

Energy efficiency modules MSE6, MSE series



Energy efficiency modules MSE6, MSE series

Key features

Overview

The products optimise the use of compressed air as an energy medium in industrial automation technology. They are with measurement, control and diagnostic functions and support energy-efficient operation of pneumatic systems. In automatic operation, they detect standby states of the production system and shut off the

compressed air feed until it is reset by the user; the shut-off is either permanent (MSE6-D2M and MSE6-E2M) or until the pressure drops to the setpoint standby pressure, which is then maintained (MSE6-C2M). This prevents unnecessary and/or increased consumption of compressed air. By monitoring the pressure drop in the

shut-off state, it is possible to detect leakages and introduce specific system maintenance actions. The products can also be used for process monitoring by enabling pressure, flow rate and consumption values to be transferred by a fieldbus connection directly to the machine controller,

where they can be analysed. These data can be transferred to the cloud, for example via the Festo IO-Gateway, so that they can be recorded and analysed over long periods of time. The range of different equipment and functions of the three product variants are shown in the following table.

Product features			
Type	MSE6-C2M	MSE6-D2M	MSE6-E2M
Control function (energy efficiency function)	<ul style="list-style-type: none"> – For regulating to the adjustable normal setpoint pressure as well as automatic shut-off and subsequent regulation to the adjustable setpoint standby pressure if the flow rate drops below the limit value for a prolonged period – User-controlled shut-off and pressure regulation – Parameterisable up-rate limit for setpoint pressure 	<ul style="list-style-type: none"> – Automatic shut-off if the flow rate drops below the limit value for a prolonged period – User-controlled shut-off and pressurisation 	<ul style="list-style-type: none"> – Automatic shut-off if the flow rate drops below the limit value for a prolonged period – User-controlled shut-off and pressurisation
Recording and provision of measurement data	<ul style="list-style-type: none"> – Output pressure – Pressure change (for monitoring pressure-tightness) – Flow rate – Air consumption 	<ul style="list-style-type: none"> – Output pressure – Pressure change (for monitoring pressure-tightness) – Flow rate – Air consumption 	<ul style="list-style-type: none"> – Output pressure – Pressure change (for monitoring pressure-tightness) – Flow rate – Air consumption
Limit monitoring	<ul style="list-style-type: none"> – Pressure, lower and upper limit value – Pressure change in shut-off mode, upper limit value – Flow rate, upper limit value 	<ul style="list-style-type: none"> – Pressure, lower and upper limit value – Pressure change in shut-off mode, upper limit value – Flow rate, upper limit value 	<ul style="list-style-type: none"> – Pressure, upper limit value – Pressure change in shut-off mode, upper limit value – Flow rate, upper limit value
Electrical inputs/outputs	<ul style="list-style-type: none"> – 2 digital inputs – 2 digital outputs – Channel-based status indicator via LED – Parameterisable special functions 	–	–
Fieldbus connection	<ul style="list-style-type: none"> – PROFINET IO via integrated fieldbus node 	<ul style="list-style-type: none"> – PROFINET IO via the fieldbus node of the CPX terminal or MSE6-C2M-...-M actuated via a CPX extension 	<ul style="list-style-type: none"> – PROFIBUS DP via integrated fieldbus node – PROFINET IO via integrated fieldbus node – EtherNet/IP via integrated fieldbus node – EtherCAT via integrated fieldbus node
System extension/integration	<ul style="list-style-type: none"> – CPX extension interface row 1 for connecting a MSE6-D2M or connecting digital and analogue CPX IO modules (MSE6-C2M-...-M only) 	<ul style="list-style-type: none"> – CPX extension interface row 2 for connection to a MSE6-C2M-...-M or to a CPX terminal with CPX extension interface row 1 	–

Energy efficiency modules MSE6, MSE series

Key features

Functions

Standby detection, automatic shut-off and regulation of compressed air supply (MSE6-C2M only)

If parameterised accordingly, the product detects when a pneumatic system is at a standstill. The system is separated from the compressed air supply using the shut-off valve without exhausting the downstream system. This avoids additional air consumption through leakages. The product remains shut-off until the output pressure has dropped to the parameterisable setpoint standby pressure. The shut-off valve is then

re-opened and this pressure value is maintained. This prevents the system from being exhausted unnecessarily and enables leaks to be detected by analysing the pressure drop. If the product receives a release signal in the automatically activated shut-off/regulation mode, the shut-off valve opens, and the pressure regulator switches back to normal pressure regulation.

Standby detection and automatic shut-off of compressed air supply (MSE6-D2M/E2M only)

If parameterised accordingly, the product detects when a pneumatic system is at a standstill. The system is separated from the compressed air supply using the shut-off valve without exhausting the downstream system. This avoids additional air consumption through leakages. If the product

receives a release signal in the automatically activated shut-off mode, the shut-off valve opens, and the system is again supplied with compressed air. After exhausting via port 1, a residual pressure of < 1 bar can remain at port 2.

Manual switching on/off of the compressed air supply

The automatic shut-off and regulation of the compressed air supply can be activated and deactivated by the user. Deactivation is worthwhile during commissioning or a critical production process if automatic standby detection is difficult or not possible. This allows the shut-off valve and pressure

regulator to be directly and remotely controlled by the machine controller. Moreover, the MSE6 of the PLC can issue a "shut-off recommendation" in semi-automatic mode. The PLC program then decides whether to switch to standby mode or not.

Testing pressure-tightness

In the shut-off state, the product measures the pressure change over time. Even in well-serviced systems, the pressure falls continuously due to leakages. The fewer leakages the

system has, the slower the pressure drop will be. The measured pressure change is indicative of leakages in the system. If the parameterised limit value is exceeded, the device will output a diagnostic message.

Pressure recording

The product continuously records the output pressure, prepares the data and makes them available cyclically. To detect operating pressures that are too high or too low (MSE6-C2M/D2M only), the product offers the option of parameterising limit values for pressure. If the parameterised limit value is exceeded, the device will output a diagnostic message.

Flow recording

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

Consumption recording

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

Note

If there is an error (e.g. fieldbus interruption, PLC failure, no voltage) on the MSE6-D2M/E2M, then the shut-off valve switches to the initial position (pressurise) if the system parameters are set accordingly. If the valve was previously shut off, the

system is pressurised. If the system was exhausted, pressurisation takes place suddenly. Use suitable counter measures to prevent unintentional pressurisation of the system in the event of an error.

New
MSE6-C2M/D2M

Energy efficiency modules MSE6, MSE series

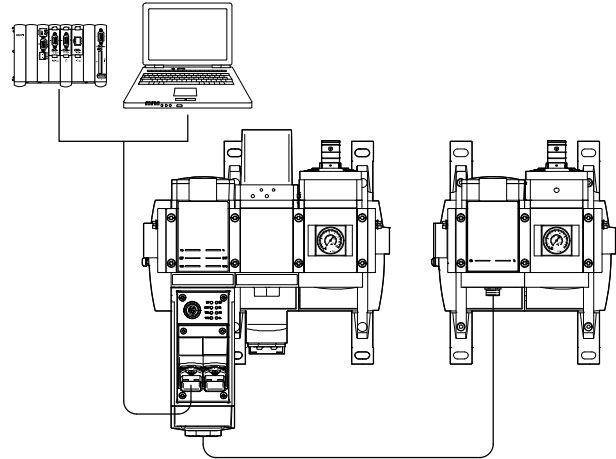
Key features



CPX extension (MSE6-C2M-...-M and MSE6-D2M only)

The MSE6-C2M-...-M can be extended with a MSE6-D2M using the CPX interface. This combination allows for energy efficiency functions on two separate compressed air systems, activated via a common bus node. As an alternative to the MSE6-D2M, CPX IO modules can also be connected to a MSE6-C2M-...-M. A CPX terminal can also be used to activate the

MSE6-D2M instead of the MSE6-C2M-...-M. The CPX extension can be flexibly mounted on two levels (rows) situated one above the other, making it particularly suitable for tight installation conditions, e.g. in a control cabinet. For further information, please see the technical data for these modules on the following pages.

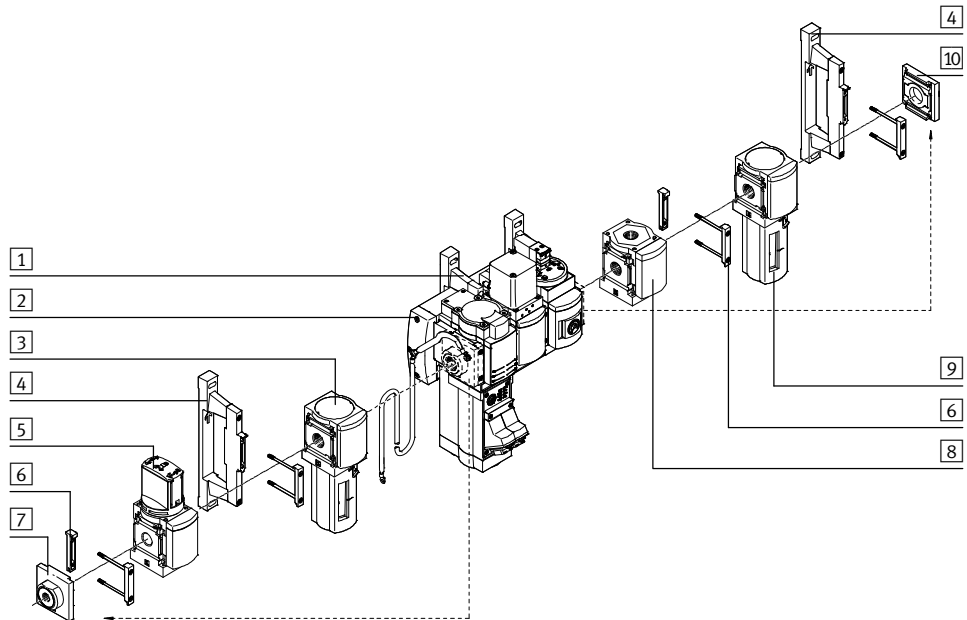


Combination of service unit components from series MS6 and MSE6

Additional service unit components of the MS6 series can be connected to the left and right of an MSE6.

