Technical Information TI-M10

Mechanical Valve Actuator MVA

- ☑ designed to actuate pneumatic clamping heads
- ☑ direct detection of a rupture of suspension element
- ☑ no electrical activation required, fast reaction time

For further information on technical data and optional accessories, please see ***"Technical Data Sheet TI-M11".***

A detailed description of the control, mounting and performance test of the SITEMA Mechanical Valve Actuator MVA can be found in the ***"Operating Manual BA-M11"***.

Contents

1 Purpose

The MVA serves as a mechanical switching device for fast activation of pneumatic components (e.g. SITEMA Clamping Head) in the event of rupture of a suspension element (e.g. rope, strap, chain, etc.).

With the MVA it is possible to operate all pneumatic SITEMA-Clamping Heads with operating pressures up to 10 bar.

2 Function

The MVA is integrated into the machine as a component moving with the load to be secured.

As the connecting element between the load to be secured and the suspension element, the MVA immediately actuates integrated pneumatic valve when the lifting force on the suspension element decreases (e.g. in the event of rupture of the suspension element). This allows a component (e.g. SITEMA Clamping Head) connected to the MVA to be switched directly, without a detour via the machine control system.

3 Design

The traction of the tensioned suspension element on the switch rod (10), *Fig. 1* keeps the stop ring (7), from contacting the slide of the pneumatic valve (8). The pneumatic valve is not actuated in this state. When the lifting force of the suspension element falls below a critical value (e.g. in the event of rupture of the suspension element, etc.), the switch rod (10) moves down and presses the stop ring onto the slide of the pneumatic valve. The pneumatic valve is actuated, and the pneumatic component is activated.

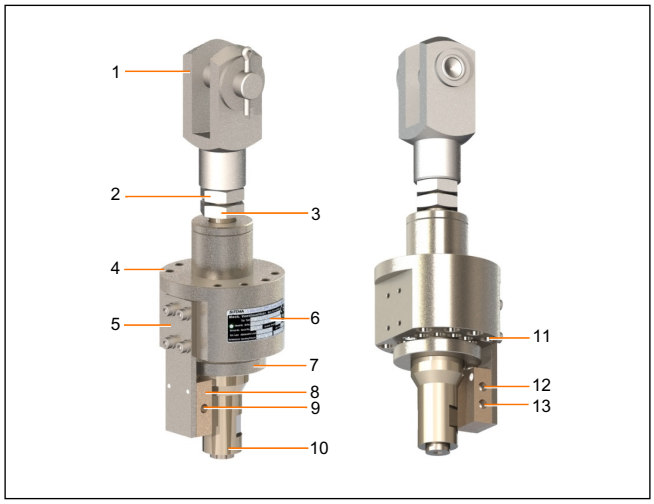

Fig. 1: Overview MVA (example design)

1 Fork
2 Locknut
3 Stop nut
4 Mounting side with threads
5 Holder for valve
6 Name plate
7 Stop ring
8 Pneumatic valve (slide operated slide valve)
9 Connection 2: "release pressure"
10 Switch rod
11 Through bore-holes
12 Connection 1: "exhaust air"
13 Connection 3: "pressure supply"

** For a non-safety-related application, the configuration of the connections can be modified.*

3.1 Layout (sample with standard SITEMA Clamping Head)

Pneumatic ports 1, 2 and 3 see (9), (12), (13), *Fig. 1* can be assigned as required. Depending on the application, this allows the initial position (not actuated/actuated) to be defined as closed or open.

If the connection is relevant to safety, the assignment is defined so that the safe state corresponds to the depressurized state.

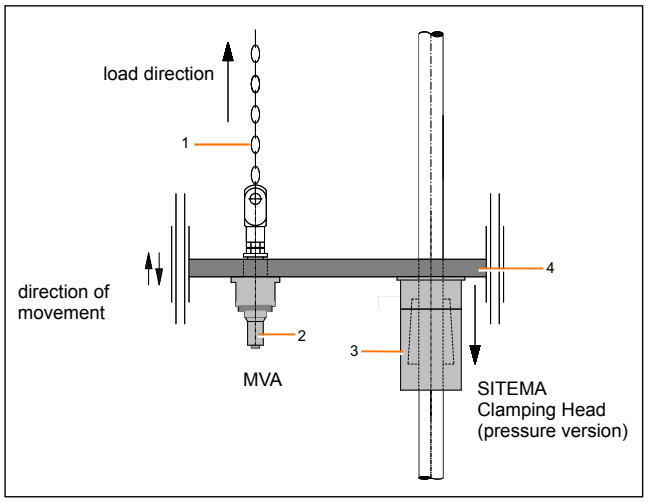

Fig. 2: MVA connected with the clamping head and the load to be secured

1 Suspension element (e.g. rope, strap, chain, etc.)
2 MVA
3 SITEMA Clamping Head, pressure version (e.g. KSP, KRP, KFP etc.)
4 Load to be secured

WARNING!
Danger if incorrectly incorporated into the lifting drive!
If, in the event of an emergency, the lifting force does not fall below the triggering force, the MVA will not actuate the pneumatic valve, which can lead to a dangerous situation.

Error example 1: The drive shaft breaks, but the rope is still held under residual tension by the gear lock while the load moves downwards.
Error example 2: On a deflection pulley, the suspension element (e.g. heavy steel rope) breaks. The weight of the broken suspension element still attached on the MVA is higher than the triggering force of the valve trigger, see *Fig. 3*. The weight of the broken suspension element may not exceed the triggering force.

