Technical Information TI-E10

Electropneumatic Module EPM

A detailed description of control, mounting and performance test of the Electropneumatic Module EPM can be found in *“Assembly Instructions MA-E11”*.

1 Purpose

The Electropneumatic Module EPM acts as an interface between (electrical) power supply / control and pneumatic SITEMA clamping head.

All pneumatic SITEMA clamping heads with an operating pressure up to 5 bar can be controlled by the EPM. Admissible volumes can be found in *Chapter 5 “Technical Data”*. Other pressure levels and volumes can be provided upon request.The EPM can be used where there is no stationary pneumatic system present and an electrical solution is required.

2 Function

The EPM is controlled by a 24 V supply voltage and switching voltage.

The outlet pressure which is required to actuate the pneumatic clamping head is controlled by the control signal (switching voltage) with the input command “apply pressure / release pressure”.

If the voltage fails or the input signal is switched off, pressure is automatically released from the clamping head and the resulting (operating) condition is achieved.

In order to monitor the proper function of the EPM, the output signal (alarm) can be integrated in the machine control.

Depending on the type of the connected clamping head, different cycle times can be achieved. Cycle times for the various type sizes may not be lower than shown in *Chapter 5 “Technical Data”*.

3 Structure

The EPM consists of several components which produce an outlet pressure.

An oil-free compressor produces pressure in a pressure accumulator. The outlet pressure is adjusted by a pressure control valve.

An electromagnetic valve which can be controlled directly by the machine control pilots the outlet pressure.

By applying 24 V between the input “switching voltage” and ground (“supply voltage GND”), the electromagnetic valve is energized and the SITEMA clamping head is pressurized.

If the switching voltage is switched off, the electromagnetic valve moves to the initial position and the clamping head is depressurized.

The air which is used for compression is absorbed through filters from the immediate environment.

4 Connection to clamping head

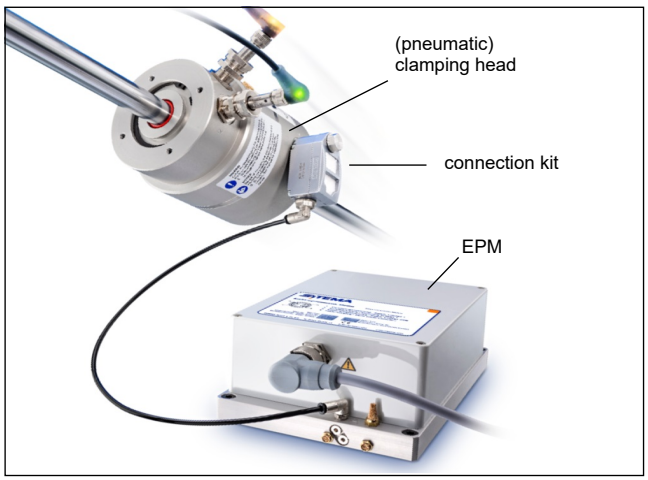

Fig. 1: EPM connected to clamping head via connection kit

The connection between EPM and clamping head requires the following parts :

- pneumatic hose
  (external diameter: 4 mm, maximum length: 3 m)
- optional: dump valve
  (size: see connection thread of pressure port at clamping head)
- hose connector
  (e.g. push-in fitting; connector between pneumatic hose and clamping head or dump valve)

We recommend our ready for use **connection kit** (see *Chapter 5.2 "Connection kit"*).

Schematic structure:

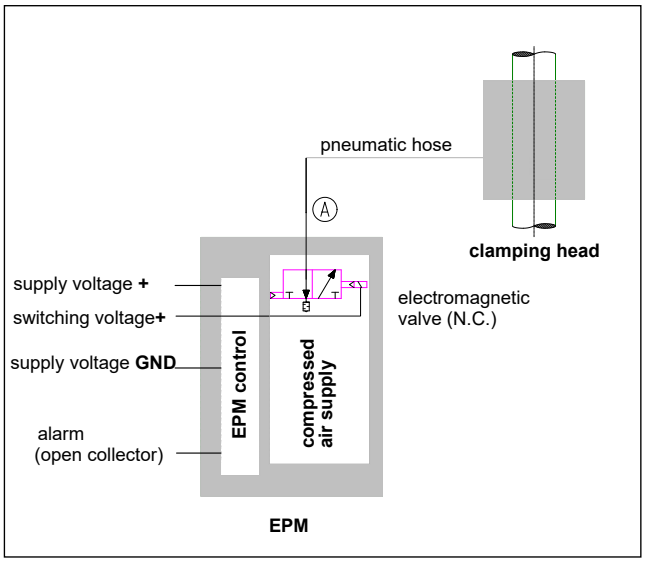

Fig. 2: Schematic structure

5 Technical Data

5.1 Electropneumatic Module EPM

Item	EPM 4	EPM 5
ID no. (order no.)	EPM 4 01	EPM 5 01
Electrical power supply		
Supply voltage, DC	24 V (tolerance: ± 10%)	
Peak current at compressor start	8 A	
Continuous power input on standby	1 W	
Continuous power input when compressor is running	72 W	
Input signal for pressurizing the clamping head		
Switching voltage of electromagnetic valve (N.C.)	24 V (tolerance: ± 10%)	
Supply current for valve	20 mA	
Output signal		
Alarm (open collector)	max. 2 W	
Connections (pneumatic / electric)		
Pneumatic hose (external diameter)	4 mm	
Recommended core cross-section	1,5 mm	
Actuation / Control of clamping head		
Operating volume max.	220 cm³	150 cm³
Outlet pressure	4 bar	5 bar
Cycle time min.	2,5 min	3 min
Operating conditions		
Temperature min.	10 °C	
Temperature max.	40 °C	
Air humidity of intake air max.	60 %	

Subject to modification without prior notice

5.2 Connection kit

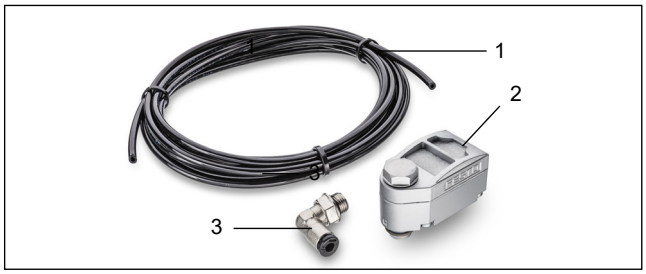

Fig. 3: Connection Kit

1 Pneumatic hose (external diameter: 4 mm, maximum length: 3 m)
2 Dump valve with sealing ring
3 Quick-acting push-in fitting with sealing

The connection kit is available in 2 sizes depending on the size of the connection thread at the clamping head:

- connection kit G1/8 (ID no.: EPM KIT G1/8)
- connection kit G1/4 (ID no.: EPM KIT G1/4)

The alignment of the dump valve can be adapted to the particular installation situation.

The connection kit contains a pneumatic hose (3 m long) that can be cut to the required length.

For the parallel operation of 2 clamping heads, a T-joint is available. Please consult SITEMA for further information.

5.3 Dimensions

The EPM can be mounted to the machine frame using the bore holes (threads: M 6) in the corners of the base plate. Mount the EPM in such a way that the electrical coupling can be reached and removed at any time.