With this combination, the following points should be noted:

- A maximum of 10 individual devices are permitted. The MSE6-C2M counts as three devices.
- Only use the wall mounting SET MS6-WPG and module connector MS6-MV-EX. Fit a wall mounting SET MS6-WPG after every second service unit component.
- No division of modules within the MSE6.
- Remove the left connecting plate from the MSE6 and mount on the extension on the left. Do the same in the case of an extension on the right (see dashed arrows).
- Connect the earth terminal on the left-hand connecting plate to the end plate of the electrical interlinking module of the MSE6. A longer FE connection may be required.



- | | | |
|--|------------------------------|----------------------------|
| 1 Energy efficiency module MSE6-C2M | 3 Filter MS6-LF | 8 Branching module MS6-FRM |
| 2 Left end plate of the electrical interlinking module of the MSE6-C2M with earth terminal | 4 Wall mounted SET MS6-WPG | 9 Fine filter MS6-LFM |
| | 5 On/off valve MS6-EM1 | 10 Right connecting plate |
| | 6 Module connector MS6-MV-EX | |
| | 7 Left connecting plate | |

Energy efficiency modules MSE6, MSE series

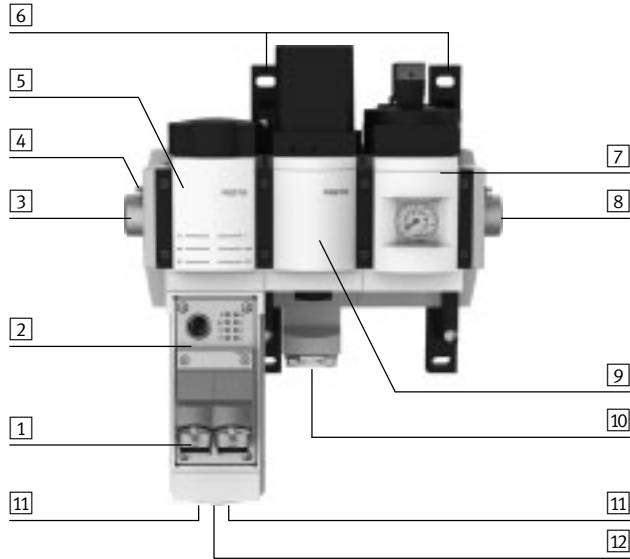
Key features

Design

MSE6-C2M

→ Page 6

The main components of the product are: fieldbus node, flow sensor, proportional-pressure regulator and shut-off valve with pressure sensor. The fieldbus interface allows connection to a higher-order controller, e.g. a system or machine controller. Certain devices, such as the MSE6-D2M or CPX IO modules, can be connected to the CPX extension connection row 2 via the CPX extension connection row 1.

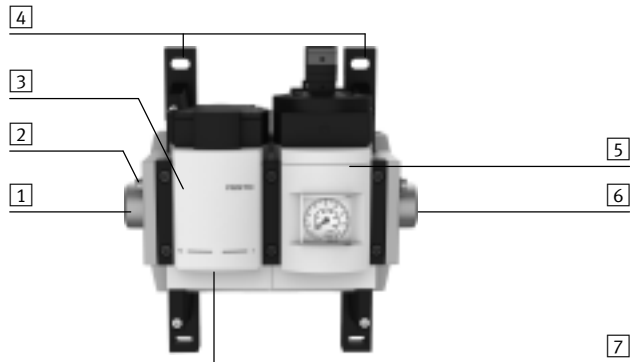


- 1 Fieldbus interface
- 2 Fieldbus node
- 3 Pneumatic port 1: Compressed air inlet
- 4 Earth terminal
- 5 Flow sensor
- 6 Mounting bracket
- 7 Shut-off valve with pressure sensor and pressure gauge
- 8 Pneumatic port 2: Compressed air outlet
- 9 Proportional-pressure regulator
- 10 System supply
- 11 Connection for electrical inputs/outputs
- 12 CPX extension connection row 1 (MSE6-C2M-...-M only)

MSE6-D2M

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The main components of the product are: flow sensor and shut-off valve with pressure sensor. It has a CPX extension connection row 2 for connection to a decentralised, separate fieldbus node with CPX extension connection row 1, e.g. MSE6-C2M-...-M or CPX terminal.

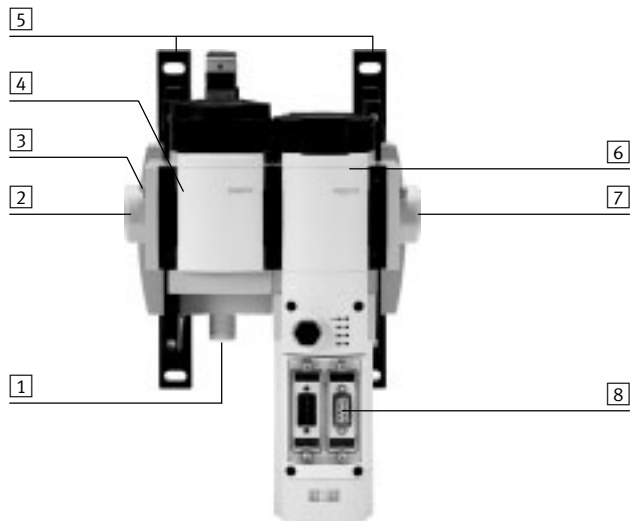


- 1 Pneumatic port 1: Compressed air inlet
- 2 Earth terminal
- 3 Flow sensor
- 4 Mounting bracket
- 5 Shut-off valve with pressure sensor and pressure gauge
- 6 Pneumatic port 2: Compressed air outlet
- 7 CPX extension connection row 2

MSE6-E2M

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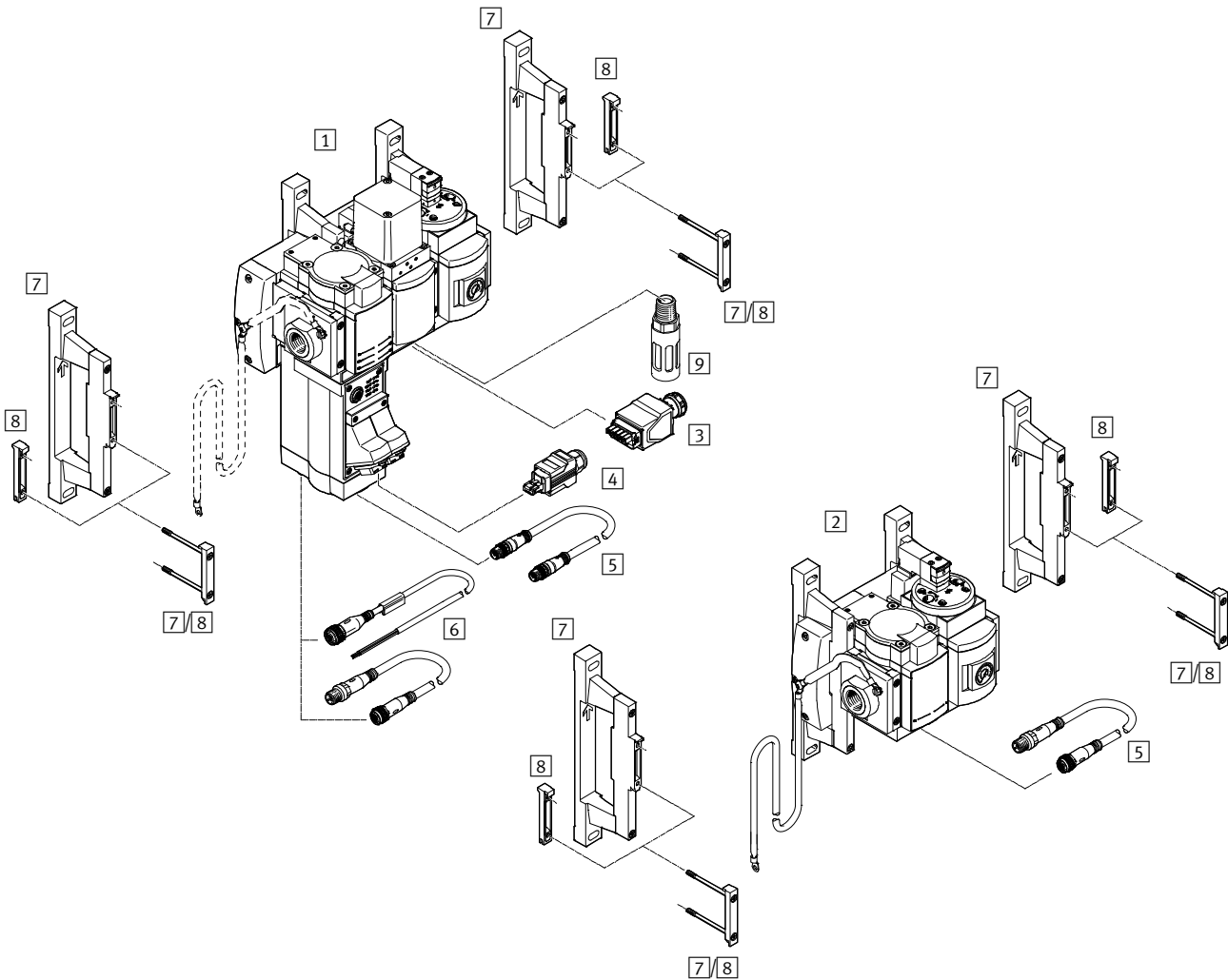
The main components of the MSE6-E2M are: shut-off valve, flow sensor, pressure sensor and bus node. The fieldbus interface allows connection to a higher-order controller, e.g. a system or machine controller.



