Application Note

FESTO

Quick Start Guide for fault clearance and troubleshooting

This document is for self-help in case of malfunctions with the product MS6-SV-*-E-10V24.

MS6-SV
MS6-SV-1/2-E-10V24-AD1
MS6-SV-1/2-E-10V24-SO-AG
MS6-SV-1/2-E-10V24-AG

100188

Title ..... Quick Start Guide for fault clearance and troubleshooting
Version 1.10
Document no. 100188
Original ..... en
Author ..... Festo

Last saved 11.10.2018

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1 Components/Software used

Type/Name	Version Software/Firmware	Date of manufacture
MS6-SV-1/2-E-10V24-AD1	--	All
MS6-SV-1/2-E-10V24-SO-AG	--	All
MS6-SV-1/2-E-10V24-AG	--	All

Table 1.1: Components/Software used

2 Introduction

The Quick Start Guide for the soft start/quick exhaust valve MS6-SV is intended as a manual for fast and expert troubleshooting in the event of malfunctions.

More detailed information can be found in Operating instructions

Mobile access to the operating instructions

Figure 2.1: QR-Code Operating Instructions

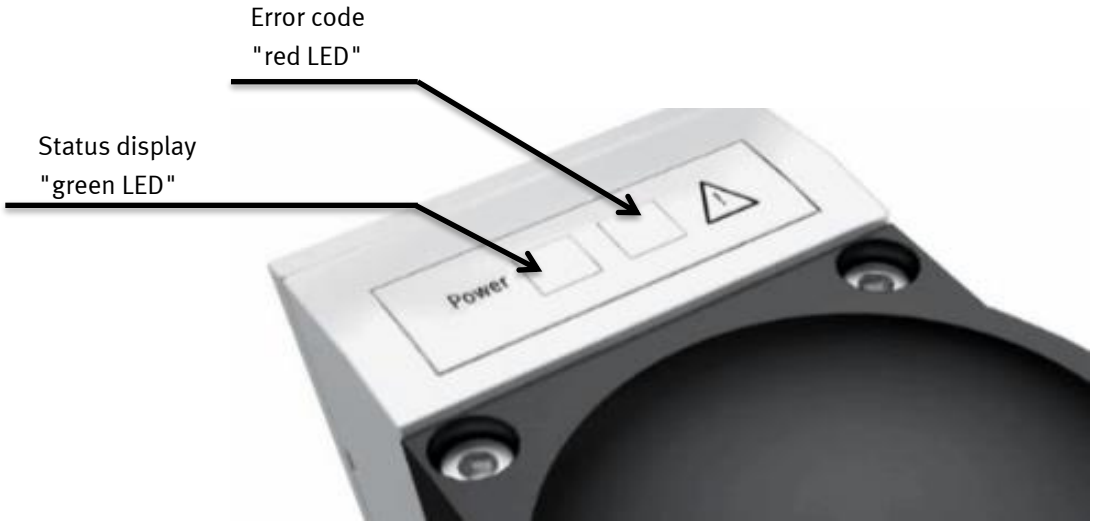
The following pages describe the process of analyzing and remedying faults. The technical prerequisites and specifications for safe operation of the component are also discussed.

3 Troubleshooting

3.1 Error codes

In case of malfunction of the MS6-SV check the LED display. Error codes are read by the flashing of the LED. The error code is indicated by four flashes of the green LED (speed 2 hertz). Then the flashes of the red LED display the error code.

Note
The number of flash pulses displays the error code.



Error code	Possible cause	Remedy
2	Bouncing on the enable signals	Make sure that only debounced contacts are used (e.g. for protective guards or doors).
5	Power supply is insufficient, voltage drops, tolerance out of range	Ensure that the power supply is sufficient.
6	Pressure supply was interrupted	Re-establish compressed air supply
	Compressed air interrupted during self-test	
	Air supply on secondary side too high (effect: pilot pressure drops)	Check compressed air supply and close actuators (blowing air, vacuum suction nozzle)
8	Enable signals outside the specification	Comply with specification (chapter 6 in this script)
	Multi-pin plug socket NECA or cable is defective	Check Multi-pin plug socket NECA or cable and replace if defective (chapter 7)
8 or 11	PLC emits test pulses that are off-set to the enable signals (length 4 ms)	– Switch off test pulses – Use NECA MP5 plug connector
	Malfunction due to electrical or electromagnetic effects (EMC notes not complied with)	– Comply with max. length of the signal lines – Connect earthing correctly – Observe min. wall distance – Do not install cables behind the MS6-SV – (chapter 4 in this script)