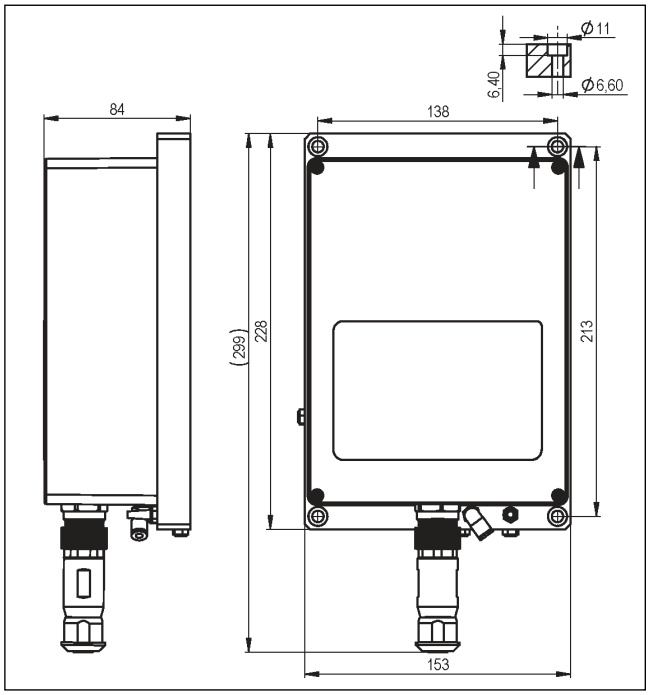

Fig. 4: Dimensions of EPM

6 Power requirement

For the operation of the EPM a 24 V DC voltage is required. The maximum current can temporarily reach 8 A.

The electrical supply and control unit needs to supply a DC voltage according to IEC 61010-1 (Chapters 6.3.1 and 6.3.2). The unit also needs to have a double separation / isolation from the power circuit according to IEC 61010-1 (Chapter 6.7).

For protecting the supply line from overload, a 5 x 20 mm T10AL, 250 V or T10AH, 250 V fuse according to IEC 60127-2 is needed.

A 4-core cable is to be used for the electrical connection. The electrical coupling with screw terminals for the cable shown in *Fig. 5* is included in the standard scope of supply.

Ready-made cables are available on request.

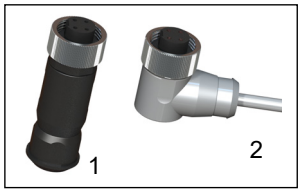

Fig. 5: Electrical coupling or ready-made cable

1 Electrical coupling (included)
2 Ready-made cable (optional accessory)

⚠ WARNING!
Danger of an electric shock

- To avoid the danger of an electric shock, establish the electrical connection as described in “Assembly Instructions MA-E11”!

7 Control

The internal pressure regulation maintains the pressure inside the pressure accumulator.

A temperature control is mounted to the compressor. It has the safety function to shut down the compressor in case of overheating and to activate the alarm. Damaging the compressor is prevented in this way. After cooling down, the compressor is reactivated.

In case other internal errors occur, the compressor is deactivated as well and the alarm activated. As long as the alarm is activated, pressure is not built up.

To ensure trouble-free functioning, the electromagnetic valve which actuates the SITEMA clamping head is controlled solely by the input signal of the machine control. The electromagnetic valve is not controlled by the EPM control.

The status of the pressure outlet is not monitored. To monitor the pressure outlet, the signals of the clamping head’s proximity switches can be used.

To achieve a fast response time between EPM and clamping head, the pneumatic hose may not be longer than 3 m.

⚠ WARNING!
Danger if the pressure fluid flow is slowed. Leaks in the connecting line between the EPM and the clamping head can lead to actuation problems.

- Do not integrate any components (e.g. a throttle) which impair the flow of the fluid.
- Lay all connection lines without kinking.
- Check the leak tightness of the connecting lines to prevent pressure loss and excessive heating of the EPM.
- When installing the pneumatic hose, pay attention to the recommended bending radius of the manufacturer: at least 10 mm.
- If there is a danger of kinks, take the appropriate safety measures.

8 Operating conditions

The immediate environment of the EPM in its standard version must be dry and clean. Especially moisture entering the EPM can cause equipment damage.

Integrated air filters protect the pneumatic components from coarse particles in the intake air.

The housing of the EPM consists of a polycarbonate plastic (PC).

- Protect the EPM from contact with brake fluids, cooling lubricants, thinners and other media, which can lead to reactions with the housing material.

Please contact SITEMA in case of heavy accumulation of contaminants.

The EPM is not suitable for use in potentially explosive areas.

9 Required risk assessment

The EPM is to be selected and arranged according to the EN ISO 12100:2010 risk assessment and additional applicable standards and regulations for the special case of application. This is fundamentally the task fo the machine manufacturer/ operator.

10 Regular performance tests

The EPM must be functionally checked at regular intervals.

11 Maintenance

The maintenance of the EPM is limited to the regular functional check of the valve function and the response times of the SITEMA clamping head.

To ensure correct functioning, any repair or refurbishing must be carried out by SITEMA.

SITEMA cannot take any responsibility for repairs by another party.