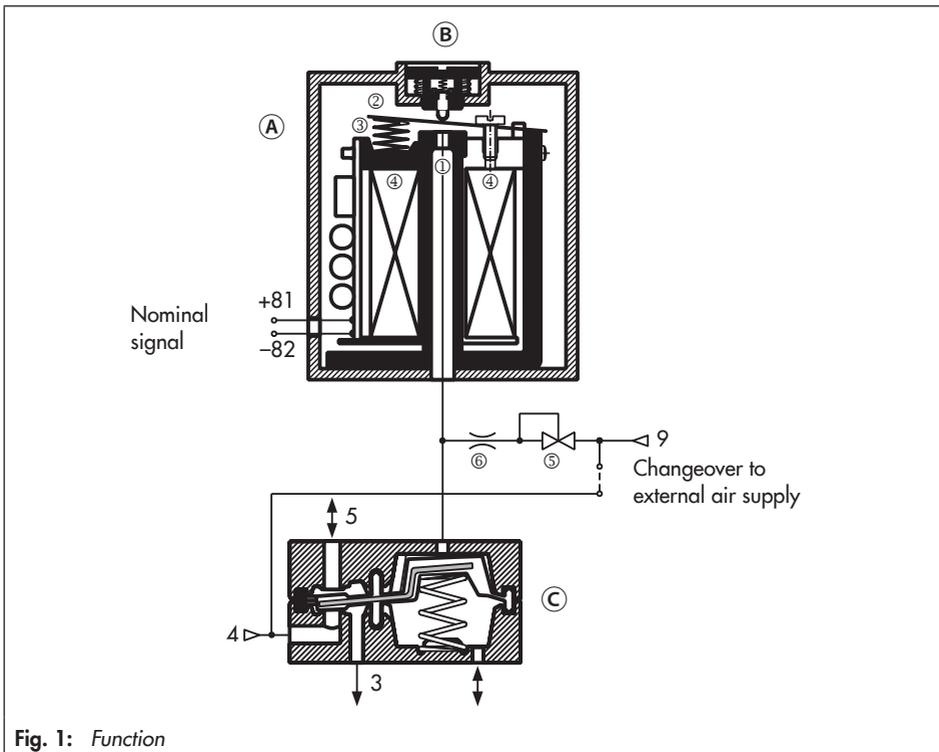


Fig. 1: Function

When the solenoid coil ④ is energized by an electric binary signal, the outlet nozzle ① is closed by the flapper ② against the force of the spring ③. This causes the pressure in the pressure divider to rise above the activation pressure of the booster valve ⑤ and switches it to the operating position.

After the solenoid coil is de-energized, the booster valve ⑤ is switched to the idle position again by a return spring.

### Solenoid valves actuated on both sides

The solenoid valves consist of two electro-pneumatic binary converters ⑥ with (optional) manual override ⑦ and a booster valve ⑤ actuated on both sides with two detent positions or spring-centered mid-position.

The air supply for the electropneumatic binary converters ⑥ is routed internally through the booster valve ⑤ (delivered state). The solenoid valve can be converted to accept an external air supply at port 9 by turning two gaskets.

The pressure reducer ⑧ reduces the supply air pressure to 1.4 bar.

In the idle position, the flapper ② is lifted off the outlet nozzle by the spring ③. As a result, a pressure lower than the deactivation pressure of the booster valve ⑤ builds up in the pressure divider, which consists of the restrictor ⑥ and outlet nozzle ①.

When the solenoid coil ④ is energized by an electric binary signal, the outlet nozzle ① is closed by the flapper ② against the force of the spring ③. This causes the pressure in the pressure divider to rise above the activa-

tion pressure of the booster valve ⑤ and switches it to the operating position.

After the solenoid coil is de-energized, the operating position of the detented booster valve ⑤ is kept until the opposing signal is received. The spring-centered booster valve ⑤ is switched to the mid-position by a return spring after the solenoid coil is de-energized.

A simultaneous control of the electropneumatic binary converter ⑥ must be ruled out on the electric control level.

### 3.1 Accessories

Accessories for Type 3963 Solenoid Valves	
Order no.	Designation
0790-6658	Cable socket according to EN 175301-803, Form A, made of polyamide, black, degree of protection IP 65
1170-4069	Cable socket with LED according to EN 175301-803, Form A, made of polyamide, black, degree of protection IP 65
1400-8298	Cable socket (Harting), 7-pole, made of aluminum, silver, degree of protection IP 65
8801-2810	Sensor connecting lead, two-wire, 3 m, blue, with angle connector M12x1, 4-pole, degree of protection IP 68
8831-0716	Cable socket (Binder), 7-pole, made of PBT GV, black, degree of protection IP 67
8831-0865	Cable socket M12x1, 4-pole, angled design, made of polyamide, black, degree of protection IP 67
3994-0160	Cable breakage protection with activation delay, enclosure for 35 mm top-hat rail mounting, IP 20 (for Type 3963-X1 with 6-V DC nominal signal)
1400-5268	Filter made of polyethylene, G 1/G ½ connection, degree of protection IP 54 (required for actuator size >1400 cm <sup>2</sup> )
8504-0066	Filter made of polyethylene, G ¼ connection, degree of protection IP 54
8504-0068	Filter made of polyethylene, G ½ connection, degree of protection IP 54
1790-7408	Filter check valve in housing with G ¼ thread made of polyamide, degree of protection IP 65
1790-7253	Filter check valve in housing with G ¼ thread made of 1.4301, degree of protection IP 65
1790-9645	Filter check valve in housing with G ¼ thread made of polyamide, degree of protection NEMA 4
1790-9646	Filter check valve in housing with G ¼ thread made of 1.4301, degree of protection NEMA 4
1400-5930	Mounting base for G-profile rail 32 according to EN 50035 (2 pcs. required)
1400-5931	Mounting base for 35 mm top-hat rail according to EN 50022 (2 pcs. required)
1400-6726	Mounting plate for wall mounting

Mounting kits for Type 3963 Solenoid Valves with threaded connections	
Order no.	Designation
1400-6759	Mounting kit for linear actuators (175 and 240 cm <sup>2</sup> actuator area, G ¼ connection) with pipe fitting, G ¼/G ¼ connection, made of CrNiMo steel
	Mounting kit for linear actuators (350, 355, 700 and 750 cm <sup>2</sup> actuator area, G ⅜ connection)
1400-6735	with pipe fitting, G ½/G ⅜ connection, made of CrNiMo steel
1400-6761	with pipe fitting, G ¼/G ⅜ connection, made of CrNiMo steel
1400-6736	Mounting kit for linear actuators (1000 and 1400-60 cm <sup>2</sup> actuator area, G ¾ connection) with pipe fitting, G ½/G ¾ connection, made of CrNiMo steel
1400-6737	Mounting kit for linear actuators (1400-120, 1400-250, 2800 and 2 x 2800 cm <sup>2</sup> actuator area, G 1 connection) with pipe fitting, G ½/G 1 connection, made of CrNiMo steel

Mounting kits for Type 3963 Solenoid Valves with threaded connections	
Order no.	Designation
1400-6749	Mounting kit for linear actuators (175/240 cm <sup>2</sup> actuator area, G ¼ connection) with mounting bracket made of CrNiMo steel and screw fittings for 8x1 pipe, G ¼/G ¼ connection, made of zinc-coated steel
1400-6750	and screw fittings for 8x1 pipe, G ¼/G ¼ connection, made of CrNiMo steel
1400-6738	Mounting kit for linear actuators (350, 355, 700 and 750 cm <sup>2</sup> actuator area, G ¾ connection) with mounting bracket made of CrNiMo steel and screw fittings for 8x1 pipe, G ¼/G ¾ connection, made of zinc-coated steel
1400-6739	and screw fittings for 8x1 pipe, G ¼/G ¾ connection, made of CrNiMo steel
1400-6743	and screw fittings for 12x1 pipe, G ¼/G ¾ connection, made of CrNiMo steel
1400-6744	and screw fittings for 10x1 pipe, G ¼/G ¾ connection, made of polyamide
1400-6745	and screw fittings for 10x1 pipe, G ¼/G ¾ connection, made of polyamide
1400-6740	Mounting kit for linear actuators (700/750 cm <sup>2</sup> actuator area, G ¾ connection) with mounting bracket made of CrNiMo steel and screw fittings for 12x1 pipe, G ½/G ¾ connection, made of zinc-coated steel
1400-6741	and screw fittings for 12x1 pipe, G ¼/G ¾ connection, made of zinc-coated steel
1400-6742	and screw fittings for 12x1 pipe, G ½/G ¾ connection, made of CrNiMo steel

Mounting kits for Type 3963 Solenoid Valves with NAMUR interface	
Order no.	Designation
1400-6746	Mounting kit for linear actuators (350, 355, 700 and 750 cm <sup>2</sup> actuator area, G ¾ connection) with NAMUR rib using adapter plate for NAMUR rib/interface (order no. 1400-6751) and screw fittings for 12x1 pipe, G ¼/G ¾ connection, made of zinc-coated steel
1400-6747	and screw fittings for 12x1 pipe, G ¼/G ¾ connection, made of CrNiMo steel
1400-6748	and screw fittings for 10x1 pipe, G ¼/G ¾ connection, made of polyamide
1400-6752	Mounting kit for linear actuators (175 and 240 cm <sup>2</sup> actuator area, G ¼ connection) with NAMUR rib using adapter plate for NAMUR rib/interface (order no. 1400-6751) and screw fittings for 6x1 pipe, G ¼/G ¼ connection, made of zinc-coated steel
1400-6753	and screw fittings for 6x1 pipe, G ¼/G ¼ connection, made of CrNiMo steel
1400-6756	and screw fittings for 10x1 hose, G ¼/G ¼ connection, made of polyamide
1400-6754	Mounting kit for linear actuators (350, 355, 700 and 750 cm <sup>2</sup> actuator area, G ¾ connection) with NAMUR rib using adapter plate for NAMUR rib/interface (order no. 1400-6751) and screw fittings for 8x1 pipe, G ¼/G ¾ connection, made of zinc-coated steel
1400-6755	and screw fittings for 8x1 pipe, G ¼/G ¾ connection, made of CrNiMo steel
1400-6757	and screw fittings for 10x1 pipe, G ¼/G ¾ connection, made of polyamide
1400-6759	Mounting kit for linear actuators (175 and 240 cm <sup>2</sup> actuator area, G ¼ connection) with pipe fitting, G ¼/G ¼ connection, made of CrNiMo steel
1400-3001	Mounting kit for Type 3353 Angle Seat Valve with adapter plate for NAMUR interface made of 1.4301

## Design and principle of operation

Accessories for mounting kits	
Order no.	Designation
0320-1416	Support for NAMUR rib (required when a positioner or limit switch is additionally mounted to the linear actuator, DN 50)
8320-0131	M8x60 hexagon screw, A4, DIN 931
1400-6751	Adapter plate with NAMUR rib/NAMUR interface (G ¼)
1400-9924	Adapter plate with NAMUR rib/NAMUR interface (¼ NPT)
	Mounting block for Type 3277 Linear Actuator with mounted Types 3793, 3766, 3767 and 3730 Positioners
1400-8813	G ¼ connection
1400-8814	¼ NPT connection
1400-6950	Pressure gauge mounting block, 1x Output and 1x Supply, made of stainless steel/brass (for mounting block)
	Piping for actuator with "stem retracts" fail-safe action
1400-6444	240 cm² actuator area, zinc-coated steel
1400-6445	240 cm² actuator area, CrNiMo steel
1400-6446	350 cm² actuator area, zinc-coated steel
1400-6447	350 cm² actuator area, CrNiMo steel
1400-6448	700 cm² actuator area, zinc-coated steel
1400-6449	700 cm² actuator area, CrNiMo steel

## 3.2 Technical data

General data		
Design	Solenoid with flapper/nozzle assembly and booster valve	
Degree of protection	IP 54 with filter	
	IP 65 with filter check valve	
Material	Enclosure	Polyamide PA 6-3-T-GF35, black
		AlMg, powder coated, gray beige RAL 1019
	Connecting plate	1.4404 (see section 2.2 for special versions)
		Polyamide PA 6-3-T-GF35, black
	Screws	1.4571
	Springs	1.4310
	Seals	Silicone rubber, Perbunan
	Diaphragms	Chloroprene rubber 57 Cr 868 (-20 to +80 °C)
	Silicone rubber (-45 to +80 °C)	

General data		
Supply	Medium	Instrument air free from corrosive substances or nitrogen
	Pressure	1.4 to 6 bar
Air consumption		≤ 80 l/h at 1.4 bar supply air in neutral position
		≤ 10 l/h at 1.4 bar supply air in operating position
Switching time		≤ 65 ms
Service life		≥ 2 × 10 <sup>7</sup> switching cycles (at -20 to +80 °C)
		≥ 2 × 10 <sup>6</sup> switching cycles (at -45 to +80 °C)
Ambient temperature		Refer to Electric data
Mounting position		Any desired position

