

MOUNTING AND OPERATING INSTRUCTIONS



EB 3930 EN

Translation of original instructions



Type 3930 Solenoid Valve

Edition January 2019



Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- If you have any questions about these instructions, contact SAMSON's After-sales Service Department (aftersaleservice@samson.de).



The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at www.samson.de > **Service & Support** > **Downloads** > **Documentation**.

Definition of signal words

DANGER

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

WARNING

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

NOTICE

Property damage message or malfunction

Note

Additional information

Tip

Recommended action

| | | |
|----------|--|-----------|
| 1 | General safety instructions | 4 |
| 1.1 | Legal information..... | 4 |
| 2 | Markings on the device | 5 |
| 2.1 | Nameplate..... | 5 |
| 2.2 | Article code..... | 6 |
| 3 | Design and principle of operation | 7 |
| 3.1 | Technical data..... | 8 |
| 3.2 | Dimensions in mm..... | 9 |
| 4 | Mounting and start-up | 10 |
| 4.1 | Mounting position..... | 10 |
| 4.2 | Conversion from 5/2-way to 3/2-way function..... | 10 |
| 4.3 | Mounting on rotary actuators..... | 12 |
| 4.4 | Attachment to linear actuators using an adapter plate..... | 13 |
| 5 | Pneumatic connection | 14 |
| 5.1 | Sizing of the connecting line..... | 14 |
| 5.2 | Compressed air quality..... | 14 |
| 6 | Electrical connection | 15 |
| 6.1 | Sizing of the connecting line..... | 15 |
| 6.2 | Manual override..... | 15 |
| 7 | Malfunctions | 16 |
| 8 | Accessories | 17 |

1 General safety instructions

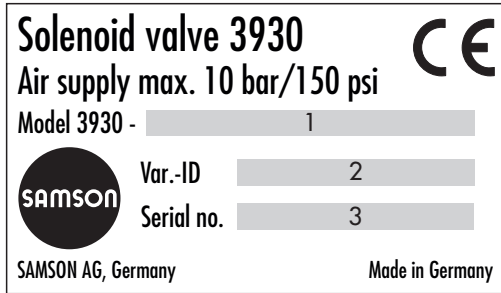
- The device is to be mounted, started up or operated only by trained and experienced personnel familiar with the product.
According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
- Any hazards that could be caused in the control valve by the process medium, the signal pressure or by moving parts are to be prevented by taking appropriate precautions.
- The pilot supply pressure must not exceed the maximum permissible limit and must be limited by a pressure reducing valve, if necessary.
- If inadmissible motions or forces are produced in the pneumatic actuator as a result of the supply pressure, it must be restricted using a suitable supply pressure reducing station.
- Proper shipping and storage are assumed.

1.1 Legal information

The Type 3930 Solenoid Valve bears a CE marking. The declaration of conformity includes information about the applied conformity assessment procedure.

2 Markings on the device

2.1 Nameplate



- 1 Article code
- 2 Configuration ID
- 3 Serial number

Markings on the device

2.2 Article code

| Solenoid valve | Type 3930- 0 0 0 x 3 x 0 0 1 0 0 0 0 0 0 0 | | | | | | | | | | | | | |
|--|--|---|--|---|---|--|---|---|---|---|--|---|--|--|
| Nominal signal | | | | | | | | | | | | | | |
| 24 V DC | 3 | | | | | | | | | | | | | |
| 230 V AC | 5 | | | | | | | | | | | | | |
| Manual override | | | | | | | | | | | | | | |
| Switch (accessible using a screwdriver) | 3 | | | | | | | | | | | | | |
| Switching function | | | | | | | | | | | | | | |
| 3/2-way function | | 0 | | | | | | | | | | | | |
| 5/2-way function | | 1 | | | | | | | | | | | | |
| Attachment | | | | | | | | | | | | | | |
| NAMUR interface 1/4" according to VDI/ VDE 3845 | | | | 0 | | | | | | | | | | |
| K _{VS} coefficient | | | | | | | | | | | | | | |
| 0.85 | | | | | 0 | | | | | | | | | |
| Pneumatic connection | | | | | | | | | | | | | | |
| G 1/4 | | | | | | | 1 | | | | | | | |
| Enclosure material | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | 0 | | | | | | |
| Electrical connection | | | | | | | | | | | | | | |
| Connector according to DIN EN 175301-803, type B, 3-pole (without cable socket) | | | | | | | | | 0 | | | | | |
| Degree of protection | | | | | | | | | | | | | | |
| IP 65 | | | | | | | | | | 0 | | | | |
| Permissible ambient temperature | | | | | | | | | | | | | | |
| -10 to +60 °C | | | | | | | | | | | | 0 | | |