- 1 System supply
- 2 Pneumatic port 1: Compressed air inlet
- 3 Earth terminal
- 4 Shut-off valve for enabling and shutting off the system supply air
- 5 Mounting bracket
- 6 Sensor module for measuring pressure, flow rate and consumption
- 7 Pneumatic port 2: Compressed air outlet
- 8 Fieldbus interface

Energy efficiency modules MSE6-C2M/D2M, MSE series

Peripherals overview



Accessories		→ Page/Internet	
1	Energy efficiency module MSE6-C2M	8	
2	Energy efficiency module MSE6-D2M	14	
3	Power supply socket NECU-M-PP	For system supply	30
4	Plug FBS-RJ45	For fieldbus node FB34 for PROFINET IO	30
5	Connecting cable NEBC-F12G8	For CPX extension (MSE6-C2M-...-M only)	30
6	Connecting cable NEBU-M12	For electrical inputs/outputs	31
7	Wall mounting SET MS6-WPG	For same wall gap for combining series MS6 and MSE6	31
8	Module connector MS6-MV-EX	For connecting modules	31
9	Silencer U	For noise reduction	31

Energy efficiency modules MSE6-C2M/D2M, MSE series

Type codes

MSE 6 - C2M - 5000 - FB34 - D - M - RG - BAR - AMI - AGD

Series

MSE	Modular standard, electric
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Size

6	Grid dimension 62 mm
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Function

C2M	Energy efficiency module
D2M	Energy efficiency module

Flow measuring range

5000	5000 l/min
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Electrical actuation

CBUS	Internal electrical activation
FB34	Fieldbus node for PROFINET IO with RJ45 port

Electrical inputs/outputs

	No digital inputs/outputs
D	2 digital inputs, 2 digital outputs

Electrical system extension

	No CPX extension connection
M	CPX extension connection row 1 (master)
S	CPX extension connection row 2 (slave)

Measured value display

RG	Integrated pressure gauge with red/green scale
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Pressure gauge scale

BAR	bar
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Electrical connection

AMI	Operating voltage plug push-pull, AIDA
VCB	Power supply via C-bus

Pneumatic connection

AGD	Connecting plate G ¹ / ₂
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Energy efficiency modules MSE6-C2M, MSE series

Technical data – Fieldbus node FB34 for PROFINET IO

MSE6-C2M...-FB34

Consisting of

- Fieldbus node for PROFINET IO
- Flow sensor
- Proportional-pressure regulator
- Shut-off valve with pressure sensor and pressure gauge
- CPX extension connection row 1 (master)
- Electrical inputs/outputs

-  - Operating pressure
5 ... 11 bar
-  - Temperature range
0 ... +50 °C



Key features

The MSE6-C2M is an intelligent combination of proportional-pressure regulator, on/off valve, sensors and fieldbus communication. It monitors the flow rate and, when production is not taking place, it automatically shuts off after a defined idle time. At the same time, it prevents the system pressure from falling below a defined standby pressure level. The lower pressure

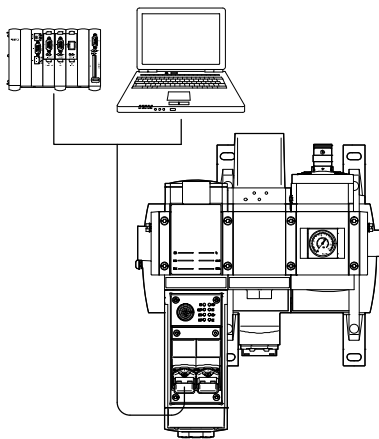
level saves energy, without completely depressurising the system. This results in energy savings without affecting the availability of the machine/system.

The MSE6-C2M can automatically detect leakages occurring over time and reports these to a controller. It can be fully integrated into the machine network via PROFINET IO. All measured

values (pressure, flow rate, consumption, system parameters) are available in the PLC/cloud and can be displayed or individually further processed. The PLC can also be used to activate the two integrated digital inputs and outputs. Via the CPX extension (MSE6-C2M...-M only), there is the option of connecting a MSE6-D2M or CPX IO modules.

-  - Note

Pressure zones that may not be shut off or reduced must be branched off upstream of the MSE6-C2M. A signal from the PLC is required for a restart after shut-down or standby. There is no automatic restart for safety reasons.



- Adjustable, regulated output pressure
- Automatic detection of system downtime using flow measurement
- Automatic pressure reduction without exhausting the system by regulating the standby pressure during downtimes
- Leakage detection by evaluating the pressure drop in standby operation

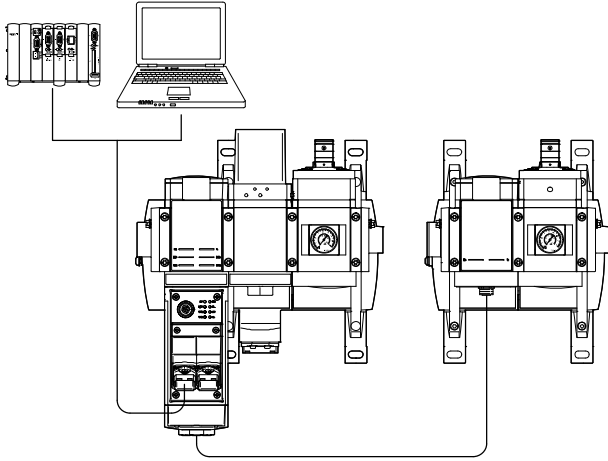
- Adjustable pressure up-rate limit
- Digital inputs/outputs
- Direct activation/integration of 2 digital inputs (2DI) and 2 digital outputs (2DO), e.g. for valve actuation or for the sensors
- Can be extended within the CPX system via CPX extensions

Energy efficiency modules MSE6-C2M, MSE series

Technical data – Fieldbus node FB34 for PROFINET IO

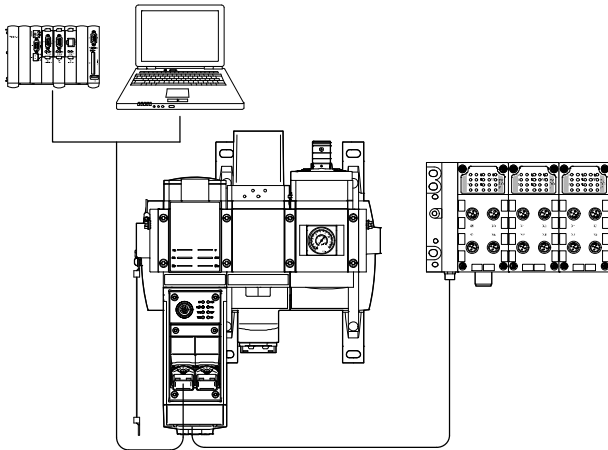
CPX extension

Extension with MSE6-D2M



- Energy efficiency function for two separate compressed air systems
- Leakage detection
- Connection to MSE6-C2M-...-M with CPX extension
- Only one fieldbus connection required
- Process monitoring
- Integrated pressure, flow rate and consumption measurement
- Fieldbus-controlled pressure regulation with automatic standby pressure reduction (MSE6-C2M only)
- Direct activation/integration of 2 digital inputs (2DI) and 2 digital outputs (2DO), e.g. for valve actuation or for the sensors (MSE6-C2M only)

Extension with up to 3 CPX IO modules



- Optional integration of additional digital/analogue inputs/outputs with CPX IO modules (up to 3 modules). The following electronics modules are supported → See following table
- Energy efficiency function with pressure regulation
- Leakage detection
- Only one fieldbus connection required
- Process monitoring with leakage detection
- Integrated pressure, flow rate and consumption measurement
- Fieldbus-controlled pressure regulation with automatic standby pressure reduction
- Direct activation/integration of 2 digital inputs (2DI) and 2 digital outputs (2DO), e.g. for valve actuation or for the sensors

Note

A CPX IO module consists of the electronics module, an interlinking block and a connection block. There are several selected options available. The possible combinations of these modules as well as information and ordering data for additional accessories (end plate with CPX extension, tie rod and mounting accessories) can be found in the CPX documentation.

→ Internet: cpx

Electronics modules

Description	Part no.	Type
Input modules, digital		
4 digital inputs, 24 V DC, PNP	195752	CPX-4DE
8 digital inputs, 24 V DC, PNP	195750	CPX-8DE
Output modules, digital		
4 digital outputs, 24 V DC, 1.0 A, PNP	195754	CPX-4DA
8 digital outputs, 24 V DC, 0.5 A, PNP	541482	CPX-8DA
Input/output modules, digital		
8 digital inputs, 8 digital outputs, 0.25 A, PNP	526257	CPX-8DE-8DA
Analogue modules		
4 analogue current and voltage inputs: ±10 V, ±5 V, 0 ... 10 V, 1 ... 5 V, ±20 mA, 0 ... 20 mA, 4 ... 20 mA	573710	CPX-4AE-U-I
2 analogue current and voltage outputs: 0 ... 10 V, 0 ... 20 mA, 4 ... 20 mA	526170	CPX-2AA-U-I

Energy efficiency modules MSE6-C2M, MSE series

Technical data – Fieldbus node FB34 for PROFINET IO

General technical data	
Pneumatic port 1, 2	G $\frac{1}{2}$ (connecting plate)
Mounting position	Horizontal $\pm 5^\circ$
Flow direction	Unidirectional P1 \rightarrow P2
Valve function	2/2-way shut-off valve, open, monostable
Pressure regulation range [bar]	2.5 ... 10
Max. pressure hysteresis [bar]	0.3
Reset method	Mechanical