Electric data							
Type 3963		-X1	-X2	-X3	-06	-05	
Nominal signal	U <sub>N</sub>	6 V DC Max. 27 V <sup>1)</sup>	12 V DC Max. 25 V <sup>1)</sup>	24 V DC Max. 32 V <sup>1)</sup>	115 V AC Max. 130 V <sup>1)</sup>	230 V AC Max. 255 V <sup>1)</sup>	
	f <sub>N</sub>				48 to 62 Hz		
Switching point	ON	U <sub>+80 °C</sub>	≥ 4.8 V	≥ 9.6 V	≥ 18 V	82 to 130 V	183 to 255 V
		I <sub>+20 °C</sub>	≥ 1.41 mA	≥ 1.52 mA	≥ 1.57 mA	≥ 2.2 mA	≥ 2.6 mA
		P <sub>+20 °C</sub>	≥ 5.47 mW	≥ 13.05 mW	≥ 26.71 mW	≥ 0.17 VA	≥ 0.46 VA
	OFF	U <sub>-25 °C</sub>	≤ 1.0 V	≤ 2.4 V	≤ 4.7 V	≤ 18 V	≤ 36 V
Impedance	R <sub>+20 °C</sub>	2.6 kΩ	5.5 kΩ	10.7 kΩ	Approx. 40 kΩ	Approx. 80 kΩ	
Temperature influence		0.4 %/°C	0.2 %/°C	0.1 %/°C	0.05 %/°C	0.03 %/°C	

**Type of protection Ex ia IIC<sup>2)</sup> for use in hazardous areas (Zone 1)**

Type 3963		-11	-12	-13		
Maximum values when connected to a certified intrinsically safe circuit						
Output voltage <sup>4)</sup>	U <sub>i</sub>	25 V · 27 V · 28 V · 30 V · 32 V				
Output current <sup>4)</sup>	I <sub>i</sub>	150 mA · 125 mA · 115 mA · 100 mA · 85 mA				
Power dissipation	P <sub>i</sub>	250 mW	No restrictions			
Outer capacitance	C <sub>i</sub>	≈ 0				
Outer inductivity	L <sub>i</sub>	≈ 0				
Ambient temperature in temperature class	T6	-45 to +60 °C				
	T5	-45 to +70 °C				
	T4	-45 to +80 °C				

## Design and principle of operation

Type of protection Ex nA II <sup>3)</sup> for use in hazardous areas (Zone 2)						
Type 3963		-81	-82	-83		
Ambient temperature in temperature class	T6	-45 to +60 °C				
	T5	-45 to +70 °C				
	T4	-45 to +80 °C				

1) Maximum permissible value at 100 % duty cycle. The maximum permissible value  $U_i$  applies to explosion-protected versions.

2) II 2G Ex ia IIC T6 according to EC type examination certificate PTB 01 ATEX 2085

3) II 3G Ex nA II T6 according to statement of conformity PTB 01 ATEX 2086 X

4) Pairs of values  $U_i/I_i$  apply to 6, 12, 24 V DC nominal signals.

Solenoid valves actuated on one side, $K_{VS}$ 0.16 or $K_{VS}$ 0.32				
Switching function	3/2-way function	3/2-way function	5/2-way function	6/2-way function
$K_{VS}$ <sup>1)</sup>	0.16	0.32	0.16	0.16
Safety function	SIL <sup>3)</sup> , TÜV <sup>4)</sup>	SIL <sup>3)</sup> , TÜV <sup>4)</sup>	SIL <sup>3)</sup> , TÜV <sup>4)</sup>	–
Design	Diaphragm switching element, soft seated, with return spring			
Operating medium	Instrument air free from corrosive substances <sup>5)</sup> , air containing oil or non-corrosive gases <sup>6)</sup>			
Operating pressure	Max. 6 bar			
Output signal	Operating pressure			
Ambient temperature <sup>2)</sup>	-45 to +80 °C			
Connection	G 1/4 or 1/4 NPT			
Approx. weight	570 g (standard version)			

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 permissible ambient temperature of the solenoid valve 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

5) With internal air supply

6) With external air supply

Solenoid valve, actuated on one side, $K_{VS}$ 4.3, with threaded connections				
Switching function	3/2-way function	3/2-way function	5/2-way function <sup>7)</sup>	6/2-way function <sup>7)</sup>
$K_{VS}$ <sup>1)</sup> (direction of flow)	1.9 (4→3), 1.5 (3→4) 4.3 (3→5), 4.7 (5→3)	1.9 (4→3), 1.5 (3→4) 4.3 (3→5), 4.7 (5→3)	1.9 (4→3), 1.5 (3→4) 4.3 (3→5), 4.7 (5→3)	1.9 (4→3), 1.5 (3→4) 4.3 (3→5), 4.7 (5→3)
Ambient temperature <sup>2)</sup>	-20 to +80 °C	-45 to +80 °C	-20 to +80 °C	-20 to +80 °C
Safety function	SIL <sup>3)</sup> , TÜV <sup>4)</sup>	SIL <sup>3)</sup> , TÜV <sup>4)</sup>	-	-
Design	Poppet valve with diaphragm actuator, soft seated, with return spring			
Material	Enclosure	GD AlSi 12, powder coated, gray beige RAL 1019 1.4404 (see section 2.2 for special versions)		
	Diaphragm	Chloroprene rubber	Silicone rubber	Chloroprene rubber
	Seals	Chloroprene rubber	Silicone rubber	Chloroprene rubber
	Screws	1.4571		
Actuation	Controlled on one side by a pilot valve, $K_{VS}$ 0.16			
Operating medium	Instrument air free from corrosive substances or nitrogen <sup>5)</sup> Instrument air free from corrosive substances, air containing oil or non-corrosive gases <sup>6)</sup>			
Max. operating pressure (direction of flow)	10 bar (4→3, 3→5) 2 bar (as required)	10 bar (4→3, 3→5) 2 bar (as required)	10 bar (as required) 2 bar (as required)	10 bar (as required) 2 bar (as required)
Switching cycles (operating pressure)	$\geq 10^7$ (6 bar) $\geq 10^6$ (10 bar)	$\geq 10^6$ (6 bar) $\geq 10^5$ (10 bar)	$\geq 10^7$ (6 bar) $\geq 10^6$ (10 bar)	$\geq 10^7$ (6 bar) $\geq 10^6$ (10 bar)
Connection	G ½ or ½ NPT			
Approx. weight	585 g (standard version)		1100 g (standard version)	

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 permissible ambient temperature of the solenoid valve 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

5) With internal air supply

6) With external air supply

7) Connecting hose between booster valves made of polyamide, see dimensional diagram on page 30 and dimensional diagram on page 31

## Design and principle of operation

Solenoid valve, actuated on one side, $K_{VS}$ 2.0 or 4.3, with NAMUR interface				
Switching function	3/2-way function with exhaust air feedback			
$K_{VS}$ <sup>1)</sup> (direction of flow)	1.1 (4→3) 2.0 (3→5)	1.1 (4→3) 2.0 (3→5)	1.9 (4→3) 4.3 (3→5)	1.9 (4→3) 4.3 (3→5)
Ambient temperature <sup>2)</sup>	-20 to +80 °C	-45 to +80 °C	-20 to +80 °C	-45 to +80 °C
Safety function	SIL <sup>3)</sup> , TÜV <sup>4)</sup>	SIL <sup>3)</sup> , TÜV <sup>4)</sup>	SIL <sup>3)</sup> , TÜV <sup>4)</sup>	SIL <sup>3)</sup> , TÜV <sup>4)</sup>
Design	Poppet valve with diaphragm actuator, soft seated, with return spring			
Material	Enclosure	GD AlSi 12, powder coated, gray beige RAL 1019 1.4404 (see section 2.2 for special versions)		
	Diaphragm	Chloroprene rubber	Silicone rubber	Chloroprene rubber Silicone rubber
	Seals	Chloroprene rubber	Silicone rubber	Chloroprene rubber Silicone rubber
	Screws	1.4571		
Actuation	Controlled on one side by a pilot valve, $K_{VS}$ 0.16			
Operating medium	Instrument air free from corrosive substances or nitrogen <sup>5)</sup> Instrument air free from corrosive substances, air containing oil or non-corrosive gases <sup>6)</sup>			
Max. operating pressure	10 bar	10 bar	10 bar	10 bar
Switching cycles (operating pressure)	$\geq 10^7$ (6 bar) $\geq 10^6$ (10 bar)	$\geq 10^6$ (6 bar) $\geq 10^5$ (10 bar)	$\geq 10^7$ (6 bar) $\geq 10^6$ (10 bar)	$\geq 10^7$ (6 bar) $\geq 10^5$ (10 bar)
Connection	Supply air	G 1/4 or 1/4 NPT, NAMUR interface 1/4" <sup>7)</sup> , G 3/8		G 1/2 or 1/2 NPT, NAMUR interface 1/2" <sup>7)</sup>
	Exhaust air	G 1/2 or 1/2 NPT, NAMUR interface 1/2" <sup>7)</sup> , G 3/8		G 1/2 or 1/2 NPT, NAMUR interface 1/2" <sup>7)</sup>
Approx. weight	1380 g (standard version)		1500 g (standard version)	

<sup>1)</sup> 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  $m^3/h$ .

<sup>2)</sup> The permissible ambient temperature of the solenoid valve depends on the permissible ambient temperature of the components, type of protection and temperature class.

<sup>3)</sup> SIL according to IEC 61508

<sup>4)</sup> Emergency release or locking of compressed air supply

<sup>5)</sup> With internal air supply

<sup>6)</sup> With external air supply

<sup>7)</sup> NAMUR interface according to VDI/VDE 3845

Solenoid valves actuated on one side, $K_{VS}$ 1.4 or $K_{VS}$ 2.9		
Switching function		3/2-way function with exhaust air feedback
		5/2-way function
$K_{VS}$ <sup>1)</sup>		1.4 or 2.9
Safety function		TÜV <sup>2)</sup> (with $K_{VS}$ 1.4)
		–
Design		Spool, metal-to-metal seat, zero overlap, with return spring
Material	Enclosure	GD AlSi 12, powder coated, gray beige RAL 1019 1.4404 (see section 2.2 for special versions)
	Seals	Silicone
	Filter	Polyethylene
	Screws	1.4571
Actuation		Controlled on one side by a pilot valve, $K_{VS}$ 0.01 (with 1.4) or $K_{VS}$ 0.16 (with 2.9)
Operating medium		Instrument air free from corrosive substances or nitrogen <sup>3)</sup> Instrument air free from corrosive substances, air containing oil or non-corrosive gases <sup>4)</sup>
Max. operating pressure		6 bar <sup>3)</sup> or 10 bar <sup>4)</sup>
Ambient temperature <sup>5)</sup>		–45 to +80 °C
Switching cycles		$\geq 2 \times 10^7$
Connection	$K_{VS}$ 1.4	G ¼ or ¼ NPT, NAMUR interface <sup>6)</sup>
	$K_{VS}$ 2.9	G ½ or ½ NPT, NAMUR interface <sup>6)</sup>
Approx. weight	$K_{VS}$ 1.4	485 g (standard version)
	$K_{VS}$ 2.9	1760 g (standard version)

- 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) Emergency release or locking of compressed air supply
- 3) With internal air supply
- 4) With external air supply
- 5) The permissible ambient temperature of the solenoid valve 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

Solenoid valves actuated on both sides, $K_{VS}$ 1.4 or $K_{VS}$ 2.9			
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)
$K_{VS}$ <sup>1)</sup>	1.4 or 2.9	1.4 (2.9 on request)	1.4 (2.9 on request)
Safety function	TÜV <sup>2)</sup> (with $K_{VS}$ 1.4)	–	TÜV <sup>2)</sup> (with $K_{VS}$ 1.4)
Design	Spool, metal-to-metal seat, zero overlap		
Material	Enclosure	GD AlSi 12, powder coated, gray beige RAL 1019 1.4404 (see section 2.2 for special versions)	
	Seals	Silicone	
	Filter	Polyethylene	
	Screws	1.4571	
Actuation	Controlled on both sides by two pilot valves, $K_{VS}$ 0.01 (with 1.4) or $K_{VS}$ 0.16 (with 2.9)		
Operating medium	Instrument air free from corrosive substances or nitrogen <sup>3)</sup> Instrument air free from corrosive substances, air containing oil or non-corrosive gases <sup>4)</sup>		
Max. operating pressure	6 bar <sup>3)</sup> or 10 bar <sup>4)</sup>		
Ambient temperature <sup>5)</sup>	–45 to +80 °C		
Switching cycles	$\geq 2 \times 10^7$		
Connection	$K_{VS}$ 1.4	G ¼ or ¼ NPT, NAMUR interface <sup>6)</sup>	
	$K_{VS}$ 2.9	G ½ or ½ NPT, NAMUR interface <sup>6)</sup>	
Approx. weight	$K_{VS}$ 1.4	685 g (standard version)	
	$K_{VS}$ 2.9	2180 g (standard version)	

<sup>1)</sup> 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  $m^3/h$ .

<sup>2)</sup> Emergency release or locking of compressed air supply

<sup>3)</sup> With internal air supply

<sup>4)</sup> With external air supply

<sup>5)</sup> The permissible ambient temperature of the solenoid valve depends on the permissible ambient temperature of the components, type of protection and temperature class.