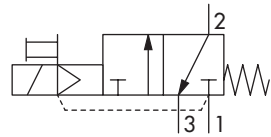
3 Design and principle of operation

The Type 3930 Solenoid Valve is suitable for controlling pneumatic rotary actuators with NAMUR interface according to VDI/VDE 3845.

The principle of operation is based on a solenoid plunger system with a downstream spool-type poppet valve. When the solenoid coil is energized, the solenoid plunger is lifted and opens the connection for the pilot control of the poppet valve. The pressure supplied over port 1 causes the switching of the poppet valve.

The Type 3930 Solenoid Valve implements 3/2-way or 5/2-way functions with K_{VS} 0.85 (see Fig. 1) depending on the version.

3/2-way function



5/2-way function

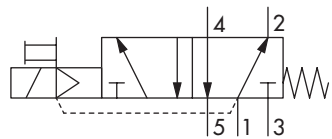


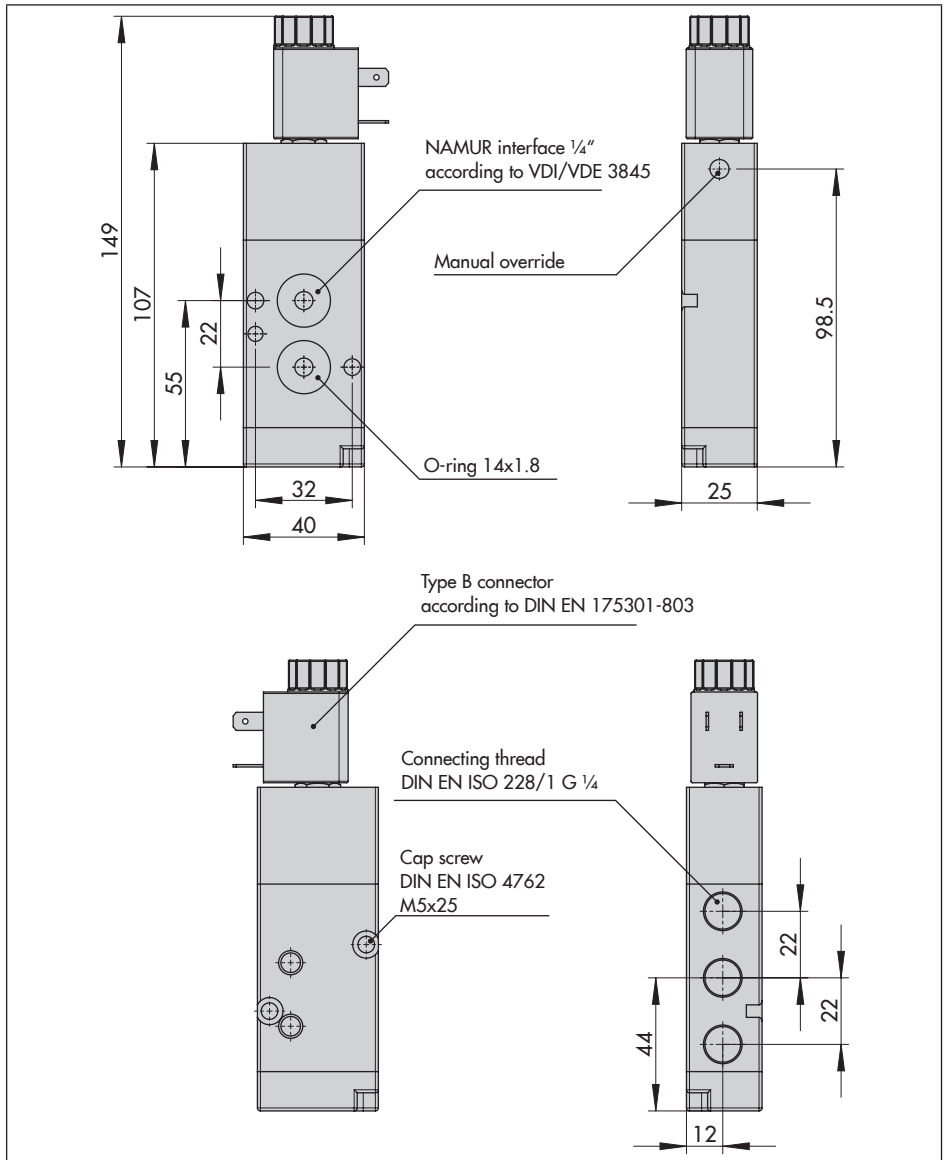
Fig. 1: Switching functions

3.1 Technical data

| General data | |
|--|--|
| Design | Solenoid and spool valve with return spring |
| Switching function | 3/2 or 5/2-way function |
| Actuation | Pilot-operated on one side |
| Material | Enclosure: black polyamide (solenoid) and aluminum (valve body) Internal parts: stainless steel and brass Screws: zinc-plated steel Short-circuit ring: copper Gaskets: nitrile butadiene rubber |
| Degree of protection | IP 65 (with mounted cable socket) |
| Mounting | NAMUR interface 1/4" according to VDI/VDE 3845 |
| Mounting position | Any desired position |
| Ambient temperature | -10 to +60 °C |
| Approx. weight | 0.42 kg |
| Electric data | |
| Nominal signal | 24 V DC ($\pm 10\%$) or 230 V AC ($\pm 10\%$), other nominal signals on request |
| Power consumption | 3 W (DC), 5 VA (AC) |
| Duty cycle | 100 % |
| Connection | Connector according to DIN EN 175301-803, type B, 3-pole |
| Pneumatic data | |
| Medium | Instrument air (free from corrosive substances) |
| Medium temperature | +5 to +80 °C |
| Compressed air quality according 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 |
| $K_{VS}^{1)}$ | 0.85 |
| Output signal | Same as the operating pressure |
| Operating pressure | 2.5 to 10 bar |
| Connection | Threaded connection G 1/4 and NAMUR interface 1/4" according to VDI/VDE 3845 |

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 .

3.2 Dimensions in mm



4 Mounting and start-up

SAMSON solenoid valves are delivered ready for use. In special cases, the solenoid and valve body are delivered separately and must be assembled on site. Proceed as follows to mount and start up the solenoid valve.

4.1 Mounting position

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

- The cable entries must face downward or, in cases where this is not possible, mount them in the horizontal position.