Electrical data	
System supply	
Electrical connection	5-pin, push-pull, AIDA
Operating voltage range for load voltage [V DC]	21.6 ... 28.8
Operating voltage range for electronics/sensors [V DC]	18 ... 30
Current consumption for actuator technology [mA]	Max. 260 ¹⁾ when valve is supplied with current and electric pressure regulation is active
Current consumption for electronics/sensors at 24 V [mA]	Max. 370 ²⁾
Reverse polarity protection	For operating voltage connections
Degree of protection	IP65 with plug socket
Duty cycle [%]	100
Inputs/outputs	
No. of inputs/outputs	2
Switching logic inputs/outputs	PNP (positive switching)
Load capacity per output [A]	Max. 1 (12 W lamp load) in compliance with the permitted total current from both outputs of max. 1 A
Fieldbus connection	
Fieldbus interface	2x RJ45 push-pull socket, AIDA

- 1) Plus max. 1000 mA (max. load current for electrical outputs)
 2) Plus max. 1000 mA (max. available sensor supply current at electrical inputs)

Standard nominal flow rate $q_{nN}^{1)}$	
Pneumatic connection	G $\frac{1}{2}$
In main direction of flow [l/min] 1 \rightarrow 2	7000

- 1) Measured at $p_1 = 10$ bar and $p_2 = 6$ bar, $\Delta p = 1$ bar

Energy efficiency modules MSE6-C2M, MSE series

Technical data – Fieldbus node FB34 for PROFINET IO

Operating and environmental conditions		
Operating pressure	[bar]	5 ... 11
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating/ pilot medium		Lubricated operation not possible
Ambient temperature	[°C]	0 ... +50
Temperature of medium	[°C]	0 ... +50
Storage temperature	[°C]	-10 ... +60
Corrosion resistance class CRC ¹⁾		2
CE mark (see declaration of conformity)		To EU EMC Directive ²⁾
Certification		RCM compliance mark

1) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → Certificates.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Display/operation		
Flow measurement		
Flow measuring range start value	[l/min]	50
Flow measuring range end value	[l/min]	5000
Accuracy of flow rate		+/- (3% of measured value + 0.3% FS) ¹⁾
Displayable unit(s)		l/min (preset)
		scfm
Pressure measurement		
Pressure measuring range start value	[bar]	0
Pressure measuring range end value	[bar]	14
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)		mbar (preset)
		kPa
		psi
Consumption measurement		
Displayable unit(s)		l (preset)
		m ³
		scf

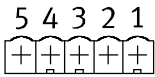
1) % FS = % of measuring range end value (full scale)

Weight		
Product weight	[g]	4550

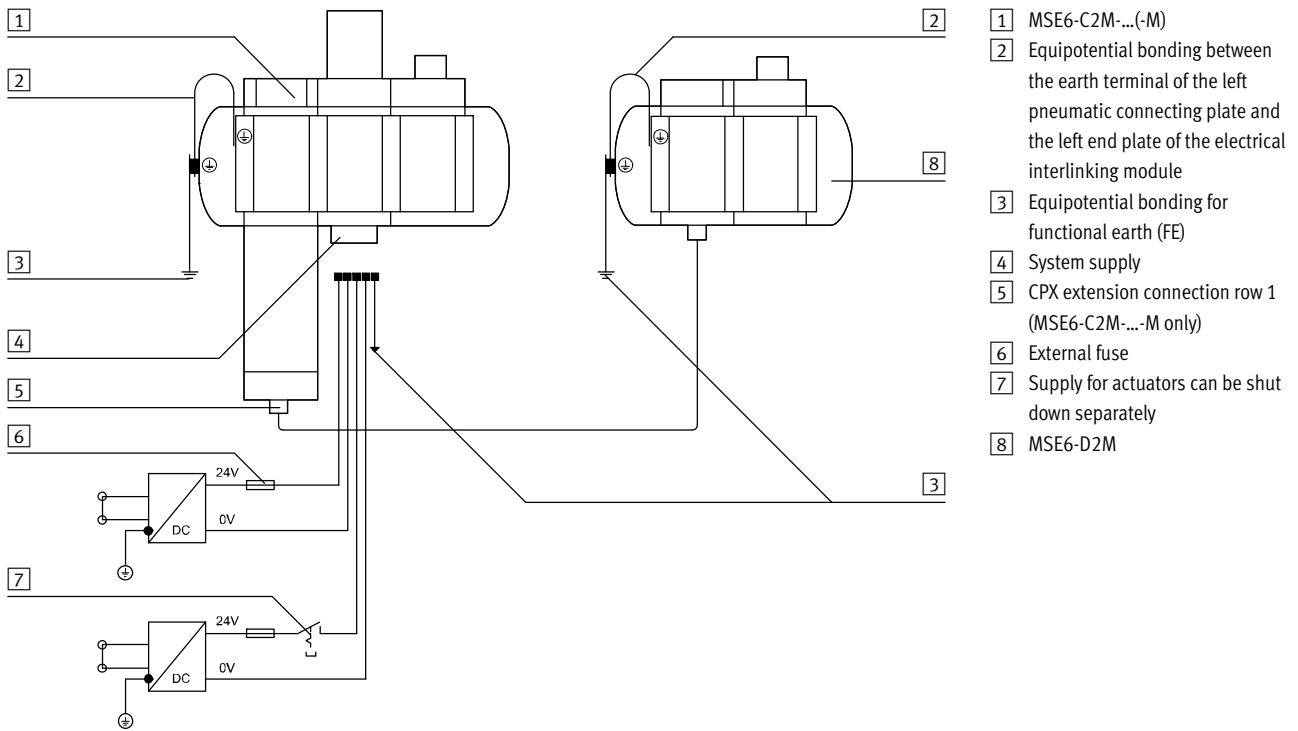
Materials	
Housing	Die-cast aluminium
Cap	Reinforced PA
Cover	Reinforced PA
Seals	NBR

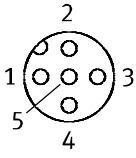
Energy efficiency modules MSE6-C2M, MSE series

Technical data – Fieldbus node FB34 for PROFINET IO

Pin allocation, system supply			
RI45 push-pull socket, AIDA	Pin	Function	
	1	24 V DC	Operating voltage supply for electronics/sensors $U_{EL/SEN}$
	2	0 V	Operating voltage for electronics/sensors $U_{EL/SEN}$
	3	24 V DC	Load voltage supply for actuators $U_{OUT/A}$
	4	0 V	Load voltage for actuators $U_{OUT/A}$
	5	FE	Functional earth

Electrical connection example



Pin allocation for inputs/outputs			
Plug M12x1, 5-pin	Pin	Function	
	Electrical inputs		
	1	24 V DC	Supply voltage
	2	Input-1	Input 1
	3	0 V	Load
	4	Input-0	Input 0
	5	FE	Functional earth
	Electrical outputs		
	1	–	Not assigned
	2	Output-1	Output 1
	3	0 V	Load
4	Output-0	Output 0	
5	FE	Functional earth	

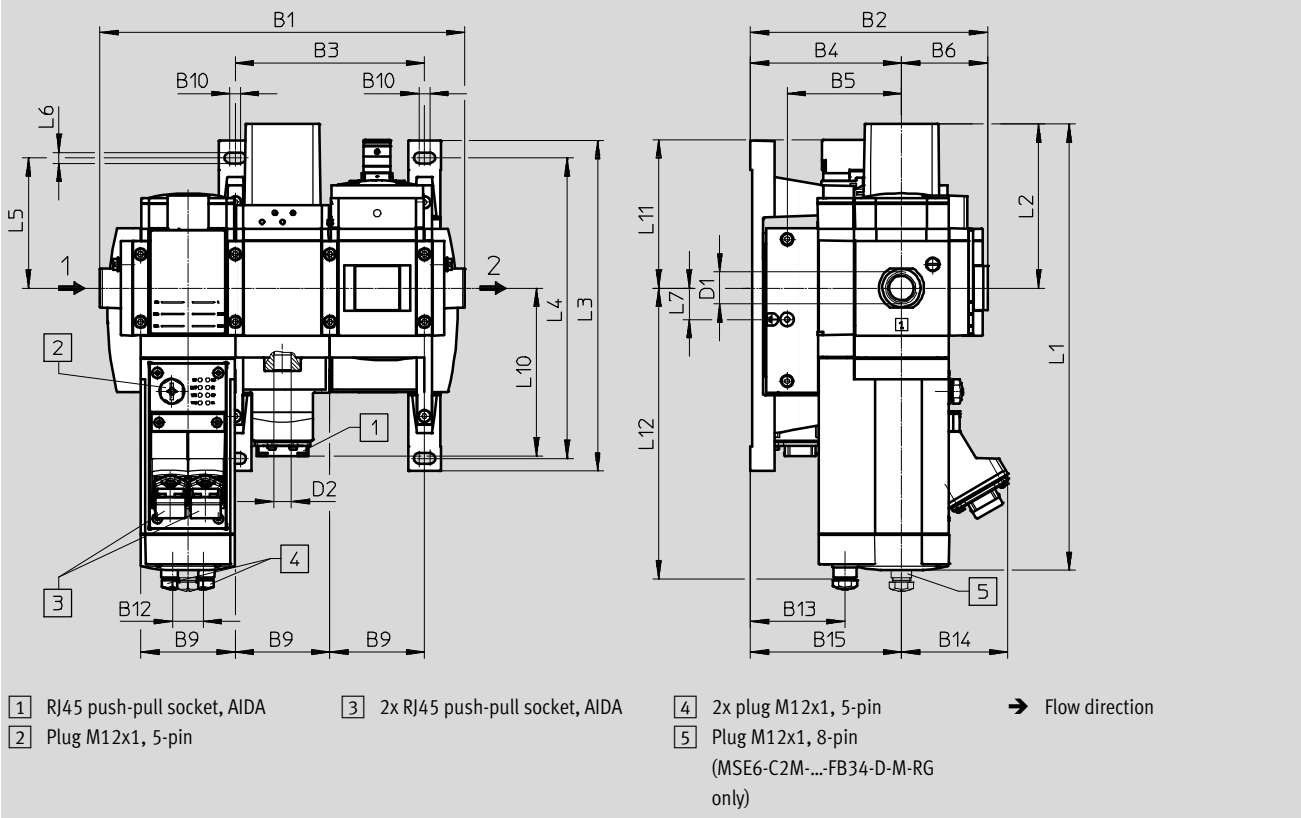
Energy efficiency modules MSE6-C2M, MSE series