Table 1: Explanation error codes

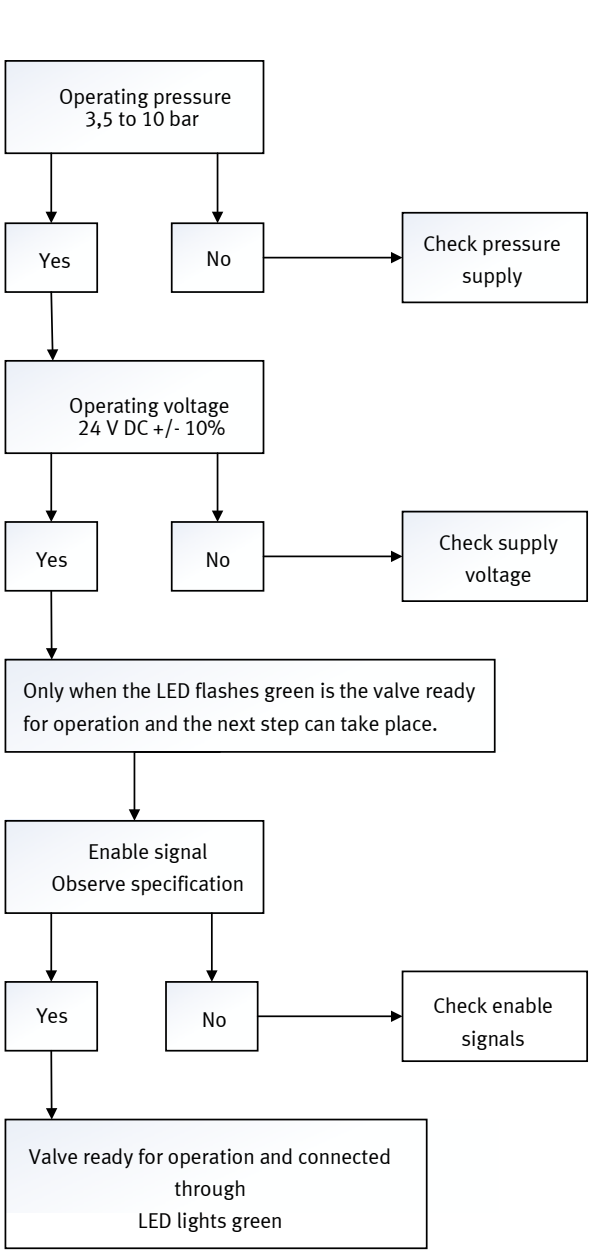
Note
Other possible errors: possible valve errors that are not or only partly indicated by error codes are listed below.

Possible error	Possible cause	Remedy
Valve does not switch	Pressure supply insufficient	Tighten flow control screw
--	No bridge between contacts 5 and 6 or the contact is faulty	Check bridge
Continuous outflow to port 3	Flow direction ignored	Specify operating pressure at port 1
Pressure p1 collapses briefly at every switching operation	The cross-section of the MS6-SV pressure supply is too small	– Tighten flow control screw – Check volume before inlet 1
	Flow control valve is opened too wide	– Adjust compressed air supply, e.g. increase cross-section of the supply cable
Valve does not switch although green LED is on (only on systems with a monitored start)	EN signal was set successfully but the pulse from the additional start pushbutton was not sent or was interrupted	Check pushbutton and lines

Table 2: Further possible errors

4 Specified switch-on sequence

The specified sequence during start-up is essential for fault-free operation and must be followed at all times.