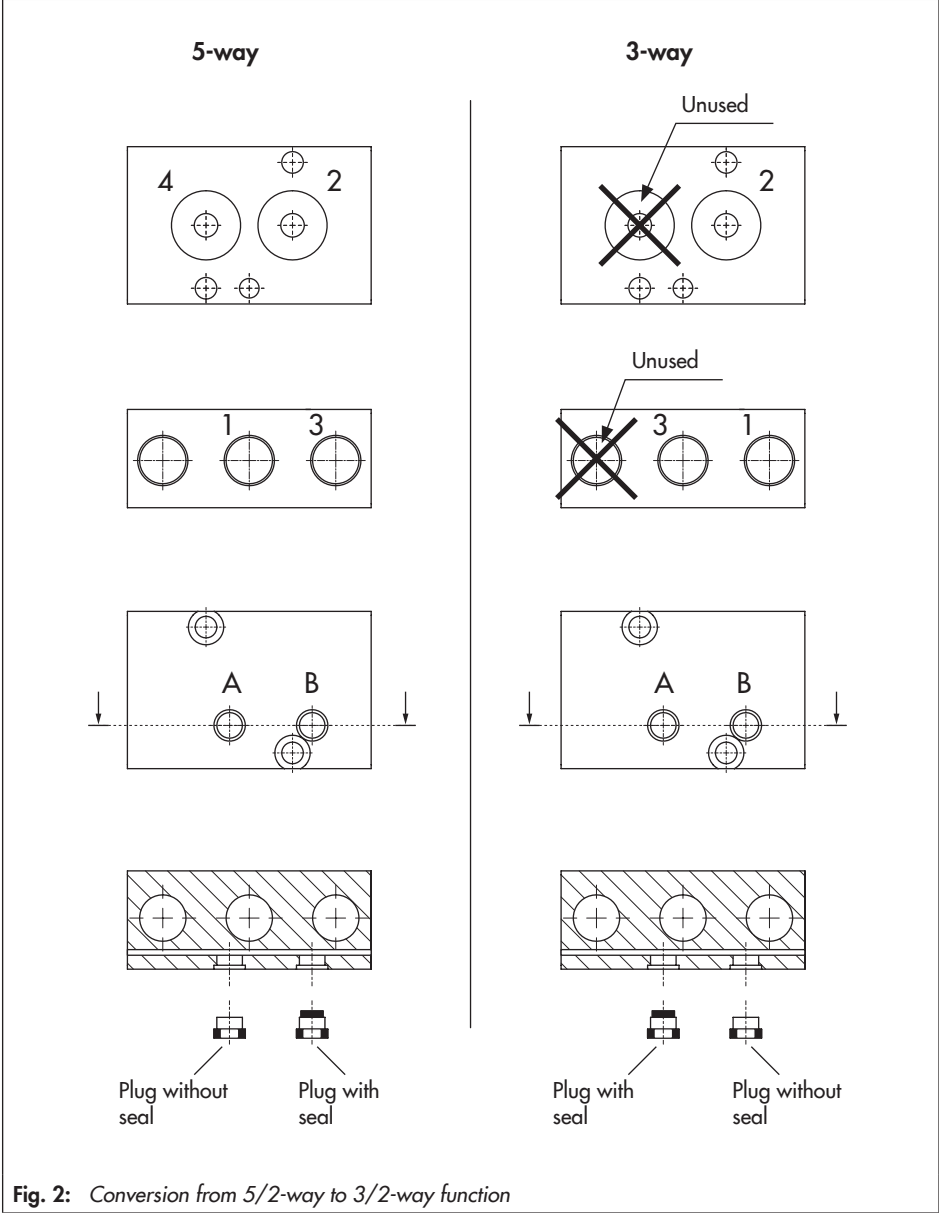
4.2 Conversion from 5/2-way to 3/2-way function

The solenoid valve can be converted from a 5/2-way to a 3/2-way function or vice versa. Proceed as described below to convert the solenoid valve (see Fig. 2):

- Unscrew both slotted-head screws A and B.
- Remove the seal and insert it into the hole for the corresponding function (see Fig. 2).
- Re-insert the two slotted-head screws into the enclosure and tighten them.

! NOTICE

The location of the supply air connection 1 is changed by turning the seal.



4.3 Mounting on rotary actuators

These devices can be mounted to rotary actuators with NAMUR interface without additional mounting parts (see Fig. 3).

Before mounting, check that two O-rings are seated properly. Use two screws to mount the device.