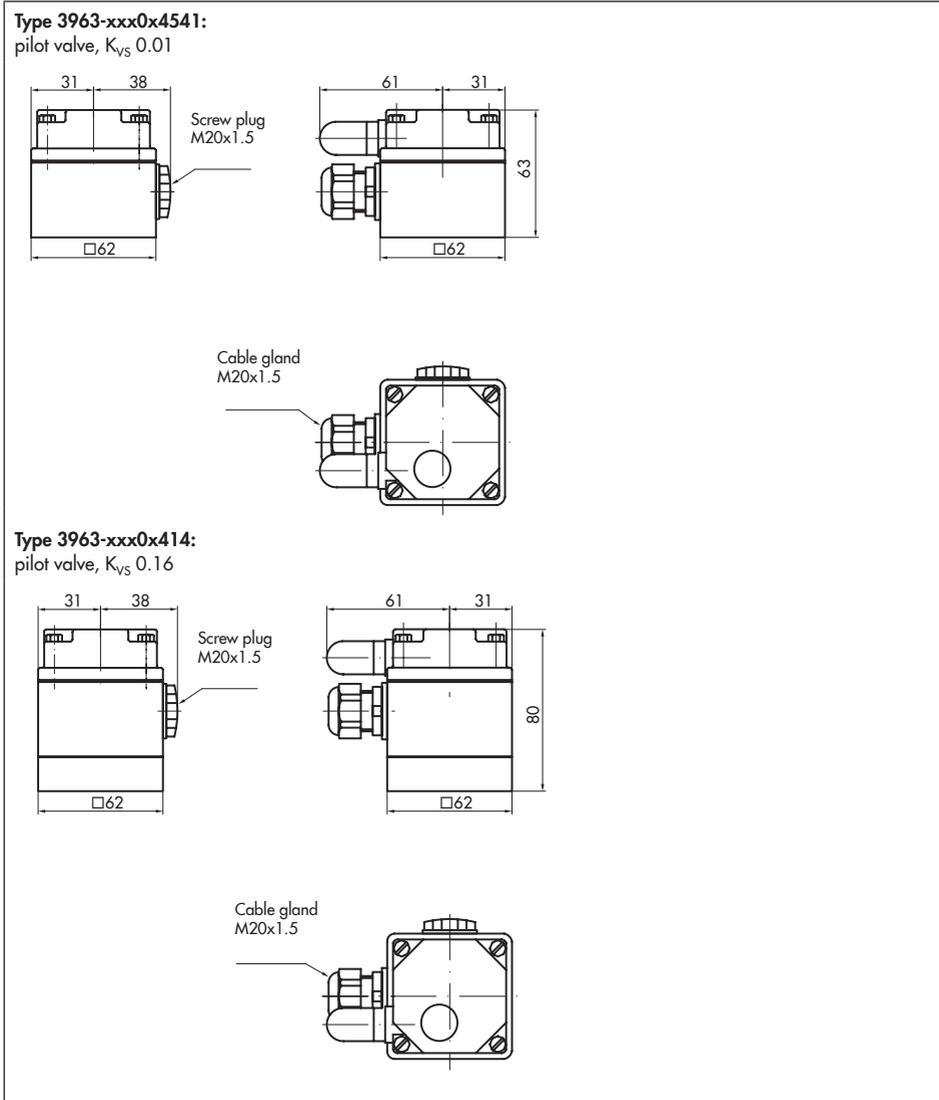
<sup>6)</sup> NAMUR interface according to VDI/VDE 3845

**Table 1:** Summary of explosion protection approvals

Type	Certification			Type of protection/comments
3963	 EC type examination certificate	Number	PTB 01 ATEX 2085	II 2G Ex ia IIC T6 Gb
		Date	2011-08-08	
		Number	RU C-DE.08.B.00764	I Ex ia IIC T6/T5/T4 Gb X
		Date	2015-02-10	
		Valid until	2020-02-09	
	<b>KCS</b>	Number	13-KB4BO-0039	Ex ia IIC T6/T5/T4
		Date	2013-01-31	
		Valid until	2019-01-31	
	<b>NEPSI</b>	Number	GYJ15.1220X	Ex ia IIC T4~T6 Gb
		Date	2016-06-16	
Valid until		2020-06-15		
<b>CSA</b>	Number	1607857	Ex ia IIC T6; Class I, Zone 0; Class I, II, Div. 1, Groups A, B, C, D, E, F, G; Class I, II, Div. 2, Groups A, B, C, D, E, F, G; Class III; Type 4 Enclosure	
	Date	2005-09-16		
<b>FM</b>	Number	3020228	Class I, Zone 0 AEx ia IIC; Class I, II, III; Div.1, Groups A, B, C, D, E, F, G; Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2 Groups F, G; Class III; Type 4X	
	Date	2015-10-12		
Statement of conformity		Number	PTB 01 ATEX 2086 X	II 3G Ex nA II T6 Gc; II 3G Ex ic IIC T6 Gc
		Date	2017-04-17	
		Number	RU C-DE.08.B.00764	2Ex nA IIC T6/T5/T4; 2Ex ic IIC T6/T5/T4
		Date	2015-02-10	
		Valid until	2020-02-09	
	<b>NEPSI</b>	Number	GYJ15.1220X	Ex ic IIC T4~T6 Gc
		Date	2016-06-16	
		Valid until	2020-06-15	

### 3.3 Dimensions in mm

#### Solenoid valves without threaded connections



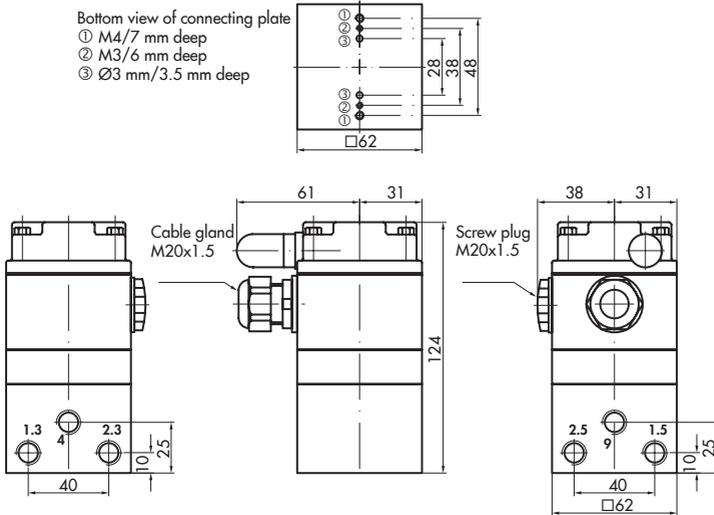
Solenoid valves with threaded connections

**Type 3963-xxx1x11:**

5/2-way solenoid valve, actuated on one side,  $K_{VS}$  0.16

Bottom view of connecting plate

- ① M4/7 mm deep
- ② M3/6 mm deep
- ③ Ø3 mm/3.5 mm deep

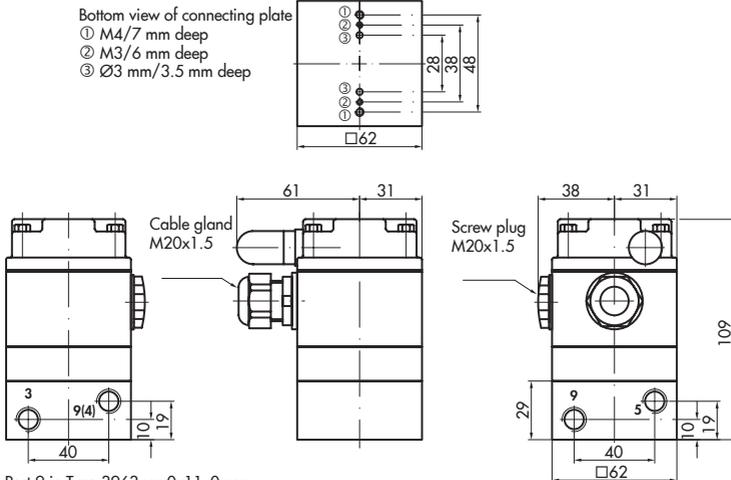


**Type 3963-xxx0x11/:**

5/2-way solenoid valve, actuated on one side,  $K_{VS}$  0.16 or 3.2

Bottom view of connecting plate

- ① M4/7 mm deep
- ② M3/6 mm deep
- ③ Ø3 mm/3.5 mm deep



Port 9 in Type 3963-xxx0x11x0xxxx  
Port 4 in Type 3963-xxx0x12xxxxxx

Ports 9 and 5 in Type 3963-xxx0x12xxxxxx

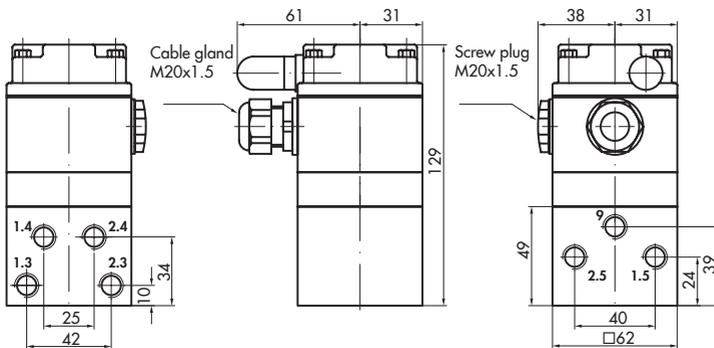
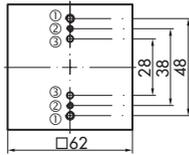
## Design and principle of operation

### Type 3963-xxx8x11:

6/2-way solenoid valve, actuated on one side,  $K_{VS}$  0.16

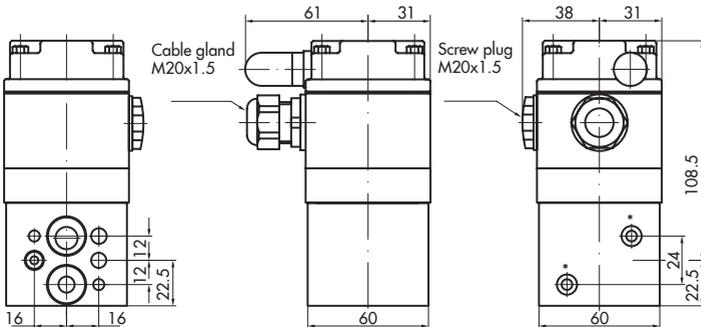
Bottom view of connecting plate

- ① M4/7 mm deep
- ② M3/6 mm deep
- ③ Ø3 mm/3.5 mm deep



### Types 3963-xxx0x314/-xxx0x324:

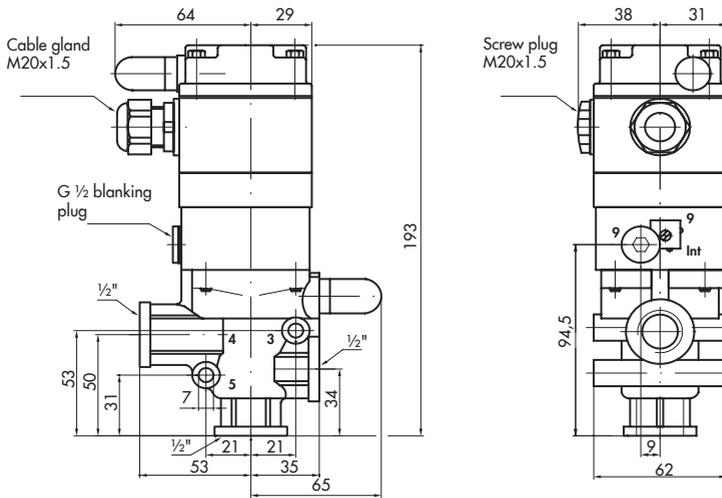
3/2-way solenoid valve, actuated on one side,  $K_{VS}$  0.16 or 0.32, for mounting to linear actuators using a mounting block



\* Mounting to a mounting block using two M5x60 (DIN 912) screws

**Type 3963-xxx0x14:**

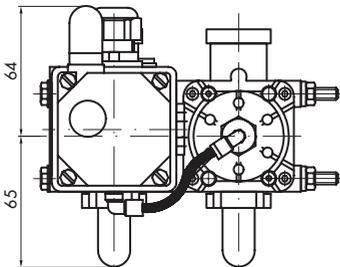
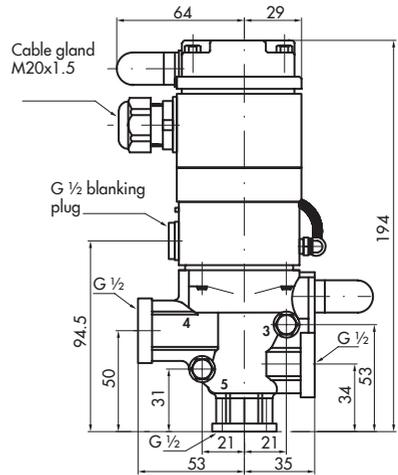
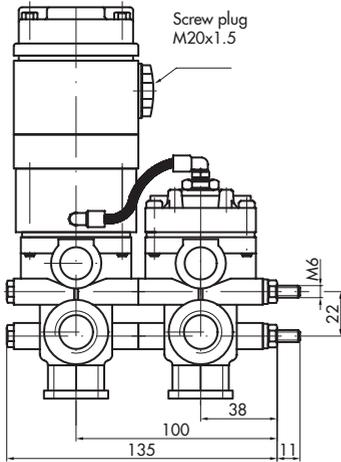
3/2-way solenoid valve, actuated on one side,  $K_{Vs}$  4.3



