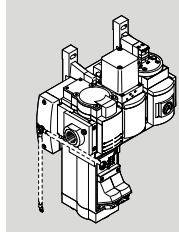


# MSE6-C2M

## Control and Condition Monitoring Module



# FESTO

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Instructions | Operating

8095296  
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[8095298]



Translation of the original instructions

PI PROFIBUS PROFINET® is a registered trademark of its respective trademark holder in certain countries.

### 1 Applicable documents

All available documents for the product → [www.festo.com/pk](http://www.festo.com/pk).

| Document    | Product   | Contents                    |
|-------------|---|-----------------------------|
| Description | Control and Condition Monitoring Module MSE6-C2M-SY | Function, Parameterisation  |
| Description | CPX system description P.BE-CPX-SYS-...             | Installation, Commissioning |
| Description | PROFINET bus node IO P.BE-CPX-PNIO-...              | PROFINET                    |

Tab. 1 Documentation on the product

### 2 Safety

#### 2.1 Safety instructions

- Only use the product in original status without unauthorised modifications.
- Only use the product if it is in perfect technical condition.
- Only use the product in an industrial environment.
- This product can generate high frequency malfunctions, which may make it necessary to implement interference suppression measures in residential areas.
- Observe labelling on the product.
- Prior to mounting, installation and maintenance work: Switch off power supply and secure it from being switched back on. Only switch on the power supply when the product has been assembled and installation and maintenance work is complete.
- Product is opened in normal position (pressurisation status). If the minimum supply voltage is not reached, the shut-off valve of the product switches to the pressurisation status.
- Note that, when the inlet pressure is switched off, depending on the function a residual pressure of < 1 bar (< 0.1 MPa) can remain at the output .

#### 2.2 Intended use

The energy efficiency module MSE6-C2M monitors and optimises the compressed air consumption via an adjustable outlet pressure.

#### 2.3 Foreseeable misuse

The following examples of foreseeable misuse are among those not approved as intended use:

- Outdoor use
- Exhaust ports sealed

#### 2.4 Training of qualified personnel

Installation, commissioning, service and disassembly should only be conducted by skilled personnel. The skilled personnel must be familiar with the installation of electrical and pneumatic control systems.

### 3 Additional information

- Accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue).
- Spare parts → [www.festo.com/spareparts](http://www.festo.com/spareparts).
- Information on the CPX field bus node → [www.festo.com/sp](http://www.festo.com/sp).
- Information on the short documentation for the CPX-Extension → [www.festo.com/sp](http://www.festo.com/sp).

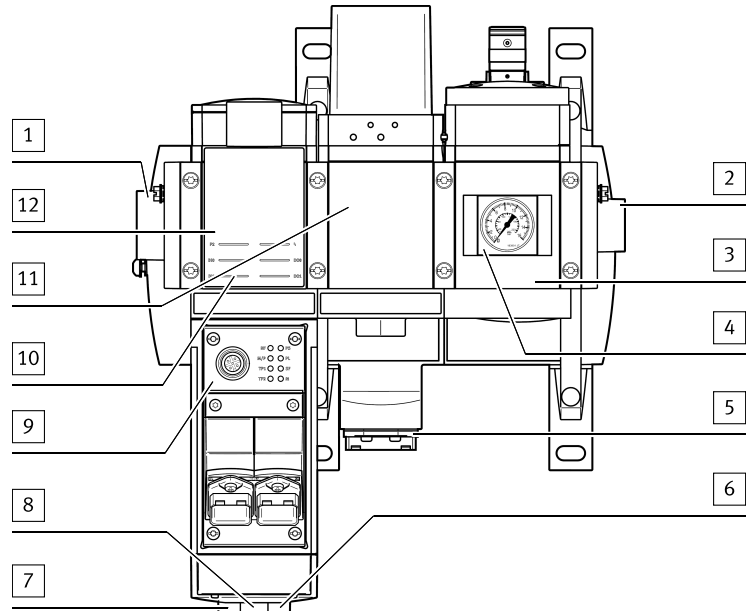
### 4 Service

Contact your regional Festo contact person if you have technical questions  
→ [www.festo.com](http://www.festo.com).

### 5 Product overview

#### 5.1 Configuration

##### 5.1.1 Product design



- |   |   |
|---|---|
| 1 Pneumatic connection 1: Input for compressed air  | 7 Connection for electrical outputs   |
| 2 Pneumatic connection 2: Output for compressed air | 8 Only MSE6-C2M...-M: connection for CPX-Extension series 1 for connecting devices with CPX-Extension series 2 connection |
| 3 Shut-off valve with pressure sensor               | 9 PROFINET bus node CPX-M-FB34  |
| 4 Pressure gauge                                    | 10 Status LEDs  |
| 5 Electrical system supply                          | 11 Proportional-pressure regulator  |
| 6 Connection for electrical inputs                  | 12 Flow sensor  |