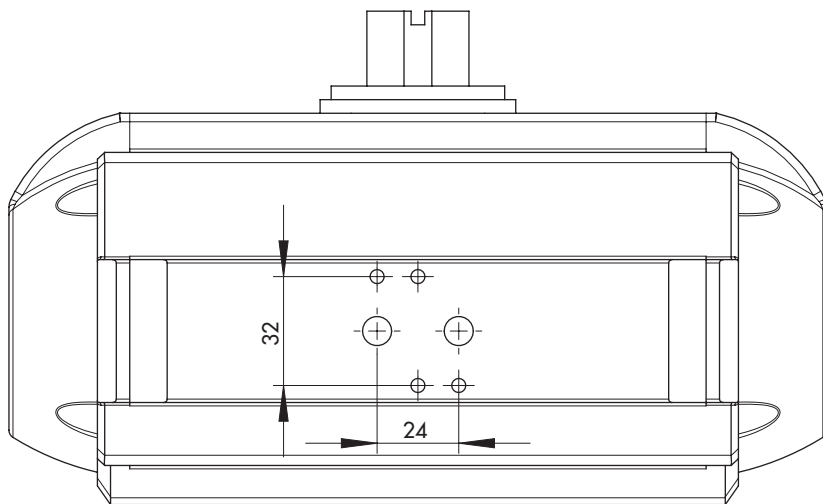


Fig. 3: Rotary actuator with NAMUR interface

4.4 Attachment to linear actuators using an adapter plate

These devices can be mounted to linear actuators with a NAMUR rib using an adapter plate (order no. 1400-6751). See Fig. 4.

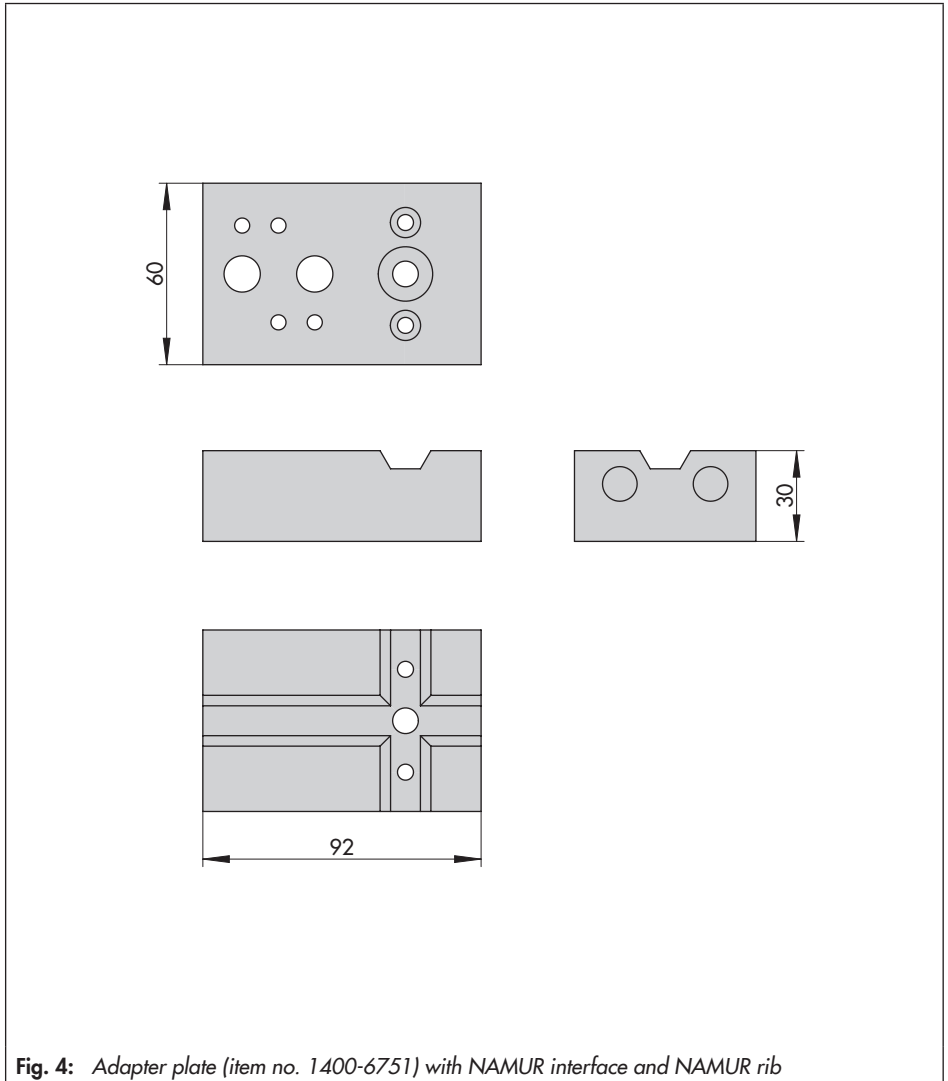


Fig. 4: Adapter plate (item no. 1400-6751) with NAMUR interface and NAMUR rib

5 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 1/4 thread or NAMUR interface according to VDI/VDE 3845, 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.
- ➔ Protect the exhaust air connections by installing a filter or taking other appropriate precautions to prevent water or dirt from entering 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

| Inscription | Function |
|-------------|------------|
| 1 | Supply air |
| 2/4 | Output |
| 3/5 | Exhaust |