Technical data – Fieldbus node FB34 for PROFINET IO

Dimensions

Download CAD data → www.festo.com

Fieldbus node FB34 for PROFINET IO with RJ45 port



Type	B1	B2	B3	B4	B5	B6	B9	B10	B12	B13	B14	B15
MSE6-C2M-...-FB34-D-RG	239	155.5	124	99	74.9	56.5	62	7	20	62	69.2	-
MSE6-C2M-...-FB34-D-M-RG												99

Type	D1	D2	L1	L2	L3	L4	L5	L6	L7	L10	L11	L12
MSE6-C2M-...-FB34-D-RG	G½	G¼	292.4	107.5	216.6	196.9	85.3	7	20.6	110	97.2	190.4
MSE6-C2M-...-FB34-D-M-RG												

Ordering data

Size	Pneumatic connection	Electric actuation	Part no.	Type
MSE6	G½	Fieldbus node FB34 for PROFINET IO with RJ45 port	8085455	MSE6-C2M-5000-FB34-D-RG-BAR-AMI-AGD
With CPX extension				
MSE6	G½	Fieldbus node FB34 for PROFINET IO with RJ45 port	8085454	MSE6-C2M-5000-FB34-D-M-RG-BAR-AMI-AGD



Energy efficiency modules MSE6-D2M, MSE series

Technical data

MSE6-D2M

Consisting of

- Flow sensor
- Shut-off valve with pressure sensor and pressure gauge
- CPX extension connection row 2 (slave)

-  - Operating pressure
3.5 ... 13 bar
-  - Temperature range
0 ... +50 °C




Key features

The energy efficiency module MSE6-D2M automates energy saving in compressed air systems. The intelligent module fully automatic monitors the compressed air supply.

These functions are integrated into the new MSE6-D2M: automatic shut-off of the compressed air supply during breaks in production, leakage

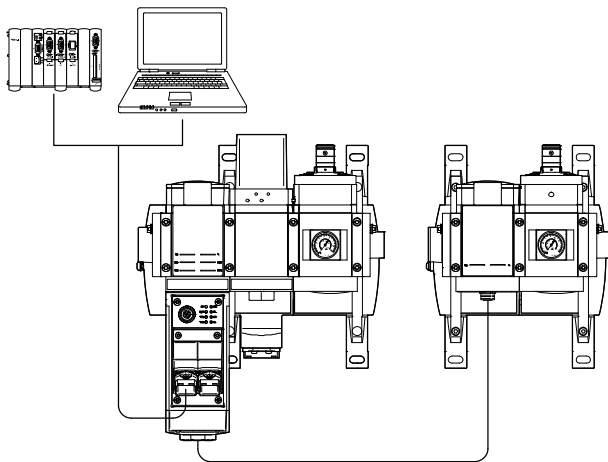
detection and process data acquisition for condition monitoring. All these functions are integrated into the new MSE6-D2M. This provides a cost-effective way of implementing energy efficiency and monitoring functions without additional fieldbus nodes. After shut-off, the MSE6-D2M can automatically detect leakages

occurring over time and reports these. It can be fully integrated into the machine network via the fieldbus node of the MSE6-C2M-...-M or CPX terminal. All measured values (pressure, flow rate, system parameters, ...) are available in the PLC/cloud and can be displayed or individually further processed.

-  - Note
The MSE6-D2M cannot be connected directly to and operated using a controller. It must be connected as an extension to the MSE6-C2M-...-M or to a CPX terminal with CPX extension.

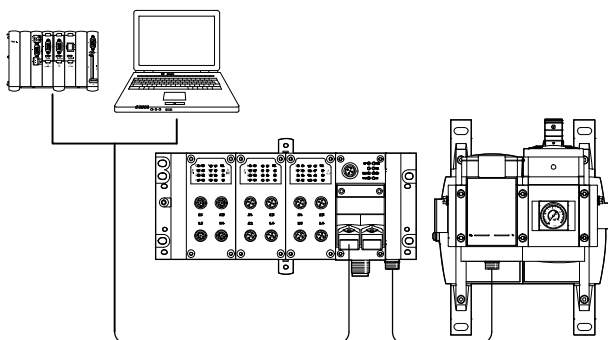
CPX extension

Extension to the MSE6-C2M-...-M



- Energy efficiency function for two separate compressed air systems
- Leakage detection
- Connection to MSE6-C2M-...-M with CPX extension
- Only one fieldbus connection required
- Process monitoring
- Integrated pressure and flow rate measurement
- Fieldbus-controlled pressure regulation with automatic standby pressure reduction (MSE6-C2M only)
- Direct activation/integration of 2 digital inputs (2DI) and 2 digital outputs (2DO), e.g. for valve actuation or for the sensors (MSE6-C2M only)

Extension to the CPX terminal



- Energy efficiency function
- Leakage detection
- Connection to CPX terminal with CPX extension (note CPX system limits!)
- Cost-efficient solution with just one fieldbus node
- Process monitoring with leakage detection
- Integrated pressure and flow rate measurement
- Automatic detection of end of production and shut-off of compressed air supply

Energy efficiency modules MSE6-D2M, MSE series

Technical data

General technical data	
Pneumatic port 1, 2	G $\frac{1}{2}$ (connecting plate)
Mounting position	Horizontal $\pm 5^\circ$
Flow direction	Unidirectional P1 \rightarrow P2
Valve function	2/2-way shut-off valve, open, monostable
Reset method	Mechanical

Electrical data	
Operating voltage range for load voltage ¹⁾	[V DC] 18 ... 28.8
Operating voltage range for electronics/sensors ¹⁾	[V DC] 18 ... 30
Current consumption for actuator technology	[mA] Max. 100 when valve is supplied with current
Current consumption for electronics/sensors at 24 V	[mA] Max. 250
Reverse polarity protection	For operating voltage connections
Degree of protection	IP65 with plug socket
Duty cycle	[%] 100

1) Supply via CPX extension

Standard nominal flow rate q_{nN} ¹⁾	
Pneumatic connection	G $\frac{1}{2}$
In main direction of flow 1 \rightarrow 2	[l/min] 4500

1) Measured at $p_1 = 6$ bar and $p_2 = 5$ bar, $\Delta p = 1$ bar

Operating and environmental conditions	
Operating pressure	[bar] 3.5 ... 13
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium	Lubricated operation not possible
Ambient temperature	[°C] 0 ... +50
Temperature of medium	[°C] 0 ... +50
Storage temperature	[°C] -10 ... +60
Corrosion resistance class CRC ¹⁾	2
CE mark (see declaration of conformity)	To EU EMC Directive ²⁾
Certification	RCM compliance mark

- 1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
- 2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp \rightarrow Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Energy efficiency modules MSE6-D2M, MSE series

Technical data

Display/operation		
Flow measurement		
Flow measuring range start value	[l/min]	50
Flow measuring range end value	[l/min]	5000
Accuracy of flow rate		+/- (3% of measured value + 0.3% FS) ¹⁾
Displayable unit(s)		l/min (preset)
		scfm
Pressure measurement		
Pressure measuring range start value	[bar]	0
Pressure measuring range end value	[bar]	14
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)		mbar (preset)
		kPa
		psi
Consumption measurement		
Displayable unit(s)		l (preset)
		m ³
		scf

1) % FS = % of measuring range end value (full scale)