## Design and principle of operation

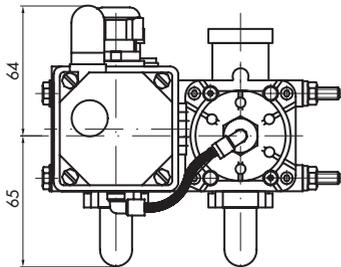
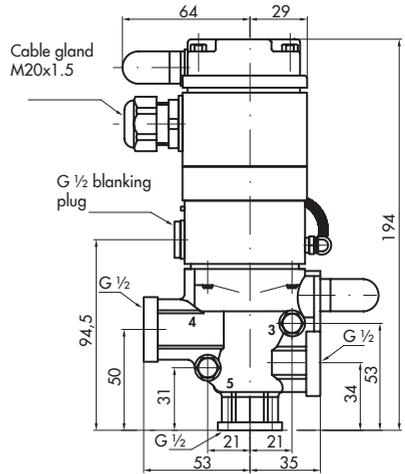
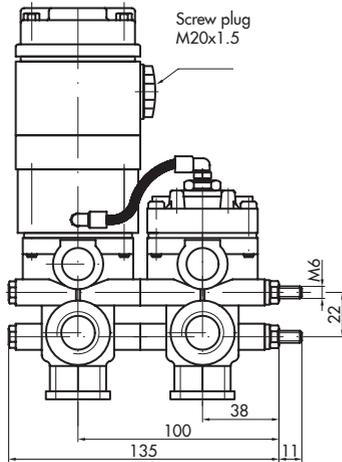
### Type 3963-xxx1x14:

5/2-way solenoid valve, actuated on one side,  $K_{VS}$  4.3



**Type 3963-xxx1x14:**

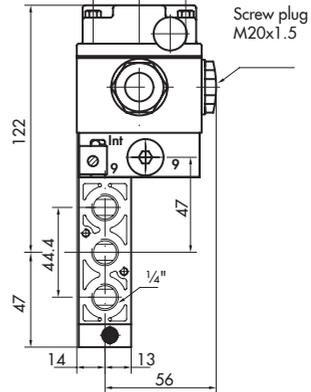
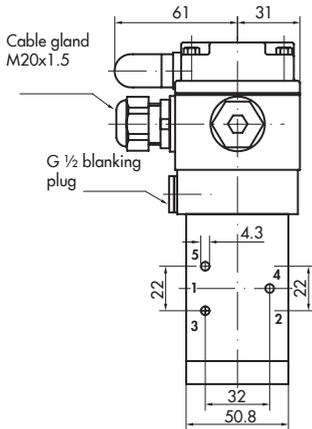
5/2-way solenoid valve, actuated on one side,  $K_{VS}$  4.3



## Design and principle of operation

### Types 3963-xxx0x13/-xxx1x13:

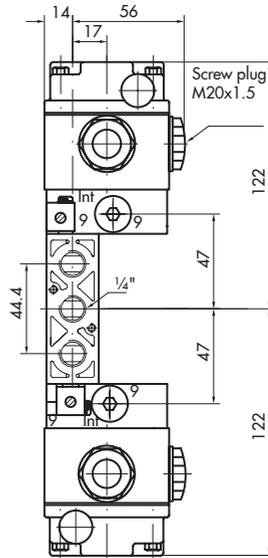
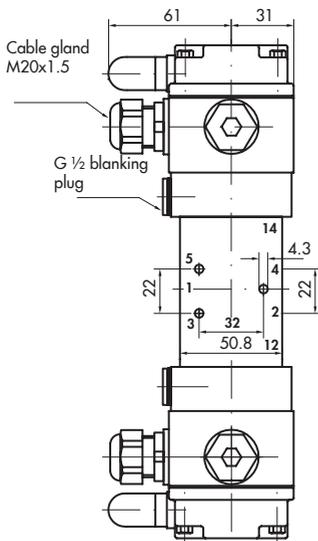
3/2-way or 5/2-way solenoid valve, actuated on one side,  $K_{VS}$  1.4



Port 5 is sealed when the 3/2-way function is used

### Types 3963-xxx2x13/-xxx3x13/-xxx5x13:

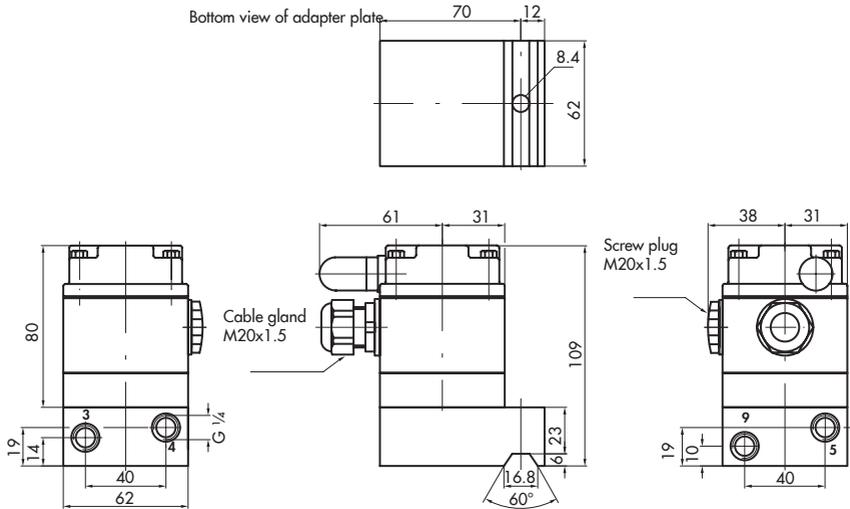
5/2-way or 5/3-way solenoid valve, actuated on both sides,  $K_{VS}$  1.4



Solenoid valves with threaded connections for linear actuators with NAMUR rib

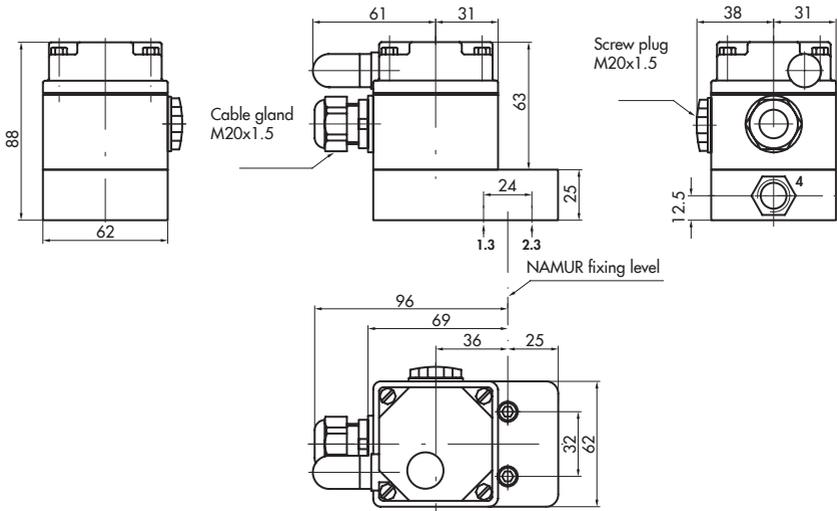
**Type 3963-xxx0x22:**

3/2-way solenoid valve, actuated on one side,  $K_{VS}$  0.32



**Types 3963-xxx0x01/-xxx1x01:**

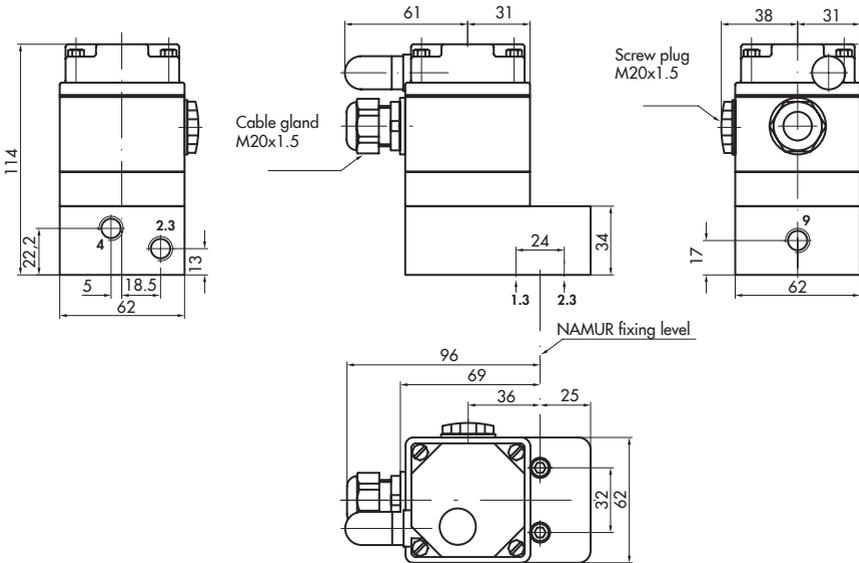
3/2-way or 5/2-way solenoid valve, actuated on one side,  $K_{VS}$  0.16



## Design and principle of operation

### Type 3963-xxx0x02:

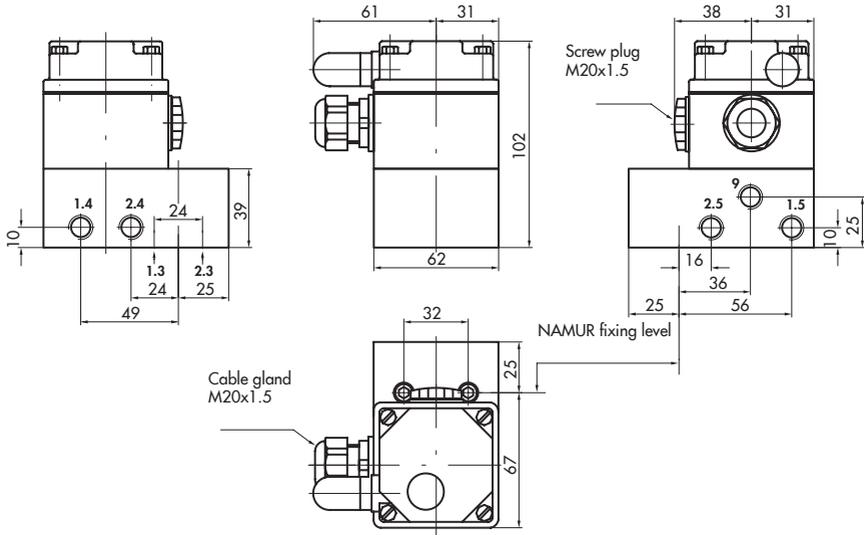
3/2-way solenoid valve, actuated on one side,  $K_{VS}$  0.32



Solenoid valves with NAMUR interface for rotary actuators

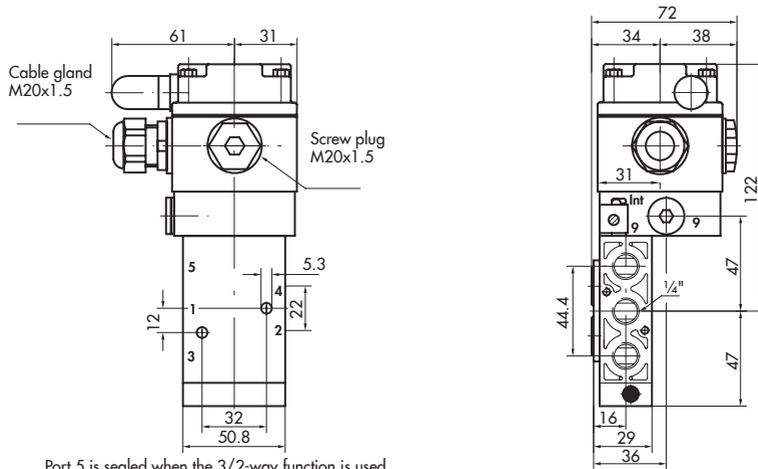
**Type 3963-xxx8x01:**

6/2-way solenoid valve, actuated on one side,  $K_{VS}$  0.16



**Types 3963-xxx0x03/-xxx1x03:**

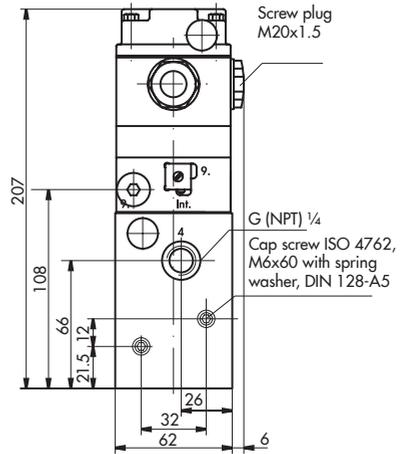
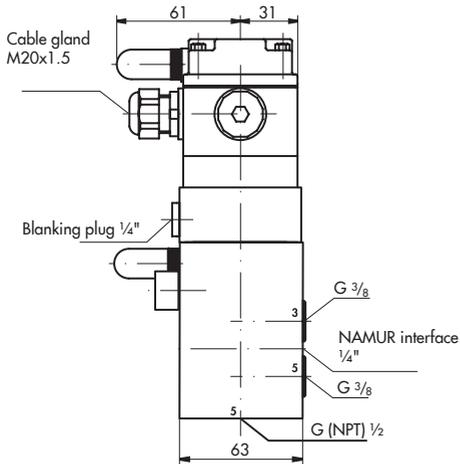
3/2-way or 5/2-way solenoid valve, actuated on one side,  $K_{VS}$  1.4