5.1 Sizing of the connecting line

Refer to the table below for the minimum required nominal size of the connecting line at the port 1 of the enclosure.

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

| Connection | 1 |
|--------------------|---------|
| Pipe ¹⁾ | 12x1 mm |
| Hose ²⁾ | 9x3 mm |

¹⁾ Outside diameter x Wall thickness

²⁾ Inside diameter x Wall thickness

5.2 Compressed air quality

The operating medium for the device is instrument air (free from corrosive substances), 2.5 to 10 bar.

| 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 |

6 Electrical connection

⚠ DANGER

For electrical installation, observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. In Germany, these are the VDE regulations and the accident prevention regulations of the employers' liability insurance.

The degree of protection (according to IEC 60529: 1989) is only guaranteed when the cable socket is mounted, the exhaust air filter is installed and the connections have been properly mounted.

A three-pole connector according to DIN EN 175301-803, type B, is used for electrical connection (see Fig. 5).

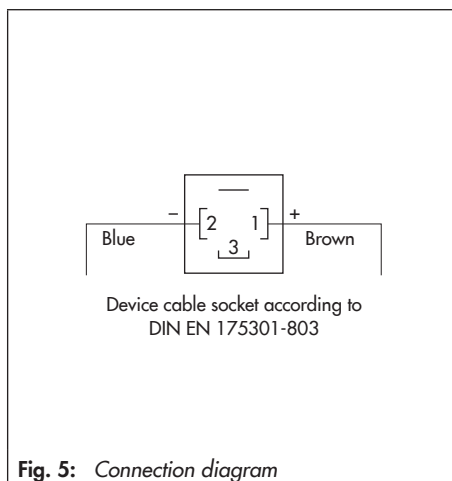


Fig. 5: Connection diagram

6.1 Sizing of the connecting line

We recommend the following size of the connecting lines:

- Wire cross-section $\geq 0.5 \text{ mm}^2$
- 8 mm outside diameter

6.2 Manual override

The devices have a manual override to allow the devices to be manually operated when an electrical nominal signal is not available.

The switch is accessible from outside the enclosure with a screwdriver.

7 Malfunctions

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

| Faults | Possible reasons | Recommended action |
|--|---|---|
| Solenoid valve does not switch | Spool in the enclosure is blocked | Contact SAMSON. |
| | Insufficient pilot pressure | Check the pressure line. Check the pressure line for leakage. Use a larger cross-section for the pressure line. |
| The solenoid valve leaks to the atmosphere | O-rings slipped | Check that the O-rings are correctly seated. |
| | Pilot pressure is insufficient and an intermediate position 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. |

8 Accessories

| Designation | Order number |
|--|--------------|
| Blanking plug G ¼, stainless steel 1.4571 (for threaded connections) | 0070-0856 |
| O-ring 14x1.5 made of nitrile butadiene rubber (for blanking plug) | 8421-0070 |
| Silencer made of polyethylene, G ¼ connection, degree of protection IP 54 | 8504-0066 |
| Cable socket according to DIN EN 175301-803, made of black polyamide, type B, 3-pole, with Pg 9 cable gland and gasket of nitrile butadiene rubber | 0790-6054 |
| Adapter plate with NAMUR interface ¼" on NAMUR rib (G ¼) | 1400-6751 |
| Adapter plate with NAMUR interface ¼" for SAMSON Types 3353 and 3354 Valves | 1409-3001 |
| Adapter plate with NAMUR interface ¼" for SAMSON Type 3351 On/off Valve | 1400-9638 |

EB 3930 EN



SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samson.de · www.samson.de