Weight		
Product weight	[g]	2700

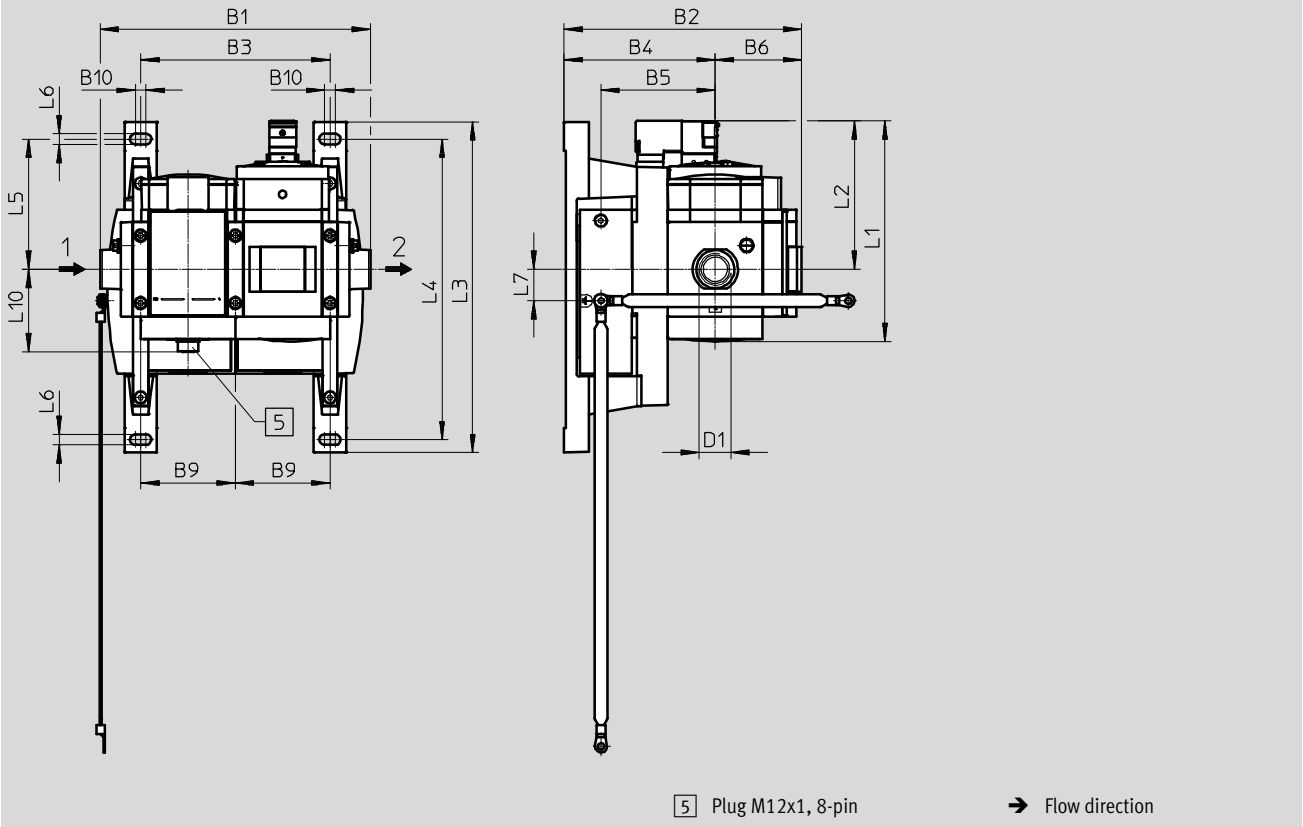
Materials	
Housing	Die-cast aluminium
Cap	Reinforced PA
Cover	Reinforced PA
Seals	NBR

Energy efficiency modules MSE6-D2M, MSE series

Technical data

Dimensions

Download CAD data → www.festo.com



Type	B1	B2	B3	B4	B5	B6	B9	B10
MSE6-D2M-...-CBUS-S-RG	177	155.5	124	99	74.9	56.5	62	7

Type	D1	L1	L2	L3	L4	L5	L6	L7	L10
MSE6-D2M-...-CBUS-S-RG	G½	144.6	97.3	216.6	196.9	85.3	7	20.6	54.1

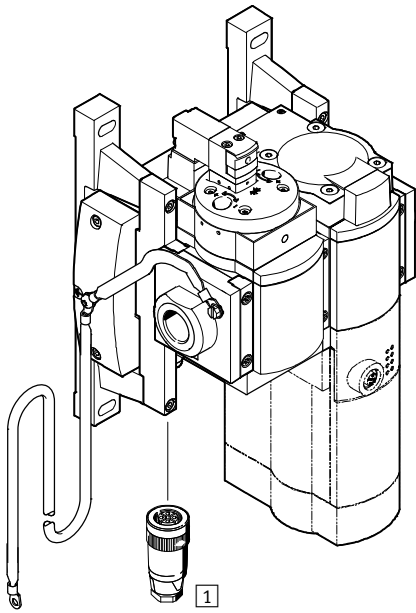
Ordering data

Size	Pneumatic connection	Electrical actuation	Part no.	Type
With CPX extension row 2				
MSE6	G½	Internal electrical actuation	8085453	MSE6-D2M-5000-CBUS-S-RG-BAR-VCB-AGD

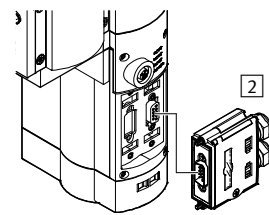
Service unit combinations MSE6-E2M, MSE series

Peripherals overview

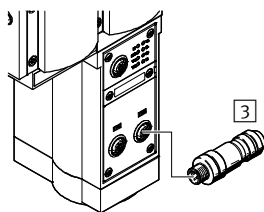
Peripherals overview



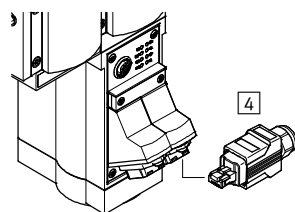
Fieldbus node FB13 for PROFIBUS DP



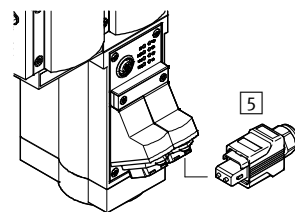
Fieldbus node FB33 for PROFINET IO with M12 port



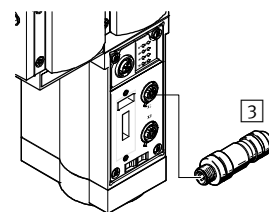
Fieldbus node FB34 for PROFINET IO with RJ45 port



Fieldbus node FB35 for PROFINET IO with SCRJ port



Fieldbus node FB36 for Ethernet/IP, fieldbus node FB37 for EtherCAT



Accessories		→ Page/Internet
1	Plug socket NTSD For system supply	30
2	Plug FBS-SUB-9 For fieldbus node FB13 for PROFIBUS DP	30
3	Plug NECU-M-S-D12G4 For fieldbus node FB33 for PROFINET IO, fieldbus node FB36 for Ethernet/IP, fieldbus node FB37 for EtherCAT	30
4	Plug FBS-RJ45 For fieldbus node FB34 for PROFINET IO	30
5	Plug FBS-SCRJ For fieldbus node FB35 for PROFINET IO	30
-	Wall mounting SET MS6-WPG For same wall gap for combining series MS6 and MSE6	31
-	Module connector MS6-MV-EX For connecting modules	31

Service unit combinations MSE6-E2M, MSE series

Type code

MSE 6 - E2M - 5000 - FB34 - AGD

Series

MSE	Modular standard, electric
-----	----------------------------

Size

6	Grid dimension 62 mm
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Function

E2M	Energy efficiency module
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Flow measuring range

5000	5000 l/min
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Electrical actuation

FB13	Fieldbus node for PROFIBUS DP
FB33	Fieldbus node for PROFINET IO with M12 port
FB34	Fieldbus node for PROFINET IO with RJ45 port
FB35	Fieldbus node for PROFINET IO with SCRJ port
FB36	Fieldbus node for Ethernet/IP
FB37	Fieldbus node for EtherCAT

Pneumatic connection

AGD	Connecting plate G1/2
-----	-----------------------

Service unit combinations MSE6-E2M, MSE series


FESTO


Technical data – Fieldbus node FB13 for PROFIBUS DP

MSE6-E2M-...-FB13

Consisting of

- Energy efficiency module
 - 2/2-way shut-off valve, open, monostable
 - Flow sensor
 - Pressure sensor for output pressure
 - Control unit for processing measuring data, activating valves and controlling energy efficiency functions
- Fieldbus node for PROFIBUS DP

 - Operating pressure
4 ... 10 bar

 - Temperature range
0 ... +50 °C



General technical data	
Pneumatic port 1, 2	G $\frac{1}{2}$ (connecting plate)
Mounting position	Horizontal $\pm 5^\circ$
Flow direction	Unidirectional P1 \rightarrow P2
Valve function	2/2-way shut-off valve, open, monostable
Reset method	Mechanical

Electrical data	
System supply	
Electrical connection	Plug M18x1, 4-pin
Operating voltage range for load voltage [V DC]	18 ... 26.4
Operating voltage range for electronics/sensors [V DC]	18 ... 30
Current consumption for actuator technology [mA]	Max. 100 when valve is supplied with current
Current consumption for electronics/sensors at 24 V [mA]	Max. 300
Reverse polarity protection	For operating voltage connections
Degree of protection	IP65 with plug socket
Duty cycle [%]	100
Fieldbus connection	
Fieldbus interface	Sub-D socket, 9-pin

Standard nominal flow rate $q_{nN}^{1)}$	
Pneumatic connection	G $\frac{1}{2}$
In main direction of flow 1 \rightarrow 2 [l/min]	4500

1) Measured at $p_1 = 6$ bar and $p_2 = 5$ bar, $\Delta p = 1$ bar

Service unit combinations MSE6-E2M, MSE series

Technical data – Fieldbus node FB13 for PROFIBUS DP

Operating and environmental conditions		
Operating pressure	[bar]	4 ... 10
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating/ pilot medium		Lubricated operation not possible
Ambient temperature	[°C]	0 ... +50
Temperature of medium	[°C]	0 ... +50
Storage temperature	[°C]	-10 ... +60
Corrosion resistance class CRC ¹⁾		2
CE mark (see declaration of conformity)		To EU EMC Directive ²⁾
Certification		RCM compliance mark

1) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → Certificates.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Display/operation		
Flow measurement		
Flow measuring range start value	[l/min]	50
Flow measuring range end value	[l/min]	5000
Accuracy of flow rate		+/- (3% of measured value + 0.3% FS) ¹⁾
Displayable unit(s)		l/min (preset)
		scfm
Pressure measurement		
Pressure measuring range start value	[bar]	0
Pressure measuring range end value	[bar]	14
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)		mbar (preset)
		kPa
		psi
Consumption measurement		
Displayable unit(s)		l (preset)
		m ³
		scf

1) % FS = % of measuring range end value (full scale)

Weight		
Product weight	[g]	3300

Materials	
Housing	Die-cast aluminium
Cap	Reinforced PA
Cover	Reinforced PA
Seals	NBR

Service unit combinations MSE6-E2M, MSE series



Technical data – Fieldbus node FB13 for PROFIBUS DP

Pin allocation, system supply		
Plug M18x1, 4-pin	Pin	Meaning
	1	Operating voltage for electronics/sensors +24 V DC
	2	Operating voltage for actuator technology +24 V DC
	3	0 V
	4	Functional earth