Further information

- Operating pressure
- Compressed air quality

- Operating voltage (switch-on sequence)
- Operating voltage (specification)

- Enable signal
- Specifications of the enable signals
- Operational principle of the NECA multi-pin

Fig. 1: Switch-on sequence

4.1 Operating pressure

The operating pressure must be between 3.5 and 10 bar. Avoid pressure drop or pressure fluctuations. Short-term pressure drop when switching on due to a line cross-section that is too small or excessive air consumption before the MS6-SV may cause malfunction. A sufficient compressed air supply is required for the function of the pilot valves. If the supply is not sufficient, the valve will output error code 6.

➔ **Note**

It is important always to apply the operating pressure first during start-up of the system.

4.2 Operating voltage

If the pressure is on, the operating voltage can be switched on. After switching on the operating voltage the valve runs a self-test. The red and green LEDs light for approx. 6 s during the test. If the self-test is completed, the green LED flashes (speed 1 hertz) and displays ready for operation.

4.3 Enable signal

If operating pressure and operating voltage are applied to the valve, the enable signals can be generated. (More detailed information on this can be found in chapter 5 in this script and in the operating instructions in Section 5).

4.4 Monitored start

If your system is fitted with an additional manual start pushbutton, make sure that the pulse of the pushbutton is between 0.1 s and 2 s. The start pulse must not be received by the valve until 1 s after the enable signals, otherwise it will not be acknowledged.

5 Installation of MS6-SV

What should be noted when installing the MS6-SV?

5.1 Layout

With reference to the air preparation the MS6-SV must be specified as a final module in the service unit. This will ensure that the compressed air quality required for the MS6-SV is maintained and the safe venting of the system is not affected by the service unit.

5.2 Wall gap

The gap between the wall and the MS6-SV must be a minimum of 32 mm. (Note: Festo MS6-WPB and MS6-WPE mounting bracket)

5.3 Distance from base

The distance between the silencer and the base must be a minimum of 15 mm.

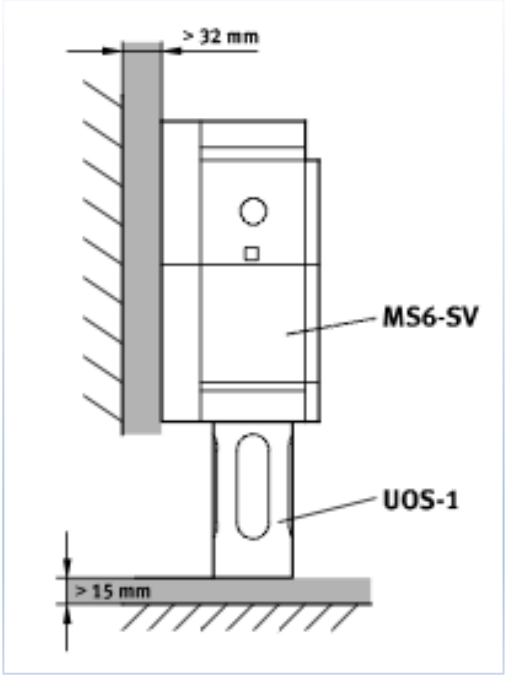


Fig. 2: Installation

5.4 Lines

Lines must not be routed between the wall and valve.

5.5 Flow direction

The standard flow direction of the MS6-SV is from inlet 1 to outlet 2. The flow direction is opposite on valves with the ending "Z" on the name plate. If the ports are reversed, the compressed air will be blown out at port 3.

5.6 Silencer

The silencer must be installed on port 3 only. Otherwise, the port must not be closed at any time. The high flow rate performance of the MS6-SV only allows use of the silencer specified by Festo.

5.7 Installation location

The recommended installation location should be as close as possible to the actual system.

5.8 Earthing

The MS6-SV earthing strap must be correctly installed. The screw attachment areas must be freed from paint to ensure a good contact. A toothed disc is specified between the screw attachment area and earthing strap and between the earthing strap and screw head. The earthing of the valve is designed to protect the component from electromagnetic interference (EMC).