Fig. 1 Product design

##### 5.1.2 Display components

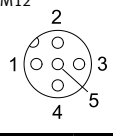
| LED                         | Meaning         |  |
|-----------------------------|-----------------|--|
| <b>P2 (green)</b>           |                 |  |
|                             | LED illuminated | Outlet pressure p2 ≥ lower critical limit pressure p2  |
|                             | LED flashes     | Outlet pressure p2 < lower critical limit pressure p2 and Outlet pressure p2 ≥ pressure setpoint auto standby -0.5 bar |
|                             | LED is off      | Outlet pressure p2 < pressure setpoint auto standby -0.5 bar   |
| <b>D10 and D11 (green)</b>  |                 |  |
|                             | LED illuminated | Signal at electrical input 0 or 1 is present (logic 1)   |
|                             | LED is off      | Signal at electrical input 0 or 1 is not present (logic 0)   |
| <b>DO0 and DI1 (yellow)</b> |                 |  |
|                             | LED illuminated | Electrical output 0 or 1 sends 1-signal (logic 1)  |
|                             | LED is off      | Electrical output 0 or 1 sends 0-signal (logic 0)  |
| <b>Red</b>                  |                 |  |
|                             | LED illuminated | Module error   |
|                             | LED is off      | No module error  |

Tab. 2 Display of status LED

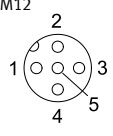
##### 5.1.3 Connecting components

###### I/O ports for MSE6-C2M

The product has two electrical inputs and two electrical outputs.

| Plug  | Pin | System supply            | Function         |
|---|-----|--------------------------|------------------|
|  | 1   | 24 V DC U <sub>SEN</sub> | Supply voltage   |
|   | 2   | Input-1                  | Input 1          |
|   | 3   | 0 V U <sub>SEN</sub>     | 0 V load         |
|   | 4   | Input-0                  | Input 0          |
|   | 5   | FE                       | Functional earth |

Tab. 3 Electrical inputs DI0 and DI1

| Plug   | Pin | System supply     | Function         |
|--|-----|-------------------|------------------|
|  | 1   | –                 | Not assigned     |
|  | 2   | Output-1          | Output 1         |
|  | 3   | 0 V <sub>VA</sub> | 0 V load         |
|  | 4   | Output-0          | Output 0         |
|  | 5   | FE                | Functional earth |

Tab. 4 Electrical outputs DO0 and DO1

### I/O and CPX-Extension connections for MSE6-C2M-...-M

The product has two electrical inputs, two electrical outputs and a CPX-Extension series 1 connection.

| Connection         | Position                                    | Plug   |
|--------------------|---|--|
| Electrical inputs  | Connections on the cover under the bus node | Design: M12, 5-pin<br>Identification: X2           |
| Electrical outputs | Connections on the cover under the bus node | Design: M12, 5-pin<br>Identification: X1           |
| CPX-Extension      | Connections on the cover under the bus node | Design: M12, hybrid, 8-pin<br>Identification: none |

Tab. 5 Electrical inputs, electrical outputs and CPX-Extension

### Bus node

The product has a PROFINET bus node CPX-FB34.

### Only energy efficiency module MSE6-C2M-...-M

The product has a CPX-Extension series 1 connection. Use only the preassembled extension connecting cables from Festo → [www.festo.com/catalogue](http://www.festo.com/catalogue).

## 5.2 Functions

### Overview

- Pressure regulation and blocking function (energy efficiency function)
  - Automatic blocking and subsequent regulation to the standby target pressure with a prolonged reduced flow rate
  - User-controlled blocking and pressure regulation
  - Parameterisable target pressure rise limitation. (Soft-Start)
- Recording and processing of measurement data
  - Outlet pressure P2
  - Pressure change (for pressure tightness testing)
  - Flow rate
  - Air consumption
- Limit monitoring
  - Pressure, lower and upper critical limit
  - Pressure change, upper critical limit
  - Flow rate, upper critical limit
- Electrical I/Os
  - 2 digital inputs
  - 2 digital outputs
  - Channel-based status indicator via LED
  - Parameterisable special functions
- Fieldbus connection
  - PROFINET connection CPX-FB34

### Standby detection and automatic pressure reduction

The product detects downtimes of a pneumatic system upon corresponding parameterisation. If the parameterised flow rate critical limit is continuously not reached during the parameterised delay period, when the automatic function is activated (controller auto-user and controller auto-enable logic 1), the supply air is blocked until the parameterised standby target pressure value is reached. The outlet pressure is then adjusted to this value. This prevents unnecessary exhausting of the system and enables leakage detection via an analysis of the pressure drop. A control signal can be used to switch back over from standby pressure regulation to normal pressure regulation. When the automatic function is deactivated, the shut-off valve and the pressure regulator can be directly controlled by the machine controller.

### Regulation of the compressed air supply

The product regulates the compressed air supply to the set pressure setpoint. This can be done in manual mode by the setting from the controller. In automatic mode, regulation takes place via the parameterised target pressure values. Prerequisite: operating pressure P1 ≥ target pressure + 1 bar.

### Pressure tightness testing

The product continuously measures the pressure change in the parameterised time interval and monitors this value to ensure it is not exceeded in the blocking status. The measured pressure change serves as a measure of the leakage existing in the downstream system.

### Pressure recording

The product continuously measures the outlet pressure, prepares the data and makes it available cyclically. To detect operating pressures that are too high or too low, the product offers the option of parameterising critical limits for pressure. If the parameterised critical limit is exceeded, the product will output a diagnostic message. The status of monitoring to ensure the critical limit is not exceeded is indicated via an input bit and via the P2 LED on the module.

### Flow recording

The product continuously records the flow rate, prepares the data and makes it available cyclically. To detect excessive flow rates, the product offers the option of parameterising the upper critical limit for the flow rate. If the parameterised critical limit is exceeded, the product will output a diagnostic message.

### Consumption recording

The product determines the compressed air consumption by recording the system flow rate. With the aid of output data, the consumption measurement can be switched on and off and the consumption value can be reset.