Dimensions Download CAD data → www.festo.com

1 Plug M18x1, 4-pin
2 M12x1 socket, 5-pin
3 Sub-D socket, 9-pin

→ Flow direction

Type	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
MSE6-E2M-...-FB13	178	150	124	99	75	45	100	55	62	7

Type	D1	L1	L2	L3	L4	L5	L6	L7	L8
MSE6-E2M-...-FB13	G½	285	98	217	197	86	7	21	292

Ordering data				
Size	Pneumatic connection	Electrical actuation	Part no.	Type
MSE6	G½	Fieldbus node FB13 for PROFIBUS DP	2465321	MSE6-E2M-5000-FB13-AGD



Service unit combinations MSE6-E2M, MSE series

Technical data – Fieldbus node FB33/FB34/FB35 for PROFINET IO

MSE6-E2M-...-FB33/FB34/FB35

Consisting of

- Energy efficiency module
 - 2/2-way shut-off valve, open, monostable
 - Flow sensor
 - Pressure sensor for output pressure
 - Control unit for processing measuring data, activating valves and controlling energy efficiency functions
- Fieldbus node for PROFINET IO

-  - Operating pressure
4 ... 10 bar
-  - Temperature range
0 ... +50 °C



General technical data	
Pneumatic port 1, 2	G $\frac{1}{2}$ (connecting plate)
Mounting position	Horizontal $\pm 5^\circ$
Flow direction	Unidirectional P1 \rightarrow P2
Valve function	2/2-way shut-off valve, open, monostable
Reset method	Mechanical

Electrical data			
Type	MSE6-E2M-...-FB33	MSE6-E2M-...-FB34	MSE6-E2M-...-FB35
System supply			
Electrical connection	Plug M18x1, 4-pin		
Operating voltage range for load voltage [V DC]	18 ... 26.4		
Operating voltage range for electronics/sensors [V DC]	18 ... 30		
Current consumption for actuator technology [mA]	Max. 100 when valve is supplied with current		
Current consumption for electronics/sensors at 24 V [mA]	Max. 320	Max. 320	Max. 400
Reverse polarity protection	For operating voltage connections		
Degree of protection	IP65 with plug socket		
Duty cycle [%]	100		
Fieldbus connection			
Fieldbus interface	2x M12x1 socket, 4-pin, D-coded	2x RJ45 push-pull socket, AIDA	2x SCRJ push-pull socket, AIDA

Standard nominal flow rate $q_{nN}^{1)}$	
Pneumatic connection	G $\frac{1}{2}$
In main direction of flow 1 \rightarrow 2 [l/min]	4500

1) Measured at $p_1 = 6$ bar and $p_2 = 5$ bar, $\Delta p = 1$ bar

Service unit combinations MSE6-E2M, MSE series



Technical data – Fieldbus node FB33/FB34/FB35 for PROFINET IO

Operating and environmental conditions		
Operating pressure	[bar]	4 ... 10
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating/ pilot medium		Lubricated operation not possible
Ambient temperature	[°C]	0 ... +50
Temperature of medium	[°C]	0 ... +50
Storage temperature	[°C]	-10 ... +60
Corrosion resistance class CRC ¹⁾		2
CE mark (see declaration of conformity)		To EU EMC Directive ²⁾
Certification		RCM compliance mark

1) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → Certificates.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Display/operation		
Flow measurement		
Flow measuring range start value	[l/min]	50
Flow measuring range end value	[l/min]	5000
Accuracy of flow rate		+/- (3% of measured value + 0.3% FS) ¹⁾
Displayable unit(s)		l/min (preset)
		scfm
Pressure measurement		
Pressure measuring range start value	[bar]	0
Pressure measuring range end value	[bar]	14
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)		mbar (preset)
		kPa
		psi
Consumption measurement		
Displayable unit(s)		l (preset)
		m ³
		scf

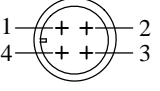
1) % FS = % of measuring range end value (full scale)

Weight			
Type	MSE6-E2M-...-FB33	MSE6-E2M-...-FB34	MSE6-E2M-...-FB35
Product weight	[g]	3350	3450

Materials	
Housing	Die-cast aluminium
Cap	Reinforced PA
Cover	Reinforced PA
Seals	NBR

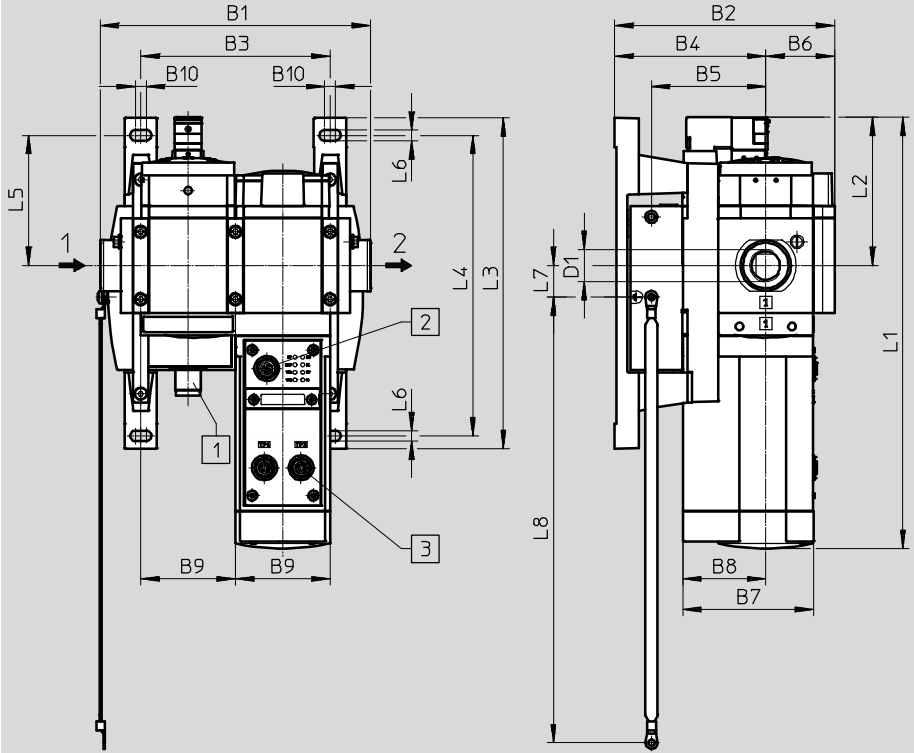
Service unit combinations MSE6-E2M, MSE series

Technical data – Fieldbus node FB33/FB34/FB35 for PROFINET IO

Pin allocation, system supply		
Plug M18x1, 4-pin	Pin	Meaning
	1	Operating voltage for electronics/sensors +24 V DC
	2	Operating voltage for actuator technology +24 V DC
	3	0 V
	4	Functional earth

Dimensions Download CAD data → www.festo.com

Fieldbus node FB33 for PROFINET IO with M12 port



- 1 Plug M18x1, 4-pin
- 2 Plug M12x1, 5-pin
- 3 2x M12x1 sockets, 4-pin, D-coded

→ Flow direction

Type	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
MSE6-E2M-...-FB33	178	145	124	99	75	45	86	55	62	7

Type	D1	L1	L2	L3	L4	L5	L6	L7	L8
MSE6-E2M-...-FB33	G½	285	98	217	197	86	7	21	292

Service unit combinations MSE6-E2M, MSE series

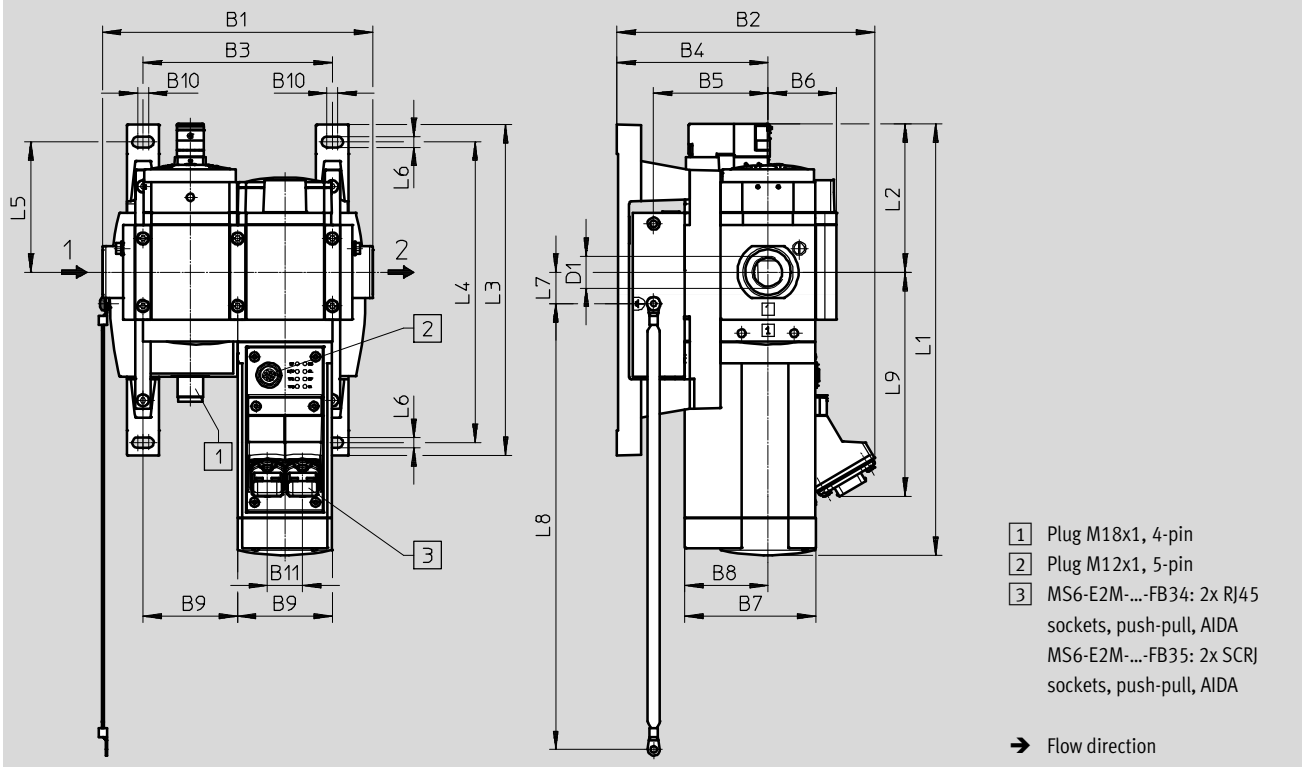
Technical data – Fieldbus node FB33/FB34/FB35 for PROFINET IO