## Design and principle of operation

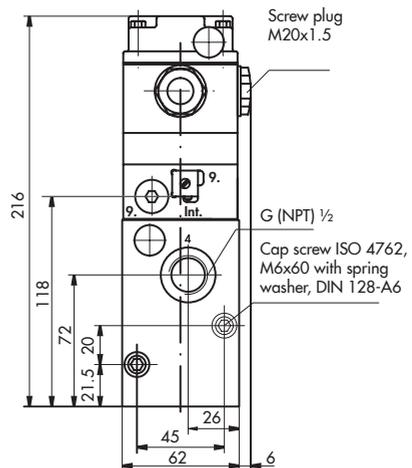
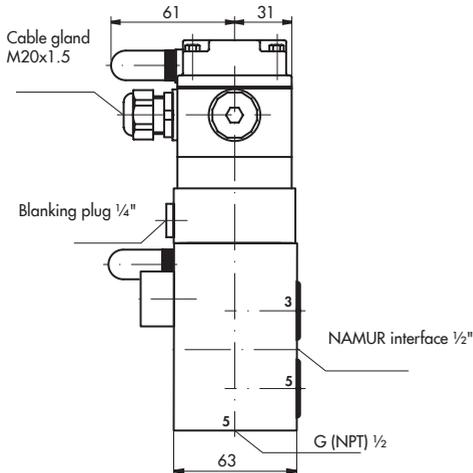
### Type 3963-xxx0x07:

3/2-way solenoid valve, actuated on one side,  $K_{VS}$  2.0



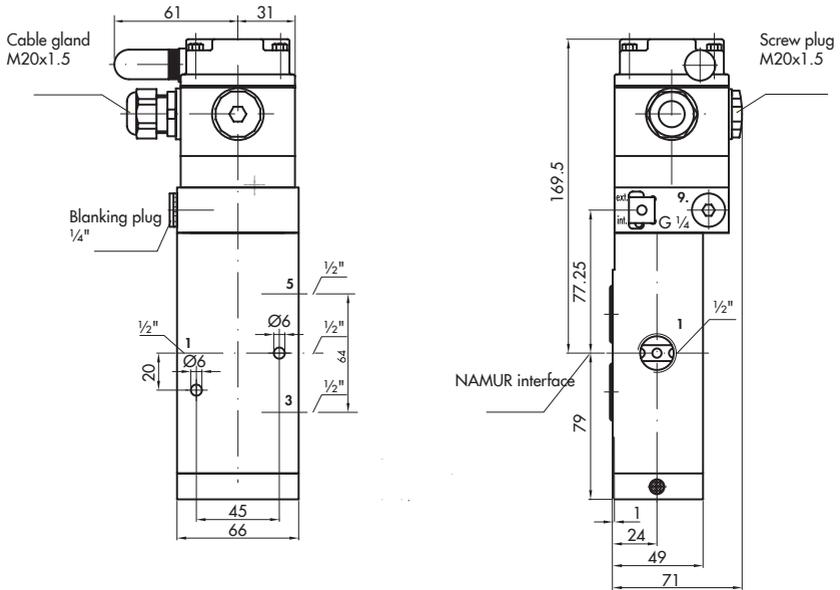
### Type 3963-xxx0x04:

3/2-way solenoid valve, actuated on one side,  $K_{VS}$  4.3



**Type 3963-xxx1x06:**

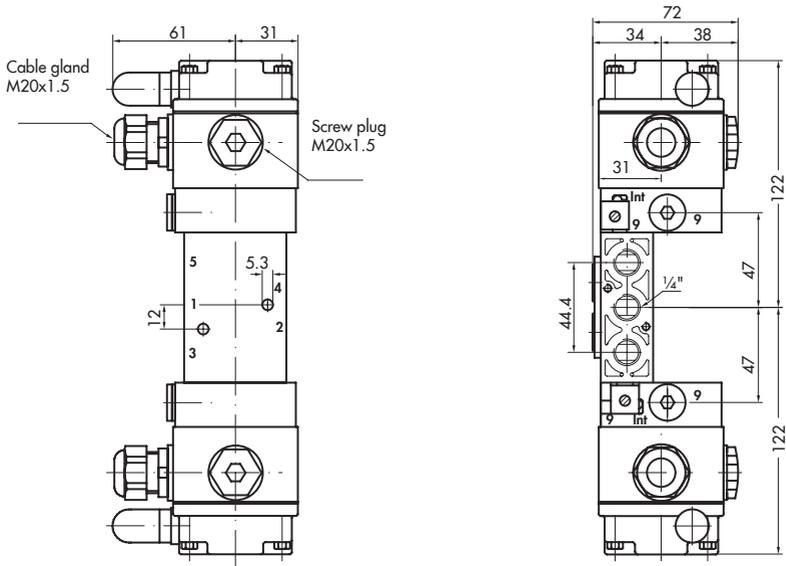
5/2-way solenoid valve, actuated on one side,  $K_{VS} 2.9$



## Design and principle of operation

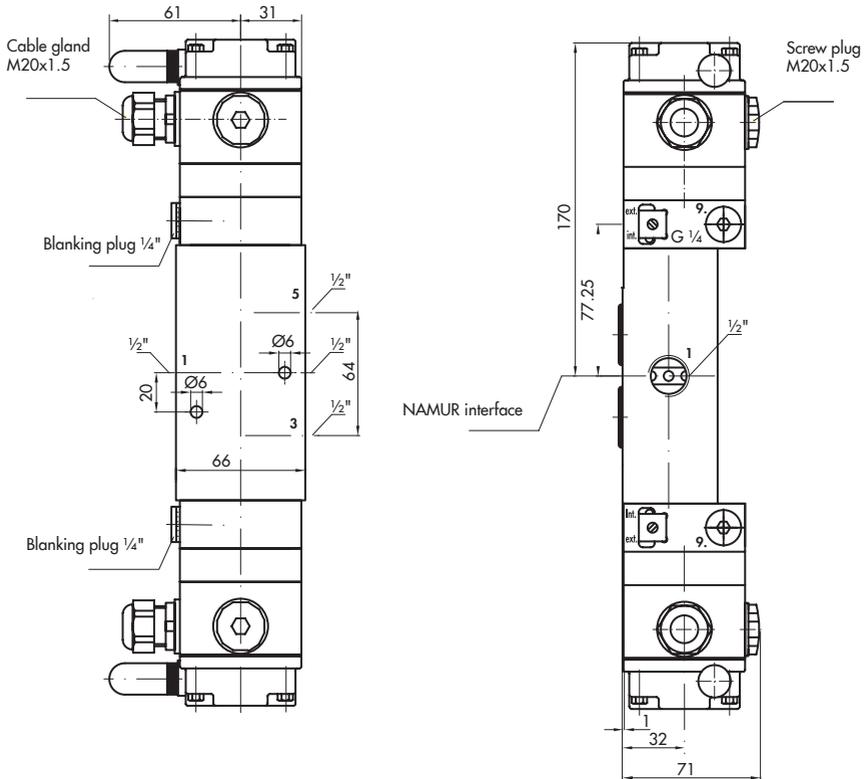
### Types 3963-xxx2x03/-xxx3x03/-xxx5x05:

5/2-way or 5/3-way solenoid valve, actuated on both sides,  $K_{VS}$  1.4



**Type 3963-xxx2x06:**

5/2-way solenoid valve, actuated on both sides,  $K_{VS} 2.9$



### 4 Measures for preparation

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Compare the shipment received with 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

##### **NOTICE**

*Risk of solenoid valve damage due to foreign particles entering the valve. Do not remove the packaging if the solenoid valve is to be transported to another location or kept in storage. Do not remove the protective film/protective caps until immediately before mounting the device on the valve.*

Before mounting the solenoid valve, proceed as follows:

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

### 4.2 Storage

##### **NOTICE**

*Risk of solenoid valve damage due to improper storage.*

*Observe storage instructions. Contact SAMSON, if need be.*

##### **Storage instructions**

- Protect the solenoid valve against external influences (e.g. impact, shocks, vibration).
- Do not damage the corrosion protection (coating).
- Protect the solenoid 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 technical data in section 3.2).
- Store solenoid valve with closed cover in airtight packaging.

## 5 Mounting and start-up

### ⓘ NOTICE

*Risk of malfunction due to incorrectly performed start-up.  
Perform start-up following the described sequence.*

The procedures to mount, install and start up the solenoid valve are described in the following. They must be performed in the prescribed sequence.

- 1. Remove the protective caps from the pneumatic connections.**
- 2. Mount the solenoid valve.**  
→ Section 5.1 onward
- 3. Perform pneumatic installation.**  
→ Section 5.4 onward
- 4. Perform electrical installation.**  
→ Section 5.5 onward

### 5.1 Installation

### ⚠ WARNING

*Risk of personal injury due to parts bursting or the process medium spurting out under high pressure.  
Before installation, depressurize the relevant plant section.*

### ⓘ NOTICE

*Risk of degree of protection being rendered ineffective.*

*Only operate the device with the enclosure cover mounted and the exhaust air filters installed.*

### Installation conditions

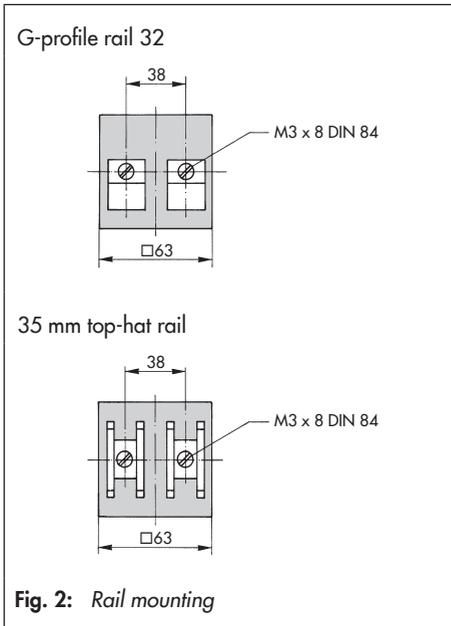
- Any mounting position may be used.
- The filter in the enclosure cover and the cable gland must face downward or, in cases where this is not possible, mount them in the horizontal position.
- On mounting, make sure that 300 mm or more clearance is kept above the enclosure cover.
- In cases where mechanical damage of the enclosure cannot be ruled out at the site of installation, mount additional protection to the enclosure.

## 5.2 Rail mounting

### Types 3963-XXXXX11/-XXXXX12

Accessories	Order no.
Mounting base for G-profile rail 32	1400-5930
Mounting base for 35 mm top-hat rail	1400-5931

- Mount the solenoid valve on two mounting bases for G-profile rail 32 according to EN 50035 or 35 mm top-hat rail according to EN 50022.

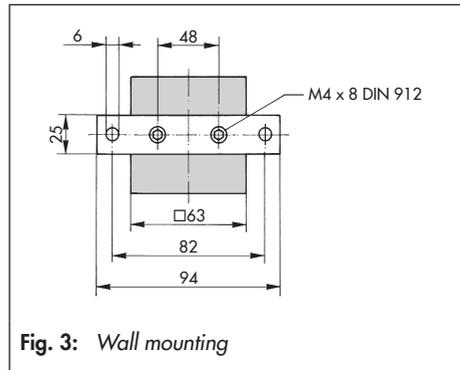


## 5.2.1 Wall mounting

### Types 3963-XXXXX11/-XXXXX12

Accessories	Order no.
Mounting plate	1400-6726

- Mount the solenoid valve on the mounting plate for wall mounting.



### Types 3963-XXXXX13/-XXXXX14

- Insert the screws through the boreholes and fasten the solenoid valve (see dimensions of the solenoid valve in section 3.3).

### 5.3 Mounting on rotary actuators with NAMUR interface

#### Type 3963-XXXXX0X

The screws required for mounting are included in the scope of delivery.

- ➔ Before mounting the solenoid valve, check that two O-rings are seated properly.
- ➔ Determine the direction of action of the rotary actuator at the connecting flange with an M5x10 coded grub screw according to DIN 916.
- ➔ Mount the solenoid valve directly to the rotary actuator using two M5x35 (ISO 4762) screws.

### 5.3.1 Mounting to linear actuators with NAMUR rib

#### Type 3963-XXX002

- ➔ Fasten the solenoid valve using the M8x35 (ISO 4762) screws included in the scope of delivery.

#### Type 3963-XXX0X0

- ➔ Mount the solenoid valves to linear actuators using the adapter plate (Fig. 5).

When positioners or limit switches are also to be mounted to the linear actuator (DN 50 and smaller), a support (0320-1416) is required.