### Operational functions

The behaviour of the product can be influenced by accessing the internal parameters, e. g.:

- Diagnostic behaviour by enabling maskable diagnostic messages
- Specification of the units and the measuring interval
- Setting of critical limits

### i

The product is delivered with pre-set parameters. Fundamentals of parameterisation → 8.3 Parameterisation. Detailed information on parameterisation → 1 Applicable documents.

## 6 Assembly

The product is intended for wall mounting, e.g. on mounting plates. The mounting brackets are integrated and may not be removed.

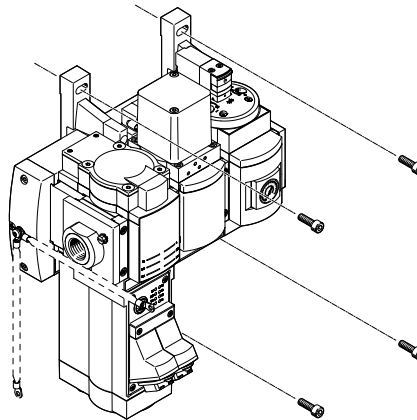


Fig. 2 Typical assembly

Prerequisite: the mounting surface is flat and can support the weight of the product.

1. Adjust the product when it is standing vertically (± 5°).
2. Mount the product using the mounting brackets and 2 screws each. Screw size: M6 if necessary, use washers.

### Dimensions

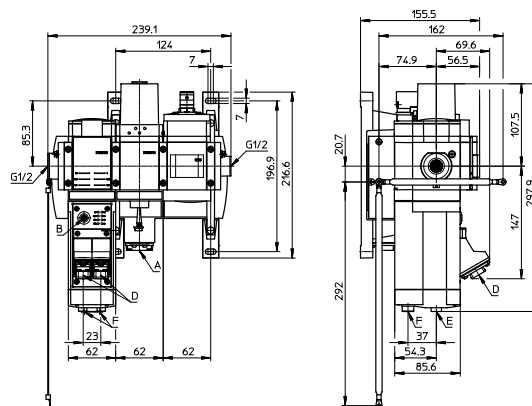


Fig. 3 Dimensions

## 7 Installation

Installation sequence:

1. Pneumatic connections
2. Earth terminal
3. Electrical connecting cables

### 7.1 Pneumatic installation

Requirements:

- The product is assembled.
- The contact surfaces must be clean (avoid leakage and contact errors).
- Connect pneumatic connections [1](#), [2](#).

## 7.2 Electrical installation

### ⚠ WARNING!

#### Risk of injury due to electric shock.

- For the electrical power supply, use only PELV circuits in accordance with IEC 60204-1/EN 60204-1 (Protective Extra-Low Voltage, PELV).
- Observe the general requirements of IEC 60204-1/EN60204-1 for PELV circuits.
- Only use voltage sources that ensure a reliable electric separation from the mains network in accordance with IEC 60204-1/EN 60204-1.

For the MSE6-C2M...-M with CPX-Extension series 1 connection, the following applies:


### NOTICE!

#### Material damage as a result of changing the connecting cable when the supply voltage is switched on

- Connect and remove the CPX-Extension connecting cable only when the supply voltage is switched off for the control extension series 1 device.
- Only use pre-assembled connecting cables.

1. Connect the earth terminal.
2. Connect CPX-Extension connecting cable (only for MSE6-C2M...-M)
  - ➔ 5.1.3 Connecting components.
3. Connect power supply and electrical inputs and outputs.

#### Pin allocation

| Plug  | Pin | System supply        | Function   |
|---|-----|----------------------|--|
| AIDA Push-pull<br>5 4 3 2 1<br> | 1   | 24 V DC $U_{EL/SEN}$ | Operating voltage supply for the electronics and sensors |
|   | 2   | 0 V $U_{EL/SEN}$     | Operating voltage of electronics and sensors             |
|   | 3   | 24 V DC $U_{OUT/A}$  | Load voltage supply for actuators                        |
|   | 4   | 0 V $U_{OUT/A}$      | Load voltage of actuators                                |
|   | 5   | FE                   | Functional earth   |