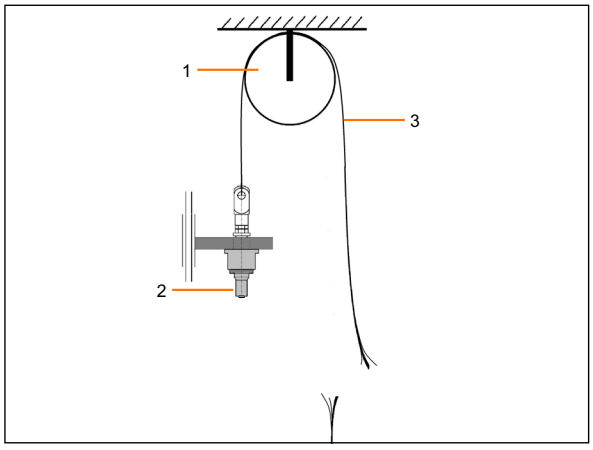

Fig. 3:Error example 2

1 Deflection pulley
2 MVA
3 broken suspension element

- Configure the lifting drive so that in case of failure, the lifting force on the suspension element falls below the triggering force!

4 Actuation

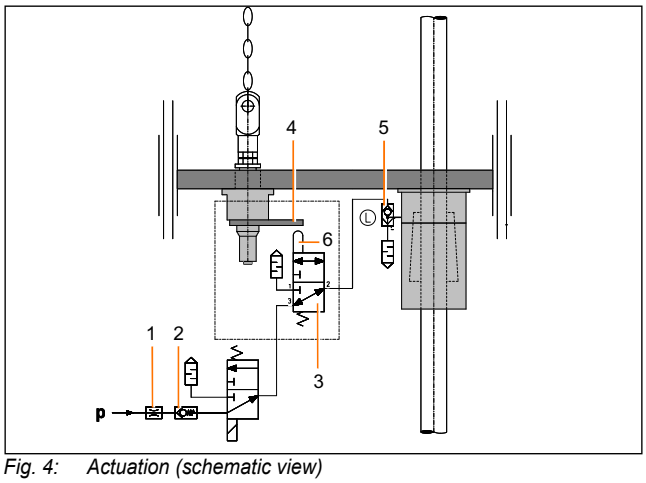

Fig. 4: Actuation (schematic view)

1 Throttle*
2 Check valve**
3 Pneumatic valve (integrated in the MVA)
4 Stop ring
5 Dump valve
6 Slide of the pneumatic valve

* In case impact noises due to excess pressure are audible when pressurizing the SITEMA Clamping Head, these can be suppressed by means of a flow control valve in the p-line.

** In case the pressure is not sufficiently constant (e.g. pressure drop at the beginning of a downward stroke), we recommend a check valve in the p-connection of the valve.

WARNING!
Danger if the pressure fluid discharge is slowed!
Slowing of the pressure fluid discharge could present a hazard as the connected pneumatic component will then only actuated after a delay.

- Do not integrate any components which impair discharge of the fluid from port 1 “exhaust air”.
- Lay all connection lines without kinking.
- If there is a risk of kinking, take precautions (protective tubing, thicker tube walling etc.).

If a fast response time of the Mechanical Valve Actuator MVA is stipulated, comply with the following requirements:

- short lines
- appropriately large valve and line cross-sections
- installation of a dump valve at L

5 Operating conditions

The immediate environment of the MVA must be dry and clean. The machine manufacturer must take measures to prevent contamination.

In case of doubt, please contact SITEMA.
The permitted surface temperature is 0 to +60 °C.
For protection against corrosion the MVA is zinc-nickel coated.

6 Choosing the right type

The data tables in *"Technical Data Sheet TI-M11"* show the admissible load (M) of the various types. The static load acting on the MVA must not exceed the admissible load (M) in any operating state. The acceleration of the load must not exceed 5 m/s².

7 Pressure medium

The MVA as a mechanical switching device does not require a pressure medium to actuate pneumatic components (e.g. SITEMA-Clamping Head). The pneumatic valve of the MVA actuates operating pressures between 3.5 bar and 10 bar.
Only use dried and filtered compressed air. SITEMA recommends using compressed air according to ISO 8573-1:2010 [7:4:4].

8 Required risk assessment

It must be ensured that the dimensions and arrangement of the MVA used in safety-relevant applications meet the requirements of the risk evaluation EN ISO 12100:2010 and also comply with any further standards and regulations applicable for the intended use. The Mechanical Valve Actuator MVA alone principally cannot form a complete safety solution. It is however suitable to be part of such a solution. Furthermore, all attachments and fixations have to be dimensioned correspondingly. This is generally the duty of the system manufacturer and the user.

9 Regular functional checks

The MVA must be subjected to performance tests at regular intervals. Only regular tests can monitor and guarantee reliable performance on a continual basis.

You can find further details in the *"Operating Manual BA-M11".*

10 Maintenance

Maintenance on the MVA is limited to the **regular performance tests**.

However, SITEMA recommends a general overhaul of the Mechanical Valve Actuator MVA by SITEMA after 5-6 years of operation (preventive maintenance). The machine manufacturer should include this overhaul in the maintenanc schedule.