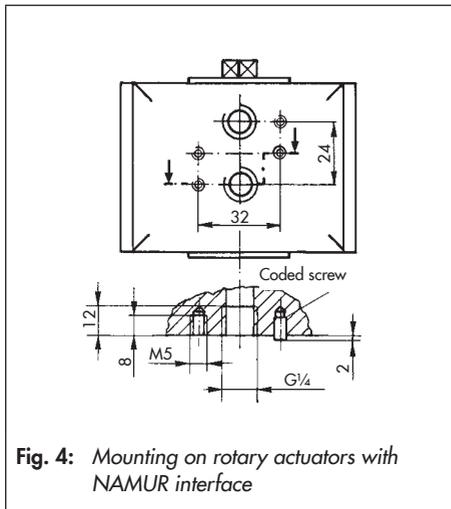
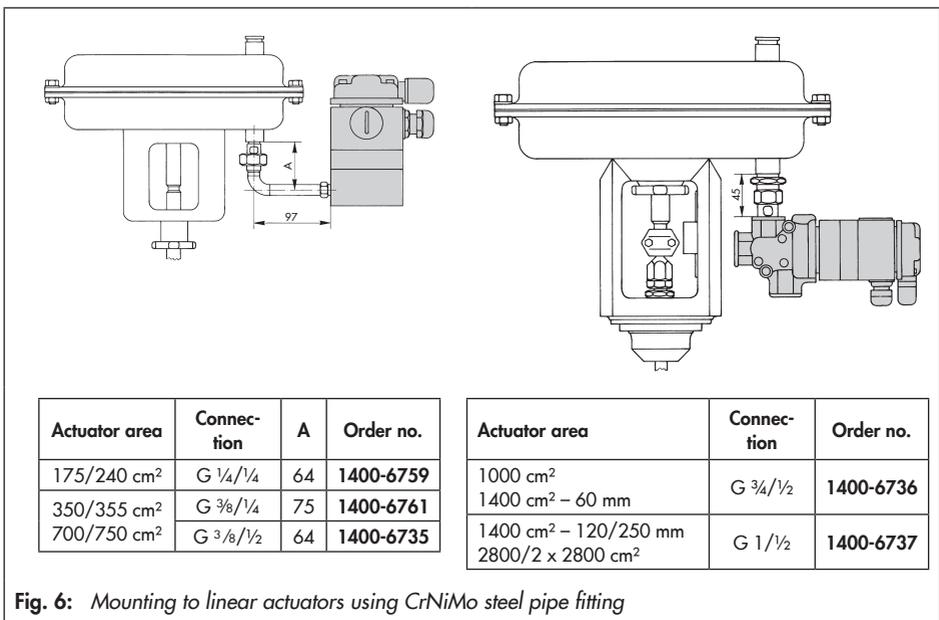
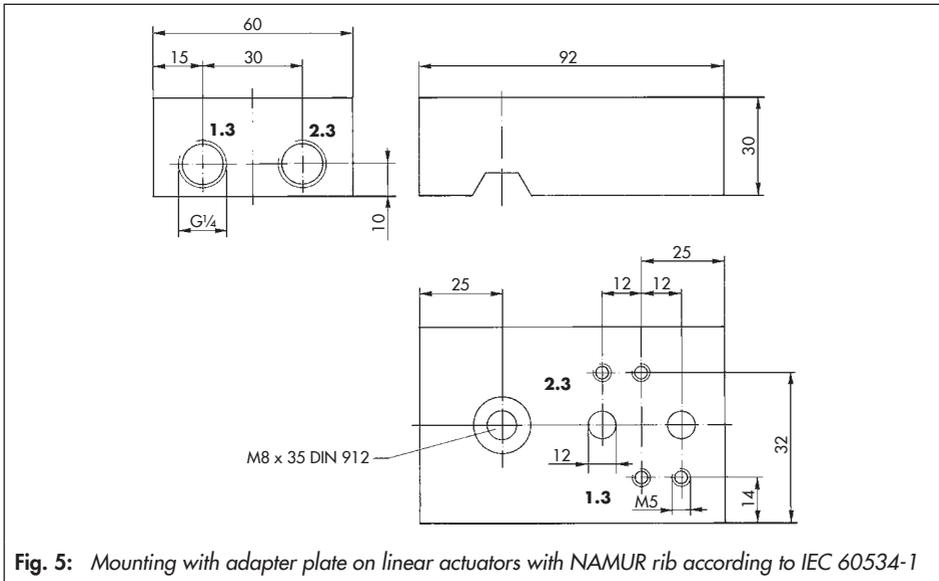


Fig. 4: Mounting on rotary actuators with NAMUR interface

## Mounting and start-up



### 5.3.2 Mounting to linear actuators using CrNiMo steel pipe fitting

**Type 3963-xxxxx11**  
(except for Types 3963xxx1011/-xxx8011)

Mounting on Type 3271 or 3277 Actuators according to Fig. 6 and the actuator mounting and operating instructions:

▶ EB 8310-X

### 5.3.3 Mounting on mounting block for SAMSON Type 3277 Pneumatic Actuator

**Type 3963-XXXXX3X**

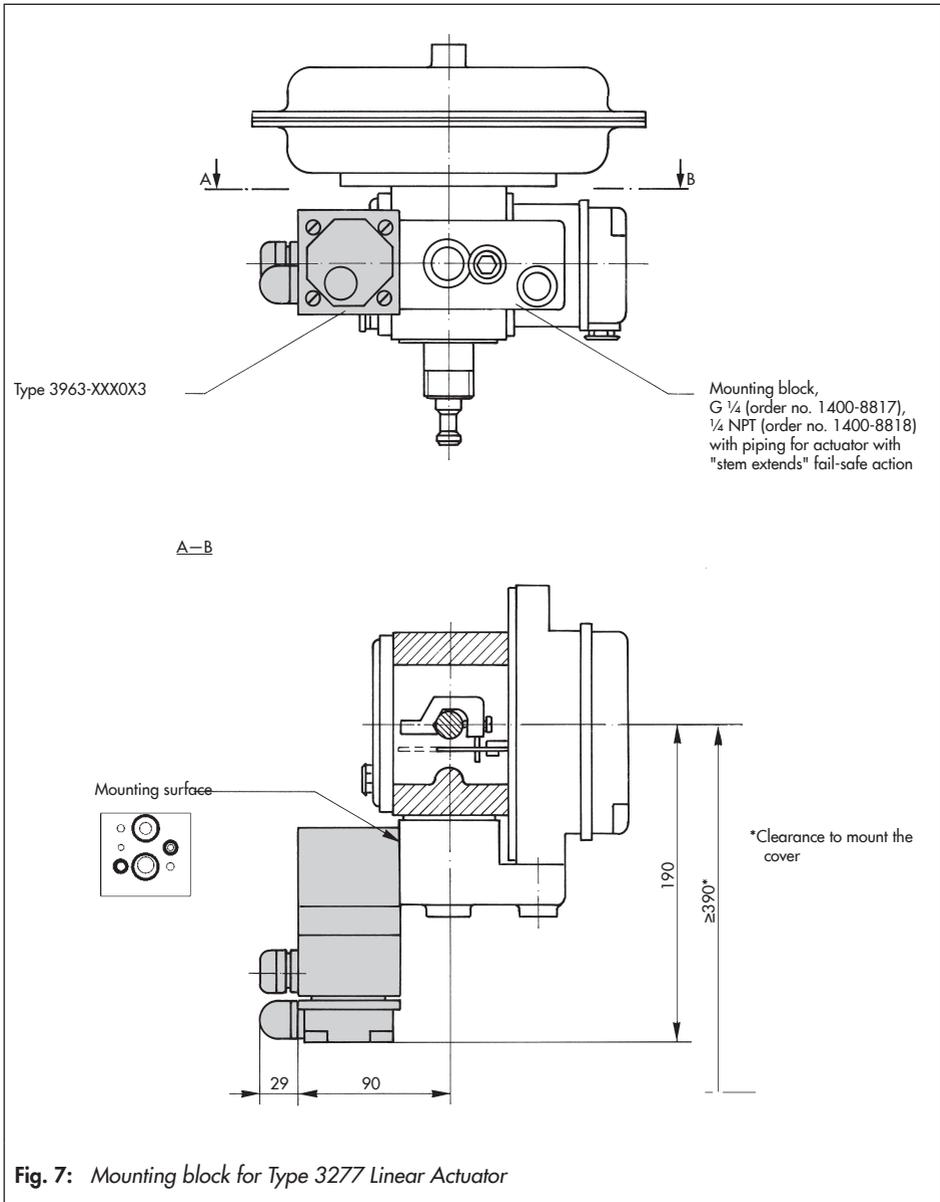
The Types 3963-XXXXX3X Solenoid Valves are suitable for the simultaneous mounting of a Type 3730-X, 3731-X, 3766, 3767, 378X or 3793 Positioner to Type 3277 Linear Actuators (Fig. 7).

The screws required for mounting are included in the scope of delivery.

- Before mounting, check that the four O-rings are seated properly on the mounting surface.
- Mount the solenoid valve using two M5x55 (ISO 4762) screws.

Read the actuator and positioner mounting instructions.

## Mounting and start-up



## 5.4 Pneumatic connection

### **⚠ WARNING**

*Risk of injury due to high pressure inside device.*

*Prior to performing repair and maintenance work on the device, depressurize the connecting lines.*

The air connections are designed as threaded holes with G or NPT thread 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, if necessary.
- ➔ 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 solenoid valve.
- ➔ Protect the exhaust air connections by installing a filter or taking other appropriate precautions to prevent water or dirt from entering them.

### 5.4.1 Sizing of the connecting line

- ➔ Refer to the table on page 47 for the minimum required nominal size of the connecting line.

The specifications apply to a connecting line shorter than 2 m. Use a larger nominal size for lines longer than 2 m.

Valve size (connection length ≤2 m)				
$K_{VS}$	0.16 0.32	1.4	2.0 4.3	—
Port	4	1 and 3	4	9
Pressure	≥1.4 bar	≥DN 6	≥DN 8	≥DN 10
	≥2.5 bar	≥DN 4	≥DN 6	≥DN 8
	≥6 bar	≥DN 4	≥DN 6	≥DN 4

### Types 3963-XXXX0X3/-XXXX014

Check whether the nominal size of the connecting line for these devices is sufficiently sized as follows:

1. Unscrew the threaded stopper from port 9 and mount a pressure gauge.
2. The nominal size of the connecting line is sufficient when the pressure reaches 1.3 bar or more during a switching process.

### 5.4.2 Compressed air quality

### **⚠ DANGER**

*Risk of asphyxiation through displacement of air on using nitrogen in unventilated spaces. Discharge the exhaust air of the pilot and booster valves over a common pipe to the atmosphere.*

## Mounting and start-up

### NOTICE

An operating pressure above the maximum permissible operating pressure will damage the solenoid valve.

- Observe the max. operating pressure (see technical data in section 3.2).
- If necessary, use a pressure reducing valve to restrict the operating pressure.

### NOTICE

Risk of malfunction due to failure to comply with required air quality.

- Only use supply air that is dry and free of oil and dust.
- Read the maintenance instructions for upstream pressure reducing stations.
- Blow through all air pipes and hoses thoroughly before connecting them.

### Operating medium for the booster valve

With internal air supply:

- Instrument air free from corrosive substances or nitrogen
- Operating pressure 1.4 to 6 bar

With external air supply over port 4 and  $K_{VS}$  1.4 or 4.3:

- Instrument air free from corrosive substances, air containing oil or non-corrosive gases
- Operating pressure 0 to 10 bar

With external air supply over port 9

- Instrument air free from corrosive substances, air containing oil or non-corrosive gases
- Operating pressure 0 to 6 bar

### Supply air for the pilot valve

- Instrument air free from corrosive substances or nitrogen
- Operating pressure 1.4 to 6 bar

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

## 5.5 Changeover to external air supply over port 9

If the solenoid valve is to be used to switch the output signal (0 to 6 bar) of a positioner, the supply air must be routed externally over port 9.

### Types 3963-XXXX0X4/-XXXXXX7

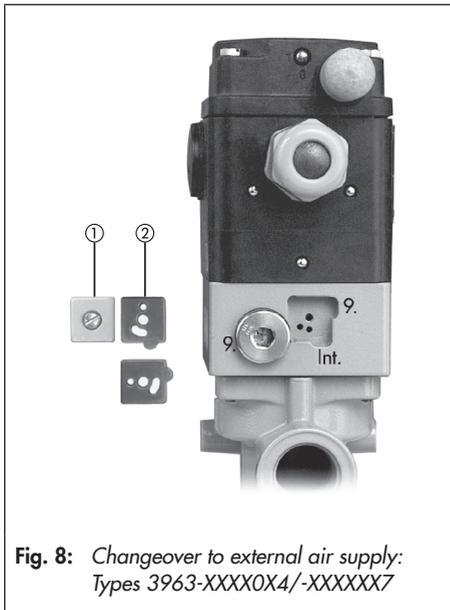
The supply air in these solenoid valves is fed internally over port 4, if not specified otherwise. To change to an external supply through port 9, proceed as follows:

1. Undo the cap screw on the connection plate and remove plate ① and gasket ②.

2. Turn the gasket ② 90°. The tip of gasket ② must rest in the plate cut-out marked '9'.
3. Fasten the plate ① and gasket ② to the connection plate.

**i Note**

The gasket of these solenoid valves must be inserted as specified for "Internal supply air at port 4" (see Fig. 10).

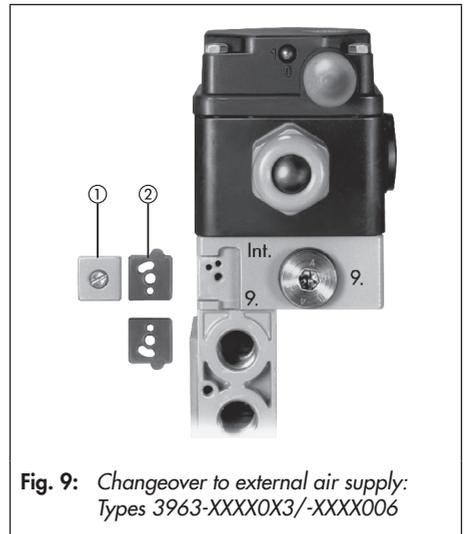


**Types 3963-XXXX0X3/-XXXX006**

The supply air in these solenoid valves is fed internally over port 1 or 3, if not specified otherwise. To change to an external supply through port 9, proceed as follows:

1. Undo the cap screw on the connection plate and remove plate ① and gasket ②.
2. Turn the gasket ② 180°. The tip of gasket ② must rest in the plate cut-out marked '9'.
3. Fasten the plate ① and gasket ② to the connection plate.