Tab. 6 Pin allocation, system supply

#### Electrical connection example

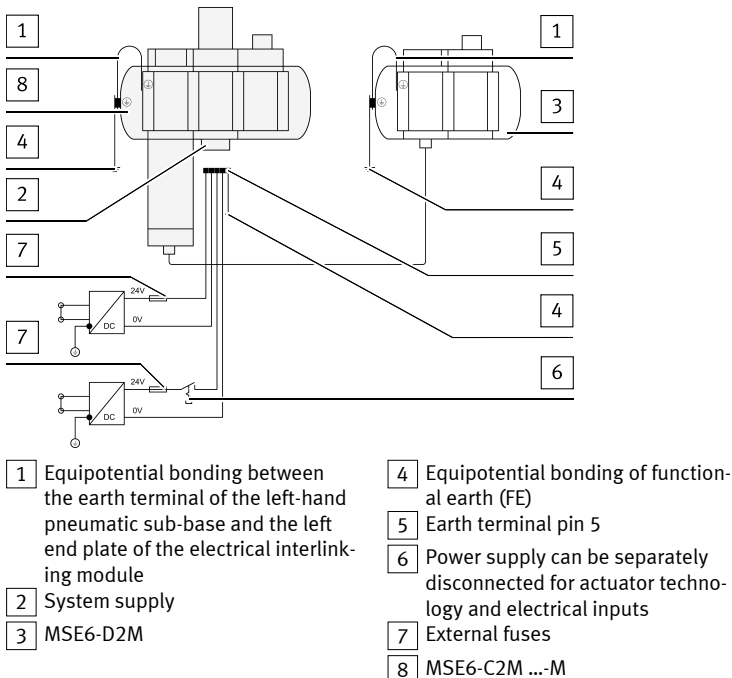


Fig. 4 Power supply with separate circuits and equipotential bonding

## 7.3 Combination with MS6 modules

#### General information

- Maximum permissible number of entire service unit component combination: 10 individual modules. The product MSE6-C2M counts as a triple module here.
- When supplementing MS6 modules, only use the wall mounting MS6-WPG and the module connector MS6-MV-EX.
- When supplementing MS6 modules, the screws on the module connector between the flow sensor, proportional-pressure regulator and the shut-off valve may not be loosened ➔ Restriction of EMC immunity to interference.
- Observe the assembly instructions for the wall mounting-SET MS6-WPG.

- In the case of a larger device configuration, a longer FE joint is required.
  - The cable has a nominal cross section of 5 mm<sup>2</sup> with cable lug in accordance with DIN 46234-4-6.
  - Alternatively: earthing straps are manufactured in a bare or tin-plated design in accordance with DIN 46444 or in accordance with DIN 72333-3. Nominal cross section: > 5 mm<sup>2</sup>. Connection: M4.

#### Assembly

1. For pre-assembled MS6 combinations: replace the wall brackets with a MS6-WPG wall mounting-SET.
2. For MS6 individual modules: replace module connectors for pre-assembled MS6 combinations with MS6-MV-EX module connectors.
3. For additions to the left side: remove the left-hand pneumatic sub-base of the MS6 module or MS6 module combination. At this point, assemble the left pneumatic sub-base of the product.
4. For additions to the right side: remove the right-hand pneumatic sub-base of the MS6 module or MS6 module combination. At this point, assemble the right pneumatic sub-base of the product.

#### Earth terminal

1. Connect the earth terminal on the pneumatic sub-base with low impedance (short cable with large cross-sectional area) to the end plate of the electrical linkage module of the product (pre-assembled on delivery status)
  - ➔ 7.2 Electrical installation.
2. Ensure that the earth terminal at the left end plate of the electrical interlinking module on the product and the earth terminal at the power supply connection have the same potential and that there are no compensating currents.
3. If necessary, the pre-assembled electrical joint of the energy efficiency module MSE6-C2M must be replaced by a longer, electrically equivalent joint.

## 8 Commissioning

### 8.1 Safety

The product is equipped with a pneumatically-piloted proportional-pressure regulator and a downstream shut-off valve. The shut-off valve is pneumatically piloted and is open in a normal position. When inlet pressure P1 is applied, the product automatically regulates the outlet pressure in the following cases to the last parameterised power-on target pressure (default setting 10 bar):

- Switch on of operating voltage until the connection is successfully made with the high-order controller.
- Interruption of the network communication with correspondingly set system parameters
- Stopping of the higher-order controller (see manufacturer's specifications), e. g. in the case of transmission of control programs, parameters, configuration data.

In the event of undervoltage in the operating voltage or the load voltage, the electronic pressure regulation is inactive when the shut-off valve is open. If prolonged, this can lead to an undefined drop in the outlet pressure.

### 8.2 Commissioning the product

The MSE6-C2M...-M enables the connection of an MSE6-D2M or max. 3 CPX I/O modules in CPX-Extension series 2.

CPX-Extension connection and connectable CPX I/O modules

➔ 12.3 Technical data, electrical.


### i

The product is delivered with pre-set parameters.

1. Check pneumatic tubing connection.
2. Check earth terminal.
3. Check the electrical wiring.
4. Check settings of the DIL switches.
5. Switch on the power supply for the product and the high-order controller.
6. Call up the control software.
7. Download the network-specific device description file from Festo's support portal (GSDML file) ➔ [www.festo.com/sp](http://www.festo.com/sp).
8. Import the device description file into the controller.
9. Activate the network scanner or open the hardware catalogue.
10. Transfer the product and bus node and the connected I/O modules for the MSE6-C2M...-M from the hardware catalogue into the software controller (detailed information can be found in the documentation for the higher-order controller).

### i

The module number 0 is always automatically assigned to the function module and the module number 1 to the integrated bus node.

11. Configure the product (e. g. make settings for network interfaces).
12. Parameterise the product (e. g. upper flow rate critical limit).
13. Apply compressed air to the product.
  - ↳ The product is operational with pre-set parameters. Upon successful commissioning, the LED  is dark. The LED P2 illuminates if the pressure at the pneumatic connection P2 is > or = 4 bar (pre-set parameter value). With bus node CPX-M-FB34, the LEDs PS and PL light up green. The LEDs TP1 and TP2 light up when the respective port is used. The remaining LEDs do not light up.