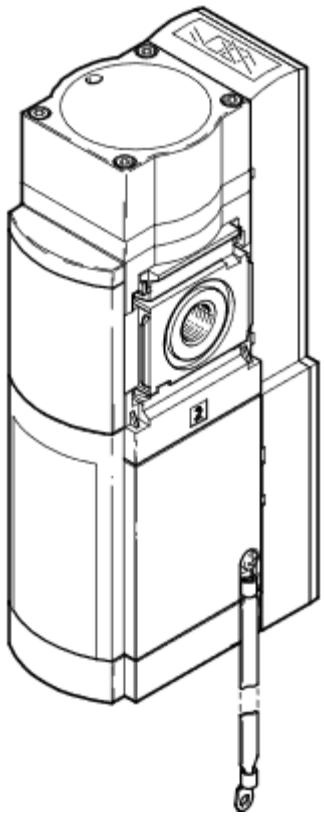


Fig. 3: Earth cable connection

5.9 Signal lines

The signal lines must not be longer than 20 m to ensure adequate signal quality.

5.10 Multi-pin plug

- Only the multi-pin plug specified by Festo may be used on the MS6-SV. The plug connector is an electronic component of the valve. It contributes to the overall function and must not be replaced by other plug connectors.
- Make sure that the plug connector is correctly oriented when connected and is then screwed in place. The pins must not be bent under any circumstances. Defective connector sockets in the valve cannot be replaced for safety reasons.

Fig. 4: Figure NECA plug

6 Requirements for the MS6-SV

Which requirements must be fulfilled?

6.1 Compressed air quality

The compressed air quality is very important!

Ester oils or moisture in the compressed air may damage the MS6-SV. Particles, rust and similar impurities will also affect the reliability of any compressed air system.

6.2 Operating voltage

The supply voltage of 24V +/- 10% at a maximum current consumption 1A must be guaranteed.

6.3 Temperature

The ambient temperature of the MS6-SV must be maintained between 0 and 60 degrees Celsius.

If a pressure sensor is installed, the maximum temperature is reduced to 50 degrees Celsius.

6.4 Vibrations

Vibrations conforming to severity class 2 are permissible.

6.5 Self-test

If the MS6-SV is not connected, the valve runs a self-test once every hour. If there is no compressed air supply at this time, the valve switches to fault mode. (error code 6)

6.6 Shutdown

The safety valve must be shut down once a month to ensure that the shutdown function is guaranteed in case of emergency.

6.7 Service life

The MS6-SV is an on/off valve with a B10 value of 900,000 switching cycles. The specified value is based on an operating pressure of 6 bar. Higher pressures will reduce the service life.

7 Specifications of the enable signals

The MS6-SV is switched by the enable signals.

The signal quality, the signal length and the spacing between them are all important.

7.1 Malfunction of the EN signals

Please note that test pulses from the controller that do not have a standardised length may cause a malfunction of the valve. Test pulses with a length of 4 ms cannot be evaluated by the valve.

For example, the Siemens ET200S output module sends a signal with a length of 4 ms, which causes a malfunction (FC 8 or FC 11).

7.2 MP1 plug connector

- The spacing between the EN1 and EN2 signals must be less than 75 ms.
- The EN1 and EN2 switch-on signals must be a minimum of 5 ms, otherwise they are not recognised as a usable signal.
- The interruption of a signal for shutdown must be a minimum of 15 ms, otherwise the valve will not be exhausted.