The changeover must be performed on both pilot valves for booster valves actuated on both sides.



**Type 3963-XXX0002/-XXX0012  
-XXX0022/-XXX1011**

The supply air in these solenoid valves is fed internally over port 4, if not specified otherwise. To change to an external supply through port 9, proceed as follows (Fig. 10):

## Mounting and start-up

1. Undo the four cap screws and remove the enclosure cover.
2. Undo the three hexagon socket head cap screws and remove the solenoid valve from the connecting plate.
3. Turn the gasket 180°. The tip of gasket must rest in the device cut-out marked '9'.
4. Fasten the solenoid valve and enclosure cover.



**Type 3963-XXXX001/-XXX0011/  
-XXX0X3X/-XXX0101/  
-XXX0111/-XXX1001/  
-XXX1201/-XXX8001**

It is not possible to convert these solenoid valves to accept an external supply air. The gasket, if it exists, must be inserted as specified for "Internal supply air at port 4" (Fig. 10).

## 5.6 Exhaust air feedback

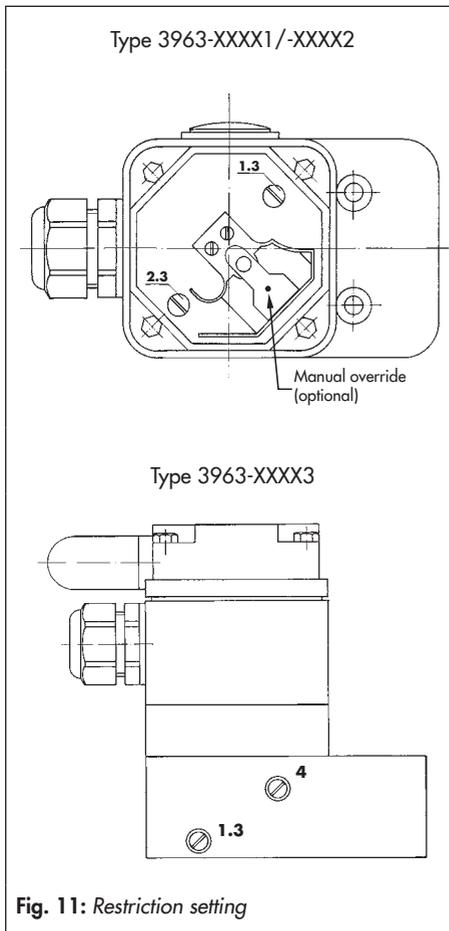
**Type 3963-XXX0013X**

In the delivered state, the port 4 of this device is sealed by a blanking plug. If the exhaust air feedback of actuators with spring return mechanism is to be used, remove the blanking plug and connect port 4 to the actuator's spring chamber using a DN 4 to 10 connection line (the sizes depends on the actuator area).

## 5.7 Restrictors

**Type 3963-XXXX1/-XXXX2/-XXXX3**

These devices have one or two restrictors. The logic symbol on the device indicates the restriction function. Use a screwdriver to turn the restriction screws underneath the enclosure cover or at the adapter plate to adjust the closing and opening times in a ratio of 1:15.



## 6 Electrical connection

### **⚠ DANGER**

*Risk of electric shock.*

*For electrical installation, observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use.*

*Valid regulations in Germany:*

- VDE regulations
- Accident prevention regulations of the employers' liability insurance.

### **⚠ DANGER**

*Risk of fatal injury due to the formation of an explosive atmosphere.*

*For installation in hazardous areas, observe the relevant standards that apply in the country of use.*

*Valid standards in Germany:*

- EN 60079-14: 2008 (VDE 0165, Part 1)  
Explosive Atmospheres – Electrical Installations Design, Selection and Erection.

### **⚠ WARNING**

*Incorrect electrical connection will render the explosion protection unsafe.*

- Adhere to the terminal assignment.
- Do not undo the enameled screws in or on the housing.
- Do not exceed the maximum permissible values specified in the EC type examination certificates when interconnecting intrinsically safe electrical equipment ( $U_i$  or  $U_o$ ,  $I_i$  or  $I_o$ ,  $P_i$  or  $P_o$ ,  $C_i$  or  $C_o$  and  $L_i$  or  $L_o$ ).

### Selecting cables and wires

- Observe clause 12 of EN 60079-14: 2008 (VDE 0165, Part 1) for installation of the intrinsically safe circuits.
- Clause 12.2.2.7 applies when running multi-core cables and wires with more than one intrinsically safe circuit.
- Preferably use connecting lines with minimum 0.5 mm<sup>2</sup> conductor cross-section and 6 to 12 mm outside diameter.
- **Radial thickness of the insulation** of a conductor for common insulating materials (e.g. polyethylene): **minimum 0.2 mm**.
- **Diameter of an individual wire** in a fine-stranded conductor: **minimum 0.1 mm**.
- Protect the conductor ends against splicing, e.g. by using wire-end ferrules.
- Seal cable entries left unused with screw plugs.
- For use in ambient temperatures **below -20 °C**: use metal cable gland.

## 6.1 Switching amplifier according to EN 60079-25

For operation of the solenoid valve, switching amplifiers must be connected in the output circuit. They must comply with the limit values of the output circuits.

- Observe the relevant regulations for installation in hazardous areas.

### Equipment for use in zone 2

In equipment operated according to type of protection Ex nA II (non-sparking equipment) according to EN 60079-15: 2003:

- Circuits may be connected, interrupted or switched while energized only during installation, maintenance or repair.

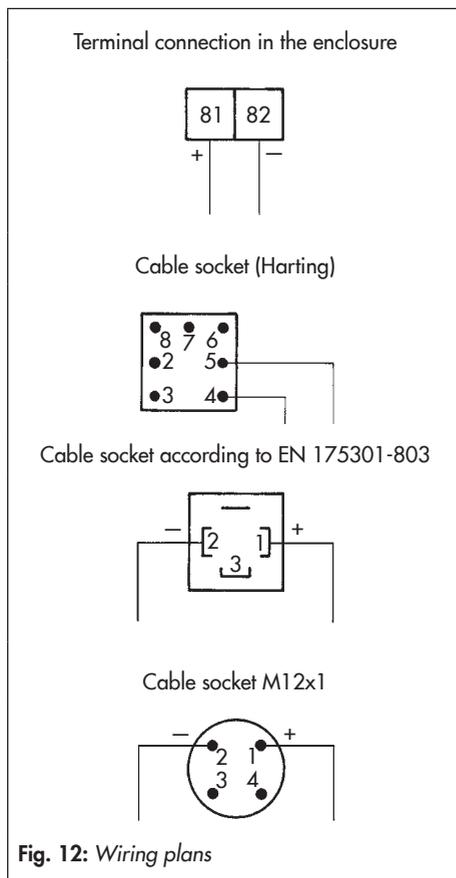
## 6.2 Cable entry with cable gland

The electrical connection is made using an M20x1.5 cable gland to the terminals in the enclosure or using a connector (see Fig. 12).

- The cable gland design depends on the ambient temperature range. See technical data in section 3.2.
- When two separate cables are used for connection, an additional cable gland can be installed.

## 6.3 Connecting the electrical power

→ Connect the electrical power (voltage) as shown in Fig. 12.



## 7 Operation

The solenoid valve is ready for use when mounting and start-up have been completed.

### 7.1 Degree of protection

Devices with a rating of IP 54 can be converted to a rating of IP 65 by exchanging the filter in the enclosure cover.

### 7.2 Manual override

The devices can be optionally fitted with a manual override to allow the device to be manually operated when a nominal signal is not available:

- As switch in the enclosure cover
- As pushbutton in the enclosure cover
- As pushbutton underneath the enclosure cover

We recommend using devices **without manual override** for **safety circuits**.

## 8 Servicing

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### **i** Note

*The solenoid 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 department.*
  - Only use original spare parts by SAMSON, which comply with the original specifications (see Data Sheet ► T 3963*
- 

### 8.1 Preparation for return shipment

Defective solenoid valves can be returned to SAMSON for repair.

Proceed as follows to return devices to SAMSON:

1. Decommission the solenoid valve and remove it from the valve.
2. Fill in the Declaration on Contamination. The declaration form can be downloaded from our website at ► [www.samson.de](http://www.samson.de) > Services > Check lists for after sales service > Declaration on Contamination.
3. Send the solenoid valve together with the filled-in form to your nearest SAMSON subsidiary. SAMSON subsidiaries are listed on our website at ► [www.samson.de](http://www.samson.de).

## 9 Malfunctions

### **i** Note

Contact SAMSON's After-sales Service department for malfunctions not listed in Table 2.

**Table 2:** Troubleshooting

Faults	Possible reasons	Recommended action
The solenoid valve does not switch.	Incorrect terminal assignment.	Check electrical connection.
	Turn turnable gasket to external supply air.	Connect port 9 and supply it with compressed air. Alternatively, turn the turnable gasket to internal air supply.
The solenoid valve leaks to the atmosphere.	Gasket slipped.	Check that the formed seal and O-rings are correctly seated.
	Pilot pressure is insufficient and an intermediate position of the solenoid valve is reached (air is constantly vented)	Check the pressure line. Check the pressure line for leakage. Use a larger cross-section for the pressure line.

### 9.1 Emergency action

The solenoid valve has a safety function. Upon failure of the supply voltage or air supply, it automatically closes (closed in the de-energized state).

The plant operator is responsible for emergency action to be taken in the plant.

### 10 Decommissioning and removal

---

#### DANGER

*Risk of electric shock.*

- Before performing any work on the device and before opening the device, disconnect the power supply and protect it against unintentional reconnection.*
  - Only use power interruption devices that are protected against unintentional reconnection of the power supply.*
- 

#### DANGER

*Risk of bursting in control valve components due to incorrect opening.*

- Before starting any work on the solenoid valve, depressurize all plant sections concerned.*
  - Observe the warnings in the actuator and valve documentation.*
- 

### 10.1 Decommissioning

To decommission the solenoid valve for disassembly, proceed as follows:

1. Close the shut-off valves upstream of the solenoid valve to stop the compressed air from flowing through the solenoid valve.
2. Relieve the pipelines completely of pressure.
3. Disconnect and lock the power supply.
4. Remove the solenoid valve from the pipeline

### 10.2 Disposal

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



TRANSLATION

(1) **EC TYPE EXAMINATION CERTIFICATION**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres –  
**Directive 94/9/EC**

(3) EC Type Examination Certificate Number

**PTB 01 ATEX 2085**

(4) Equipment: Model 3963-1.. Solenoid Valve

(5) Manufacturer: SAMSON AG

(6) Address: Weismüllerstr. 3, D-60314 Frankfurt, Germany

(7) The equipment and any acceptable variations thereof are specified in the schedule to this certificate.

(8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 according to Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report: **PTB Ex 01-21061**

(9) The Essential Health and Safety Requirements are satisfied by compliance with

**EN 50014: 1997**

**EN 50020: 1994**

---

EC Type Examination Certificates without signature and seal are invalid.  
This EC Type Examination Certificate may only be reproduced in its entirety and without any changes, schedule included.  
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt., Bundesallee 100, D-38116 Braunschweig

Ptb23-3963.doc

- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use as specified in the schedule to this certificate.
- (11) According to the Directive 94/9/EC, this EC TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.
- (12) The marking of the equipment shall include the following:



Zertifizierungsstelle Explosionsschutz  
By order

Braunschweig, 8. August 2001

(Signature)

(Seal)

Dr. Ing. U. Johannsmeyer  
Regierungsdirektor

---

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## Schedule

(13)

(14) **EC TYPE EXAMINATION CERTIFICATE No. PTB 01 ATEX 2085**

(15) **Description of Equipment**

The Model 3963-1.. Solenoid Valve converts electrical binary signals in the input circuit into pneumatic output signals. It is intended for attachment to actuators and for constructing control systems.

It may be installed inside and outside of hazardous areas.

The Model 3963-1.. Solenoid Valve is a passive two-terminal network that may be connected to any certified intrinsically safe circuit, provided the permissible maximum values of  $U_i$ ,  $I_i$  and  $P_i$  are not exceeded.

By connection of suitable series dropping resistors the Model 3963-1.. Solenoid Valve can accommodate nominal voltages of 6, V, 12 V and 24 V.