### 8.3 Parameterisation

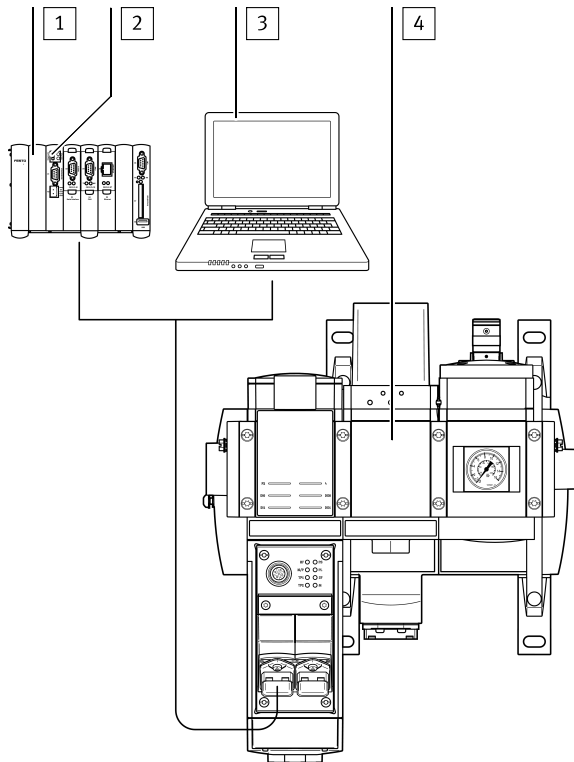
Overview of the module parameters of the function module. A differentiation is made between changeable module parameters and read-only module parameters.



Detailed information on parameterisation → 1 Applicable documents.

#### Overview

The product can only be parameterised via the fieldbus or diagnostic interface.



- 1) Interface module or network scanner/bus master; the desired parameterisation can be guaranteed e.g. in the start-up phase or after fieldbus interruptions.
- 2) User program in the machine controller; parameters can be modified during operation.
- 3) Network-specific configurators; parameters can be modified during the commissioning phase or during troubleshooting.
- 4) MSE6-C2M...(-M)

Fig. 5 Parameterisation the MSE6-C2M...(-M)

#### Module parameters

| Function no. <sup>1)</sup>   | Changeable module parameters                   | Function |    |    |    |    |    |    |   |
|------------------------------|--|----------|----|----|----|----|----|----|---|
|                              |  | 2)       | 3) | 4) | 5) | 6) | 7) | 8) |   |
| 4828<br>+ m * 64 + 0         | Monitoring                                     |          |    |    |    |    |    |    |   |
|                              | Bit 0: Short circuit/overload in sensor supply | -        | -  | -  | -  | -  | ■  | -  | - |
|                              | Bit 1: Short circuit/overload at outputs       | -        | -  | -  | -  | -  | -  | ■  | - |
|                              | Bit 2: Undervoltage in actuator supply         | -        | -  | -  | -  | ■  | -  | ■  | - |
|                              | Bit 6: Critical limits                         | ■        | -  | ■  | ■  | -  | -  | -  | - |
| 4828<br>+ m * 64 + 7         | Critical limit startup                         | ■        | -  | ■  | -  | -  | -  | -  | - |
| 4828<br>+ m * 64 + 8         | Units  |          |    |    |    |    |    |    |   |
|                              | Bit 0 ... 1: Pressure                          | -        | -  | ■  | ■  | ■  | -  | -  | - |
|                              | Bit 2 ... 3: Flow rate                         | ■        | -  | -  | -  | ■  | -  | -  | - |
|                              | Bit 4 ... 5: Consumption                       | -        | ■  | -  | -  | -  | -  | -  | - |
| 4828<br>+ m * 64 + 10        | Pressure change sample time                    | -        | -  | -  | ■  | -  | -  | -  | - |
| 4828<br>+ m * 64 + 11 ... 12 | Upper critical limit flow rate                 | ■        | -  | -  | -  | -  | -  | -  | - |
| 4828<br>+ m * 64 + 13 ... 14 | Upper critical limit pressure                  | -        | -  | ■  | -  | -  | -  | -  | - |
| 4828<br>+ m * 64 + 15 ... 16 | Upper critical limit pressure change           | -        | -  | -  | ■  | -  | -  | -  | - |
| 4828<br>+ m * 64 + 17 ... 18 | Auto controller delay time                     | -        | -  | -  | -  | ■  | -  | -  | - |
| 4828<br>+ m * 64 + 19 ... 20 | Auto controller flow rate critical limit       | -        | -  | -  | -  | ■  | -  | -  | - |

| Function no. <sup>1)</sup>   | Changeable module parameters   | Function |    |    |    |    |    |    |   |
|------------------------------|--|----------|----|----|----|----|----|----|---|
|                              |  | 2)       | 3) | 4) | 5) | 6) | 7) | 8) |   |
| 4828<br>+ m * 64 + 21 ... 22 | Pressure setpoint auto normal  | -        | -  | -  | -  | ■  | -  | -  | - |
| 4828<br>+ m * 64 + 23 ... 24 | Pressure setpoint auto standby   | -        | -  | -  | -  | ■  | -  | -  | - |
| 4828<br>+ m * 64 + 25 ... 26 | Lower critical limit pressure P2   | -        | -  | ■  | -  | -  | -  | -  | - |
| 4828<br>+ m * 64 + 27        | Module control (byte 0)  |          |    |    |    |    |    |    |   |
|                              | Bit 0: signal extension channel digital input 0                                    | -        | -  | -  | -  | -  | ■  | -  | - |
|                              | Bit 1: signal extension channel digital input 1                                    | -        | -  | -  | -  | -  | -  | ■  | - |
|                              | Bit 2 ... 3: signal extension time digital inputs                                  | -        | -  | -  | -  | -  | -  | ■  | - |
|                              | Bit 4 ... 5: debouncing time digital inputs  | -        | -  | -  | -  | -  | -  | -  | ■ |
|                              | Bit 6: behaviour of sensor supply U <sub>SEN/EL</sub> after short circuit/overload | -        | -  | -  | -  | -  | -  | -  | ■ |
| 4828<br>+ m * 64 + 28        | Module control (byte 1)  |          |    |    |    |    |    |    |   |
|                              | Bit 0 ... 1: Q <sub>low</sub> timer reset selection                                | -        | -  | -  | -  | -  | ■  | -  | - |
|                              | Bit 2: target pressure power on  | -        | -  | -  | -  | -  | -  | ■  | - |
|                              | Bit 3: selection for digital output 0  | -        | -  | -  | -  | -  | -  | -  | ■ |
| 4828<br>+ m * 64 + 28        | Bit 4 ... 6: target pressure rise limit  | -        | -  | -  | -  | -  | ■  | -  | - |