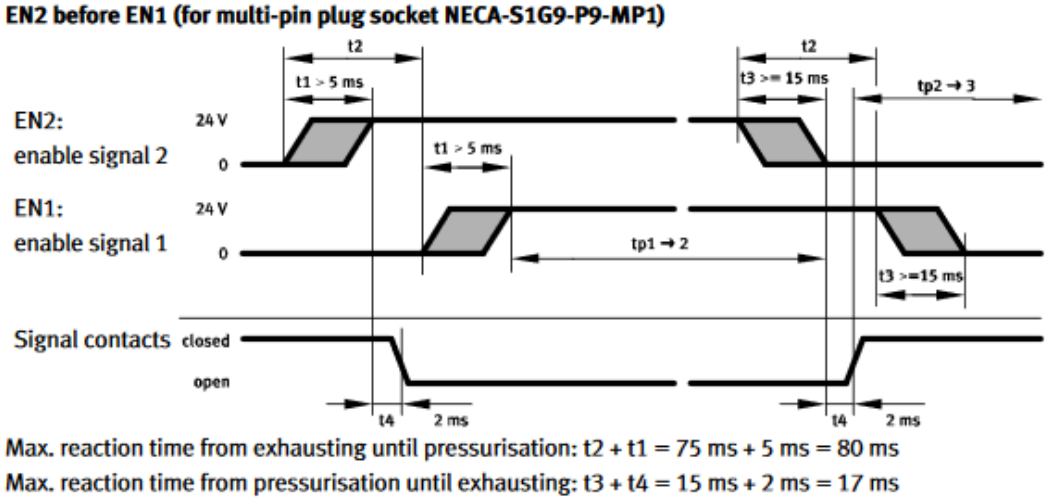


Fig. 5: Switching characteristic MP1 plug

The sequence of the enable signals is not relevant. The diagram shows that EN2 is applied before EN1. However, the principle with EN1 before EN2 is the same.

Further information regarding cross-circuit detection with the MP1 plug type with a safety switching device can be found in the operating instructions in Section 4.

7.3 MP3 and MP5 plug connectors

- The spacing between the EN1 and EN2 signals must be less than 75 ms.
- The EN1 and EN2 switching signals must be a minimum of 5 ms, otherwise they are not recognised as a usable signal.
- The interruption of a signal for shutdown must be a minimum of 15 ms, otherwise the valve will not be exhausted.

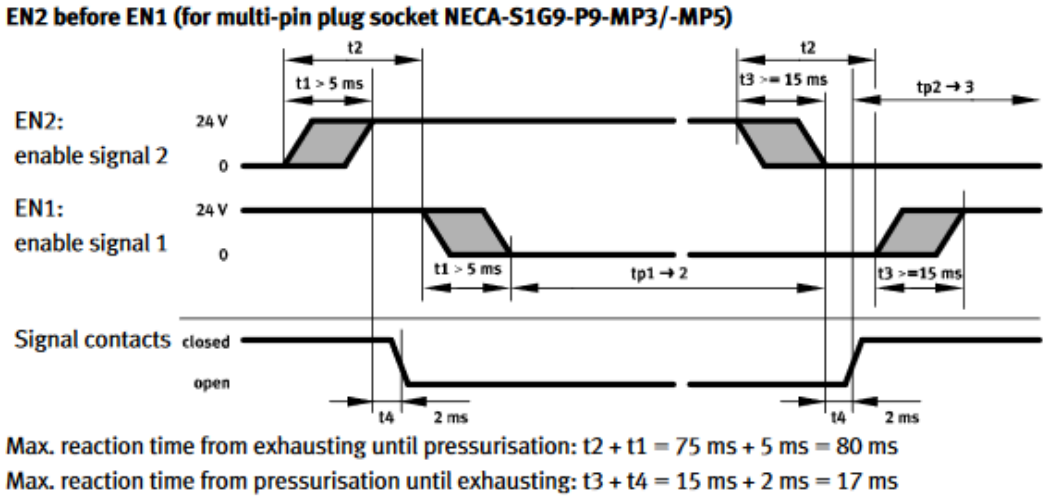


Fig. 6: Switching characteristic MP3 and MP5 plug

The sequence of the enable signals is not relevant. The diagram shows that EN2 is applied before EN1. However, the principle with EN1 before EN2 is the same.

Information on the cross-circuit detection can be found in Section 4.

8 Operational principle of the NECA multi-pin plug socket

Use only the original Festo multi-pin plug. The plugs are electronic components that contribute to the overall function of the system and cannot be replaced by other plug connectors.

Enable signal status		**MS6-SV-E-10V24 with multi-pin plug socket status**		
EN1	EN2	MP1	MP3	MP5
0V	0V	Unpressurized	Valve switches to fault mode	Valve does not switch to fault mode, but remains in the safe, unpressurized status
0V	24V	Valve switches to fault mode	Pressurized	Pressurized
24V	24V	Pressurized	Valve switches to fault mode	Valve does not switch to fault mode, but remains in the safe, unpressurized status
24V	0V	Valve switches to fault mode	Unpressurized	Unpressurized

Table 3: State Enable signals and reactions of the valve