**Electrical data**

Signal circuit normal signal ... Type of protection: Intrinsic Safety EEx ia IIC

The correlation between version, temperature classification, permissible maximum ambient temperature ranges and maximum power dissipation is shown in the table below:

Version ( UN )		6V	12V	24V
Temperature class	T6	60°C		
	T5	-45°C ≤ T <sub>a</sub> ≤ 70°C		
	T4	80°C		
Characteristic linear or rectangular	Pi	#	##	
Ci negligible, Li negligible				

# The permissible maximum power dissipation  $P_i$  in the 6 V version is 250 mW.

## The maximum values for connection to a certified intrinsically safe circuit are shown in the table below:

---

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U <sub>i</sub>	25V	27V	28V	30V	32V
I <sub>i</sub>	150mA	125mA	115mA	100mA	85mA
P <sub>i</sub>	no limitation				
C <sub>i</sub> negligible, L <sub>i</sub> negligible					

(16) Test Report **PTB Ex 01-21061**

(17) **Special conditions for safe use**

None

(18) **Special Health and Safety Requirements**

In compliance with the standards specified above.

Zertifizierungsstelle Explosionsschutz  
By order

Braunschweig, 8 August 2001

(Signature) (seal)

Dr. Ing. U. Johannsmeyer  
Regierungsdirektor

---

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**1. SUPPLEMENT**

according to Directive 94/9/EC Annex III.6

**to EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2085**

**(Translation)**

Equipment: Solenoid, type 3963-1.. and type 3963-1.....25

Marking:  II 2 G Ex ia IIC T6 Gb **alternatively** II 2 G Ex ia IIC T6

Manufacturer: SAMSON AG Mess- und Regeltechnik

Address: Weismüllerstr. 3, 60314 Frankfurt, Germany

Description of supplements and modifications

The solenoid of type 3963-1.. converts binary electrical signals of the input circuit into pneumatic output signals. It is mounted on actuators and used for the design of control systems.

The equipment is intended for the installation in hazardous areas.

The solenoid of type 3963-1.. is a passive two-terminal network that may be connected to intrinsically safe circuits unless the permissible maximum values for  $U_i$ ,  $I_i$  and  $P_i$  are exceeded.

Using appropriate resistors connected in series to the coil, the solenoid of type 3963-1.. is suitable for the operation with nominal voltages of 6 V, 12 V and 24 V.

The solenoid of type 3963-1.. is supplemented by type 3963-1.....25. This variant is provided with an electrical cubic LED-plug showing the operating mode of the equipment. Further modifications have not been made.

The permissible thermal and electrical maximum values are presented in summary.

Electrical data

Signal circuit, nominal signal.....type of protection Intrinsic Safety Ex ia IIC

For relationship between variant, temperature class, permissible ambient temperature ranges and maximum power dissipation, reference is made to the following table:

ZSEx10101e.d0m

Sheet 1/2

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EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

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## 1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2085

Variant		3963-11..	3963-12..	3963-13..
$U_N$		6 V	12 V	24 V
3936-1..	T6	60 °C		
	T5	-45 °C ... 70 °C		
	T4	80 °C		
3936-1.....25	T6	55 °C		
	T5	-45 °C ... 70 °C		
	T4	80 °C		
linear or rectangular characteristic	$P_I$	*	**	

\* The maximum permissible power dissipation  $P_I$  of the 6 V-design is 250 mW.

\*\* The maximum values for connection to a certified intrinsically safe circuit are tabulated below.

$U_I$	25 V	27 V	28 V	30 V	32 V
$I_I$	150 mA	125 mA	115 mA	100 mA	85 mA
$P_I$	no limitation				

$C_I$  negligibly low  
 $L_I$  negligibly low

### Applied standards

EN 60079-0:2009

EN 60079-11:2012

Test report: PTB Ex 12-22145

Zertifizierungssektor Fachbereich Schutz  
 On behalf of PTB:

Braunschweig, November 28, 2012

Dr.-Ing. U. Johann Meyer  
 Direktor und Professor



Sheet 2/2

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TRANSLATION



Statement of conformity

- (1)
- (2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres –  
**Directive 94/9/EC**
- (3) EC Type Examination Certificate Number  

**PTB 01 ATEX 2086 X**
- (4) Equipment: Model 3963-8., Solenoid Valve
- (5) Manufacturer: SAMSON AG Mess- und Regeltechnik
- (6) Address: Weismüllerstr. 3, 60314 Frankfurt am Main, Germany
- (7) The equipment and any acceptable variation thereof are specified in the schedule to this certificate and the documents referred to therein.
- (8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 according to Article 9 of the Council Directive 94/9/ of 23 March 1994, certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.  

The examination and test results are recorded in confidential report: **PTB Ex 01-21204**
- (9) The essential health and safety requirements are satisfied by compliance with  

**EN 50021: 1999**
- (10) If the sign “X” is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use as specified in the schedule to this certificate.
- (11) In compliance with the Directive 94/9/Ex this Statement of Conformity relates only to the design and construction of the equipment specified. Further requirements of this Directive apply to manufacture and marketing of this equipment.

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Ptb23-Ex n.doc

- (12) The marking of the equipment shall include the following:



Zertifizierungsstelle Explosionsschutz  
By order

Braunschweig, 14 November 2001

(Signature)

(Seal)

Dr. Ing. U. Johannsmeyer  
Regierungsdirektor

---

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Physikalisch-Technische Bundesanstalt., Bundesallee 100, D-38116 Braunschweig

Ptb23-Ex n.doc

## Schedule

(13)

(14)

Statement of Conformity PTB 01 ATEX 2086 X

(15) Description of Equipment

The model 3963-8.. Solenoid Valve converts electrical binary signals in the input circuit into pneumatic output signals. It is intended for attachment to actuators and for constructing control systems.

The correlation between the version, temperature classification and permissible ambient temperature ranges is shown in the table below:

Version ( UN )	6V	12V	24V
Temperature class T6	60°C		
T5	-45°C ≤ T <sub>a</sub> ≤ 70°C		
T4	80°C		

(16) Test report PTB Ex 01-21204

(17) Special conditions for safe use

1. The Model 3963-8.. Solenoid valve shall be installed in an enclosure providing at least Degree of Protection IP 54 according to IEC Publication 60529:1989.
2. The wiring shall be connected in such a manner that the connection facilities are free of tensile and torsional load.

(18) Special health and safety requirements

In compliance with the standard specified above.

Zertifizierungsstelle Explosionsschutz  
By order

Braunschweig, 14 November 2001

(Signature) (seal)

Dr. Ing. U. Johannsmeyer  
Regierungsdirektor

---

Statement of Conformity without signature and seal are invalid.  
This Statement of Conformity may only be reproduced in its entirety and without any changes, schedule included.  
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

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Ptb23-Ex n.doc

## 1. SUPPLEMENT

to CONFORMITY STATEMENT PTB 01 ATEX 2086 X

(Translation)

Equipment: Solenoid, type 3963-8..

Marking:  II 3 G EEx nA II T6

Manufacturer: SAMSON AG Mess- und Regeltechnik

Address: Weismüllerstr. 3, 60314 Frankfurt, Germany

### Description of supplements and modifications

The solenoid of type 3963-8.. converts binary electrical signals into pneumatic output signals. It is intended for installation onto actuators and for the configuration of control systems.

The solenoid of type 3963-8.. is supplemented by type 3963-8.....25. This model is provided with a cubic LED-plug showing the operational state of the equipment.

Further modifications have not been made.

The equipment is installed inside of the hazardous area.

The permissible thermal and electrical maximum values are presented in summary.

For relationship between temperature class and permissible thermal maximum values, reference is made to the following table:

3963-8..	T6	60 °C
	T5	-45 °C ... 70 °C
	T4	80 °C
3963-8.....25	T6	55 °C
	T5	-45 °C ... 70 °C
	T4	80 °C

### Electrical data

The solenoid of type 3963-8.. is suitable for nominal voltages of 6 V, 12 V and 24 V when appropriate resistors are connected in series.

Sheet 1/3

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## 1. SUPPLEMENT TO CONFORMITY STATEMENT PTB 01 ATEX 2086 X

For relationship between model, nominal signal and maximum permissible electrical power, reference is made to the following table:

Signal circuit ..... type of protection Ex ic IIC  
(terminals 11/12) or Ex nA II

Model	3963-81	3963-82	3963-83
Nominal signal $U_N$	6 V	12 V	24 V
Temperature class	T6 60 °C		
	T5 -45 °C ... 70 °C		
	T4 80 °C		
$P_1$	No limitation		

or

Signal circuit ..... type of protection Ex ic IIC  
(terminals 11/12)

For permissible electrical maximum values, reference is made to the following table:

$U_i$	25 V	27 V	28 V	30 V	32 V
$I_i$	150 mA	125 mA	115 mA	100 mA	85 mA

$C_i$  negligibly low  
 $L_i$  negligibly low

### Special conditions

The solenoid of type 3963-8.. shall be mounted into an enclosure that guarantees a minimum degree of protection of IP 54 according to IEC 60529.

The cables shall be connected in such a way that the connecting points are not subjected to tensile or torsional stress.

All further specifications of the conformity statement apply without changes also to this supplement.

The future marking reads:


**II 3 G Ex ic IIC T6 Gc** or **II 3 G Ex nA II T6 Gc** alternatively  
**II 3 G Ex ic IIC T6** or **II 3 G Ex nAc II T6**

Sheet 2/3

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Applied standards

EN 60079-0:2009

EN 60079-11:2012

EN 60079-15:2010

Test report:

PTB Ex 14-23193

Zertifizierungssektor Explosionsschutz

Braunschweig, April 17, 2014

By order:



Dr.-Ing. T. Horn



Sheet 3/3

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This declaration of conformity is issued under the sole responsibility of the manufacturer/  
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.  
Für das folgende Produkt / For the following product / Nous certifions que le produit

### Magnetventil / Solenoid Valve / Electrovanne Typ/Type/Type 3963

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt /  
the conformity with the relevant Union harmonisation legislation is declared with /  
est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU

EN 61000-6-2:2005, EN 61000-6-3:2007/  
A1:2010, EN 61326-1:2013

LVD 2014/35/EU

EN 61010-1:2010

RoHS 2011/65/EU

EN 50581:2012

Hersteller / Manufacturer / Fabricant:

SAMSON AKTIENGESELLSCHAFT  
Weismüllerstraße 3  
D-60314 Frankfurt am Main  
Deutschland/Germany/Allemagne

Frankfurt / Francfort, 2017-07-29

Im Namen des Herstellers/ On behalf of the Manufacturer/ Au nom du fabricant.

*H. Zager*

Hanno Zager  
Leiter Qualitätssicherung/Head of Quality Management/  
Responsable de l'assurance de la qualité

*D. Hoffmann*

Dirk Hoffmann  
Zentralabteilungsleiter/Head of Department/Chef du département  
Entwicklungsorganisation/Development Organization

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This declaration of conformity is issued under the sole responsibility of the manufacturer/  
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.  
Für das folgende Produkt / For the following product / Nous certifions que le produit

### Magnetventil / Solenoid Valve / Electrovanne Typ/Type/Type 3963-1...

entsprechend der EU-Baumusterprüfbescheinigung PTB 01 ATEX 2085 ausgestellt von der/  
according to the EU Type Examination PTB 01 ATEX 2085 issued by/  
établi selon le certificat CE d'essais sur échantillons PTB 01 ATEX 2085 émis par:

Physikalisch Technische Bundesanstalt  
Bundesallee 100  
D-38116 Braunschweig  
Benannte Stelle/Notified Body/Organisme notifié 0102

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt /  
the conformity with the relevant Union harmonisation legislation is declared with/  
est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU	EN 61000-6-2:2005, EN 61000-6-3:2007 +A1:2011, EN 61326-1:2013
Explosion Protection 94/9/EC (bis/to 2016-04-19) Explosion Protection 2014/34/EU (ab/from 2016-04-20)	EN 60079-0:2009, EN 60079-11:2012
RoHS 2011/65/EU	EN 50581:2012

Hersteller / Manufacturer / Fabricant:

SAMSON AKTIENGESELLSCHAFT  
Weismüllerstraße 3  
D-60314 Frankfurt am Main  
Deutschland/Germany/Allemagne

Frankfurt / Francfort, 2017-07-29

Im Namen des Herstellers/ On behalf of the Manufacturer/ Au nom du fabricant.

Hanno Zager  
Leiter Qualitätssicherung/Head of Quality Management/  
Responsable de l'assurance de la qualité

Dirk Hoffmann  
Zentralabteilungsleiter/Head of Department/Chef de département  
Entwicklungsorganisation/Development Organization



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This declaration of conformity is issued under the sole responsibility of the manufacturer/  
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.  
Für das folgende Produkt / For the following product / Nous certifions que le produit

### Magnetventil / Solenoid Valve / Typ/Type/Type 3963-8...

entsprechend der EU-Baumusterprüfbescheinigung PTB 01 ATEX 2086 X ausgestellt von der/  
according to the EU Type Examination PTB 01 ATEX 2086 X issued by/  
établi selon le certificat CE d'essais sur échantillons PTB 01 ATEX 2086 X émis par:

Physikalisch Technische Bundesanstalt  
Bundesallee 100  
D-38116 Braunschweig  
Benannte Stelle/Notified Body/Organisme notifié 0102

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EMC 2014/30/EU	EN 61000-6-2:2005, EN 61000-6-3:2007 +A1:2011, EN 61326-1:2013
Explosion Protection 94/9/EC (bis/to 2016-04-19) Explosion Protection 2014/34/EU (ab/from 2016-04-20)	EN 60079-0:2009, EN 60079-11:2012, EN 60079-15:2010
RoHS 2011/65/EU	EN 50581:2012

Hersteller / Manufacturer / Fabricant:

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Entwicklungsorganisation/Development Organization

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**EB 3963 EN**



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