- 1) m = module number (0)
- 2) Flow measurement
- 3) Consumption measurement
- 4) Pressure measurement
- 5) Pressure change
- 6) Regulation and blocking function
- 7) Digital inputs
- 8) Digital outputs

Tab. 7 Overview - changeable module parameters

| Function no. <sup>1)</sup> | Read-only module parameters |
|----------------------------|-----------------------------|
| 4828 + m * 64 + 29 ... 30  | Module time of operation    |
| 4828 + m * 64 + 31 ... 32  | Shut-off valve cycles       |

- 1) m = module number (0)

Tab. 8 Overview - read-only module parameters

#### Input and output data

The product possesses multiple items of functional module data, which can be replaced with the higher-order controller using the I/O data presented below.

| Data field / function                            | Input word <sup>1)</sup>                          | Output word                            |
|--|---|--|
| <b>Flow measurement</b>                          |   |  |
| Measured value                                   | Em.0  | -                                      |
| Status of monitoring of lower critical limit     | Em.3.6  | -                                      |
| <b>Consumption measurement</b>                   |   |  |
| Measured value channel 0 (16 Bit)                | Em.1  | -                                      |
| Measured value channel 0 (32 Bit)                | Data access via selectable input data: Em.5, Em.6 | Input address for data selection: Am.1 |
| Measured value channel 1 (16 Bit)                |   |  |
| Measured value channel 1 (32 Bit)                |   |  |
| Measurement impulse                              | Em.3.7  | -                                      |
| Status channel 0                                 | Em.3.12   | -                                      |
| Status channel 1                                 | Em.3.13   | -                                      |
| Measurement control channel 0, Run/Stop          | -   | Am.0.12                                |
| Measurement control channel 0, Reset             | -   | Am.0.13                                |
| Measurement control channel 1, Run/Stop          | -   | Am.0.14                                |
| Measurement control channel 1, Reset             | -   | Am.0.15                                |
| <b>Pressure measurement</b>                      |   |  |
| Measured value                                   | Em.2  | -                                      |
| <b>Pressure change measurement</b>               |   |  |
| Measured value                                   | Data access via selectable input data: Em.5, Em.6 | Input address for data selection: Am.1 |
| <b>Pressure regulation and blocking function</b> |   |  |
| Status of shut-off valve                         | Em.3.0  | -                                      |
| Status of Q <sub>low</sub> timer                 | Em.3.4 ... 3.5                                    | -                                      |
| Functional status                                | Em.8 ... 11                                       | -                                      |
| Shut-off valve controller                        | -   | Am.0.0                                 |

| Data field / function             | Input word <sup>1)</sup>                                 | Output word    |
|-----------------------------------|--|----------------|
| Auto-user controller              | –  | Am.0.1         |
| Q_low timer reset                 | –  | Am.0.2         |
| Selection of user target pressure | –  | Am.0.3 ... 0.4 |
| Auto enable controller            | –  | Am.0.5         |
| User pressure setpoint            | –  | Am.2           |
| Electrical inputs                 |  |                |
| Status of sensor supply           | Em.3.1   | –              |
| Status of electrical input 0      | Em.3.2   | –              |
| Status of electrical input 1      | Em.3.3   | –              |
| Electrical outputs                |  |                |
| Status of electrical output 0     | Em.3.14  | –              |
| Status of electrical output 1     | Em.3.15  | –              |
| Controller<br>Electrical output 0 | –  | Am.0.6         |
| Electrical controller<br>Output 1 | –  | Am.0.7         |
| Selectable input data             |  |                |
| Input address                     | Em.4   | Am.1           |
| Input data                        | Em.5 (data bits 0 ... 15),<br>Em.6 (data bits 16 ... 32) | –              |

1) m = module number (0)

Tab. 9 Overview of I/O data

## 9 Malfunctions

### 9.1 Diagnostics

The product offers extensive possibilities of diagnosis and error handling via the fieldbus or diagnostic interface.

| Diagnostics | Description  | Information   |   |
|-------------|--|---|---|
| 1           | Via status LEDs on product   | The LEDs on the module indicate the status of the outlet pressure p2, the status of the electrical inputs and outputs and module errors.  | → 5.1.2 Display components.                           |
|             | Via status LEDs on CPX field bus node  | The LEDs on the module indicate hardware errors, bus errors, etc.   | CPX system description<br>→ 3 Additional information. |
| 2           | Locally via the bus node diagnostic interface and operation using the CPX FMT (Festo Maintenance Tool) | – Shows current error messages in plain text<br>– Offers access to the diagnostic memory.   | → 1 Applicable documents.                             |
|             | System status scanning via the network (status bits scanning)  | The 8 status bits display common diagnostic messages (global error message).  | CPX system description<br>→ 3 Additional information. |
| 3           | System diagnostics with the network (via I/O diagnostic interface)                                     | Internal diagnostics data can be read via the I/O diagnostics interface. In this way, detailed diagnostic information can be accessed, even if the network used does not offer any extensive network-specific diagnostic functions.<br>The I/O diagnostic interface offers:<br>– Access to the current error message<br>– Access to the diagnostic memory<br>– Read access to internal parameters and data. |   |
|             | Network-specific diagnostic functions  | Diagnostic functions or communication services e. g. DPV1 (PROFIBUS)  |   |

Tab. 10 Description of diagnostic options

### 9.2 Error numbers

| No. | Description   |
|-----|---|
| 0   | No error or end of a message status                         |
| 2   | Short circuit/overload                                      |
| 10  | Upper critical limit exceeded <sup>1)</sup>                 |
| 15  | Module/channel failure <sup>2)</sup>                        |
| 24  | Fault in parametrising lower critical limit <sup>1)3)</sup> |
| 25  | Fault in parametrising upper critical limit <sup>1)3)</sup> |
| 26  | Fault in actuator supply <sup>1)</sup>                      |
| 29  | Fault in parametrising <sup>1)3)</sup>                      |

1) With active monitoring, the module displays the relevant error, depending on the parameterisation. However, the input signals will be processed further.

2) All the electrical module functions are stopped.

3) The parameter values entered will be ignored; the module operates internally with the last valid parameter values.

Tab. 11 Error numbers

## 10 Disassembly

### i

Settings are not saved in the product. Back up settings if required (e. g. on the higher-order controller).

Dismantle the product in the following sequence:

1. Switch off the power supply (compressed air and power supply).
2. Remove the earth connection.
3. Loosen the pneumatic connections.
4. Loosen the screws from all mounting brackets, one after the other. Start with the screws beneath the product.
5. Remove the complete product.

## 11 Disposal

### ENVIRONMENT!

Send the packaging and product for environmentally sound recycling in accordance with the current regulations → [www.festo.com/sp](http://www.festo.com/sp).

## 12 Technical data

### 12.1 Technical data, mechanical

| MSE6-C2M  |          |
|---|----------|
| Product weight                                    | [g] 4550 |
| Vibrations and shock (to IEC 60068) <sup>1)</sup> |          |
| Vibration (part 2-6)                              | SG1      |
| Shock (part 2 – 27)                               | SG1      |

1) For explanations on the severity level, see the → following table

Tab. 12 Technical data, mechanical

### Vibration load

| Frequency range [Hz] | Acceleration [m/s <sup>2</sup> ] | Deflection [mm] |
|----------------------|----------------------------------|-----------------|
| SG1                  | SG1                              | SG1             |
| 2 ... 8              | –                                | ± 3.5           |
| 8 ... 41             | 10                               | –               |
| 41 ... 58            | –                                | ± 0.15          |
| 58 ... 160           | 20                               | –               |
| 160 ... 200          | 10                               | –               |

Tab. 13 Values for vibration and shock in accordance with IEC 60068

### Shock load

| Acceleration [m/s <sup>2</sup> ] | Duration [ms] | Shocks per direction |
|----------------------------------|---------------|----------------------|
| SG1                              | SG1           | SG1                  |
| ± 150                            | 11            | 5                    |

Tab. 13 Values for vibration and shock in accordance with IEC 60068

### Continuous shock load

| Acceleration [m/s <sup>2</sup> ] | Duration [ms] | Shocks per direction |
|----------------------------------|---------------|----------------------|
| ± 150                            | 6             | 1000                 |

Tab. 13 Values for vibration and shock in accordance with IEC 60068

### 12.2 Technical data, pneumatic

| MSE6-C2M   |   |
|--|---|
| Pressure ranges  |   |
| Operating pressure P1                                      | [bar] 5 ... 11<br>[MPa] 0.5 ... 1.1                   |
| Outlet pressure P2   | [bar] 2.5 ... 10<br>[MPa] 0.25 ... 1                  |
| Medium   |   |
| Operating medium   | Compressed air to ISO 8573-1:2010 [7:4:4]<br>Nitrogen |
| Note   | Lubricated operation not possible                     |
| Temperature of medium                                      | [°C] 0 ... 50   |
| Mounting position  | Horizontal ± 5°                                       |
| Flow rate  |   |
| Standard nominal flow rate 1 → 2<br>In main flow direction | 7000 <sup>1)</sup>                                    |
| Pressure sensor <sup>2)</sup>                              |   |
| Pressure measuring range                                   | [bar] 0 ... 14<br>[MPa] 0 ... 1.4                     |
| Accuracy   | [%FS] ± 3   |
| Repetition accuracy  | [%FS] ± 0.3   |
| Flow sensor <sup>2)3)</sup>                                |   |
| Flow direction   | Unidirectional P1 → P2                                |

| MSE6-C2M   |           |   |
|--|-----------|---|
| Flow measuring range                             | [l/min]   | 50 ... 5000   |
| Accuracy of flow rate                            |           | ± (3 % of measured value + 0.3 % FS)  |
| Repetition accuracy, zero point                  | [%FS]     | ± 0.2   |
| Repetition accuracy, margin                      | [%FS]     | ± 0.8   |
| Temperature coefficient, margin                  | [%FS/K]   | Type ± 0.1  |
| Pressure-dependent margin                        | [%FS/bar] | ± 0.5   |
|  | [%FS/MPa] | ± 5   |
| Pressure regulation <sup>2)</sup>                |           |   |
| Pressure regulation range P2 <sup>4)</sup>       | [bar]     | 2.5 ... 10<br>Condition:<br>Operating pressure P1 ≥ target pressure + 1 bar   |
|  | [MPa]     | 0.25 ... 1<br>Condition:<br>Operating pressure P1 ≥ target pressure + 0.1 MPa |
| Linearity error                                  | [%FS]     | 2   |
| Repetition accuracy                              | [%FS]     | 3   |
| Pressure hysteresis                              | [bar]     | 0.3   |
|  | [MPa]     | 0.03  |
| Total accuracy                                   | [bar]     | ± 0.35  |
|  | [MPa]     | ± 0.035   |
| Shut-off valve                                   |           |   |
| Switch-on pressure                               | [bar]     | ≤ 3.5   |
|  | [MPa]     | ≤ 0.35  |
| Switch-off pressure                              | [bar]     | < 1   |
|  | [MPa]     | < 0.1   |
| Residual pressure                                | [bar]     | < 1   |
|  | [MPa]     | < 0.1   |
| Degree of protection in accordance with EN 60529 |           | IP65 <sup>5)</sup>  |

1) Measured at p1 = 10 bar and p2 = 6 bar. Δp = 1 bar

2) % FS = percent of the measurement value range end value (full-scale)

3) Typical accuracy with nominal conditions (6 bar (0.6 MPa), 23 °C and horizontal mounting position)

4) measured at ambient temperature 23 °C ± 5 °C and temperature of medium 18 °C ± 5 °C

5) plug connector inserted or fitted with protective cap

Tab. 14 Technical data, pneumatic

### 12.3 Technical data, electrical

| MSE6-C2M   |        |  |
|--|--------|--|
| Technical data for electrical inputs and outputs   |        |  |
| Operating voltage supply for the electronics/sensors   |        |  |
| Nominal voltage  | [V DC] | 24 ± 25 %  |
| Nominal voltage range  | [V DC] | 18 ... 30  |
| Intrinsic current consumption at 24 V  | [mA]   | Max. 370   |
| Additional current consumption via sensor supply at electrical inputs                          | [mA]   | Max. 1000  |
| Only MSE6...-M:<br>Additional current consumption via connected modules at extension interface |        | Description of connected modules (MSE6-D2M, CPX-I/O modules) |
| Residual ripple  | [%]    | ≤ 10<br>(within the nominal voltage range)                   |
| Load voltage supply for actuators  |        |  |
| Nominal voltage  | [V DC] | 24 -10 %/+ 20 %  |
| Nominal voltage range  | [V DC] | 21.6 ... 28.8  |
| Intrinsic current consumption at 24 V  | [mA]   | Max. 260   |
| Additional current consumption via load current at electrical outputs                          | [mA]   | Max. 1000  |
| Only MSE6...-M:<br>Additional current consumption via connected modules at extension interface |        | Description of connected modules (MSE6-D2M, CPX-I/O modules) |
| Residual ripple  | [%]    | ≤ 10<br>(within the nominal voltage range)                   |
| Electrical inputs  |        |  |
| Number of digital inputs   |        | 2  |
| Switching logic inputs   |        | Positive logic (PNP)   |
| Input characteristics  |        | To IEC61131-2  |
| Switching level, inputs  |        | Signal 0: ≤ 5 V<br>Signal 1: ≥ 11 V                          |
| Electrical isolation channel – inputs channel  |        | No   |
| Electrical isolation channel – Internal bus inputs   |        | No   |

| MSE6-C2M  |     |   |
|---|-----|---|
| Technical data for electrical inputs and outputs    |     |   |
| Power rating of sensor supply                       | [A] | Max. 1  |
| Fuse protection (short circuit) sensor supply       |     | Internal electronic fuse  |
| Cable length, inputs                                | [m] | Max. 30   |
| Electrical outputs                                  |     |   |
| Number of digital outputs                           |     | 2   |
| Switching logic at outputs                          |     | PNP (positive switching)  |
| Characteristic curve, outputs                       |     | Based on IEC 61131-2  |
| Electrical isolation channel – channel outputs      |     | No  |
| Electrical isolation channel – Internal bus outputs |     | Yes (when using a Push-Pull feed)   |
| Power rating per channel outputs                    | [A] | Max. 1 (12 W lamp load)<br>In compliance with the des max. permitted resultant current  |
| Resultant current of outputs                        | [A] | Max. 1  |
| Fuse protection (short circuit) outputs             |     | Internal electronic fuse per channel  |
| Cable length, outputs                               | [m] | Max. 30   |
| CPX-Extension connection                            |     |   |
| Connectable module                                  |     | 1 MSE6-D2M or<br>Up to max. 3 CPX I/O modules   |
| Permitted CPX I/O modules                           |     | – CPX-4DE (4 digital inputs)<br>– CPX-8DE (8 digital inputs)<br>– CPX-4DA (4 digital outputs)<br>– CPX-8DA (8 digital outputs)<br>– CPX-8DE/8DA (8 digital inputs and 8 digital outputs)<br>– CPX-4AE-U-I (4 analogue inputs)<br>– CPX-CPX-2AA-U-I (2 analogue outputs) |
| Connecting cable length                             | [m] | Max. 2  |
| Electromagnetic compatibility                       |     |   |
| Interference emission                               |     | → Declaration of conformity (www.festo.com).  |
| Immunity to interference                            |     | → Declaration of conformity (www.festo.com).  |

Tab. 15 Technical data, electrical