Dimensions

Download CAD data → www.festo.com

Fieldbus node FB34/FB35 for PROFINET IO with RJ45/SCRJ port



Type	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
MSE6-E2M-...-FB34/FB35	178	170	124	99	75	45	86	55	62	7	23

Type	D1	L1	L2	L3	L4	L5	L6	L7	L8	L9
MSE6-E2M-...-FB34/FB35	G½	285	98	217	197	86	7	21	292	147

Ordering data

Size	Pneumatic connection	Electrical actuation	Part no.	Type
MSE6	G½	Fieldbus node FB33 for PROFINET IO with M12 port	3850287	MSE6-E2M-5000-FB33-AGD
		Fieldbus node FB34 for PROFINET IO with RJ45 port	3869585	MSE6-E2M-5000-FB34-AGD
		Fieldbus node FB35 for PROFINET IO with SCRJ port	3870296	MSE6-E2M-5000-FB35-AGD

Service unit combinations MSE6-E2M, MSE series



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Technical data – Fieldbus node FB36 for Ethernet/IP and FB37 for EtherCAT

MSE6-E2M-...-FB36/FB37

Consisting of

- Energy efficiency module
 - 2/2-way shut-off valve, open, monostable
 - Flow sensor
 - Pressure sensor for output pressure
 - Control unit for processing measuring data, activating valves and controlling energy efficiency functions
- Fieldbus node for Ethernet/IP or EtherCAT

-  - Operating pressure
4 ... 10 bar
-  - Temperature range
0 ... +50 °C



General technical data	
Pneumatic port 1, 2	G $\frac{1}{2}$ (connecting plate)
Mounting position	Horizontal $\pm 5^\circ$
Flow direction	Unidirectional P1 \rightarrow P2
Valve function	2/2-way shut-off valve, open, monostable
Reset method	Mechanical

Electrical data	
System supply	
Electrical connection	Plug M18x1, 4-pin
Operating voltage range for load voltage [V DC]	18 ... 26.4
Operating voltage range for electronics/sensors [V DC]	18 ... 30
Current consumption for actuator technology [mA]	Max. 100 when valve is supplied with current
Current consumption for electronics/sensors at 24 V [mA]	Max. 300
Reverse polarity protection	For operating voltage connections
Degree of protection	IP65 with plug socket
Duty cycle [%]	100
Fieldbus connection	
Fieldbus interface	2x M12x1 socket, 4-pin, D-coded

Standard nominal flow rate $q_{nN}^{1)}$	
Pneumatic connection	G $\frac{1}{2}$
In main direction of flow 1 \rightarrow 2 [l/min]	4500

1) Measured at $p_1 = 6$ bar and $p_2 = 5$ bar, $\Delta p = 1$ bar

Service unit combinations MSE6-E2M, MSE series

FESTO

Technical data – Fieldbus node FB36 for Ethernet/IP and FB37 for EtherCAT

Operating and environmental conditions		
Operating pressure	[bar]	4 ... 10
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating/ pilot medium		Lubricated operation not possible
Ambient temperature	[°C]	0 ... +50
Temperature of medium	[°C]	0 ... +50
Storage temperature	[°C]	-10 ... +60
Corrosion resistance class CRC ¹⁾		2
CE mark (see declaration of conformity)		To EU EMC Directive ²⁾
Certification		RCM compliance mark

1) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → Certificates.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Display/operation		
Flow measurement		
Flow measuring range start value	[l/min]	50
Flow measuring range end value	[l/min]	5000
Accuracy of flow rate		+/- (3% of measured value + 0.3% FS) ¹⁾
Displayable unit(s)		l/min (preset)
		scfm
Pressure measurement		
Pressure measuring range start value	[bar]	0
Pressure measuring range end value	[bar]	14
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)		mbar (preset)
		kPa
		psi
Consumption measurement		
Displayable unit(s)		l (preset)
		m ³
		scf

1) % FS = % of measuring range end value (full scale)

Weight		
Product weight	[g]	3300

Materials	
Housing	Die-cast aluminium
Cap	Reinforced PA
Cover	Reinforced PA
Seals	NBR

Service unit combinations MSE6-E2M, MSE series

Technical data – Fieldbus node FB36 for Ethernet/IP and FB37 for EtherCAT

Pin allocation, system supply		
Plug M18x1, 4-pin	Pin	Meaning
	1	Operating voltage for electronics/sensors +24 V DC
	2	Operating voltage for actuator technology +24 V DC
	3	0 V
	4	Functional earth

Dimensions Download CAD data → www.festo.com


- 1 Plug M18x1, 4-pin
- 2 M12x1 socket, 5-pin
- 3 2x M12x1 sockets, 4-pin, D-coded

→ Flow direction

Type	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
MSE6-E2M-...-FB36/FB37	178	145	124	99	75	45	94	55	62	7

Type	D1	L1	L2	L3	L4	L5	L6	L7	L8
MSE6-E2M-...-FB36/FB37	G½	285	98	217	197	86	7	21	292

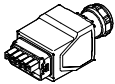
Ordering data				
Size	Pneumatic connection	Electric actuation	Part no.	Type
MSE6	G½	Fieldbus node FB36 for EtherNet/IP	3990296	MSE6-E2M-5000-FB36-AGD
		Fieldbus node FB37 for EtherCAT	3992150	MSE6-E2M-5000-FB37-AGD



 **New**
MSE6-C2M/D2M


Energy efficiency modules MSE6, MSE series


Accessories


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
Ordering data – Power supply socket NECU-M-PP			Technical data → Internet: necu	
Description	Electrical connection		Part no.	Type
 For MSE6-C2M	5-pin, push-pull, connection pattern PP, fulfils requirements to AIDA		5195383	NECU-M-PPG5PP-C1-PN


Ordering data – Plug socket NTSD			Technical data → Internet: ntsd	
Description	Electrical connection		Part no.	Type
 For MSE6-E2M	Straight socket, 4-pin	Screw terminal Pg9, connection cross section 1.5 mm ²	18493	NTSD-GD-9
		Screw terminal Pg13, connection cross section 2.5 mm ²	18526	NTSD-GD-13,5
 For MSE6-E2M	Angled socket, 4-pin	Screw terminal Pg9, connection cross section 1.5 mm ²	18527	NTSD-WD-9

Ordering data – Plug FBS-SUB-9			Technical data → Internet: fbs-sub-9	
Description	Electrical connection		Part no.	Type
 For fieldbus node FB13 for PROFIBUS DP	Plug, 9-pin, Sub-D		532216	FBS-SUB-9-GS-DP-B

Ordering data – Plug NECU-M-S-D12G4			Technical data → Internet: necu	
Description	Electrical connection		Part no.	Type
 For fieldbus node FB33 for PROFINET IO, for fieldbus node FB36 for EtherNet/IP, for fieldbus node FB37 for EtherCAT	Plug M12x1, 4-pin, D-coded		543109	NECU-M-S-D12G4-C2-ET

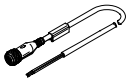

Ordering data – Plug FBS-RJ45			Technical data → Internet: fbs	
Description	Electrical connection		Part no.	Type
 For fieldbus node FB34 for PROFINET IO	Plug RJ45, 8-pin, push-pull		552000	FBS-RJ45-PP-GS

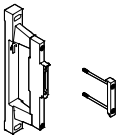
Ordering data – Plug FBS-SCRJ			Technical data → Internet: fbs	
Description	Electrical connection		Part no.	Type
 For fieldbus node FB35 for PROFINET IO	Plug SCRJ, 2-pin, push-pull		571017	FBS-SCRJ-PP-GS


Ordering data – Connecting cable NEBC-F12G8			Technical data → Internet: nebc	
Description	Electrical connection		Part no.	Type
 For MSE6-C2M/D2M	8-pin	0.25 m	564189	NEBC-F12G8-KH-0.25-N-S-F12G8
		0.5 m	564190	NEBC-F12G8-KH-0.5-N-S-F12G8
		1 m	564191	NEBC-F12G8-KH-1-N-S-F12G8
		1.5 m	564192	NEBC-F12G8-KH-1.5-N-S-F12G8
		2 m	576015	NEBC-F12G8-KH-2-N-S-F12G8


Energy efficiency modules MSE6, MSE series

Accessories

Ordering data – Connecting cable NEBU-M12				Technical data → Internet: nebu	
Description		Electrical connection		Part no.	Type
	For MSE6-C2M	Straight socket, 5-pin	Open cable end, 5-wire	2.5 m	541330 NEBU-M12G5-K-2.5-LE5
			5 m	541331 NEBU-M12G5-K-5-LE5	
		Angled socket, 5-pin	Open cable end, 5-wire	2.5 m	567843 NEBU-M12W5-K-2.5-LE5
			5 m	567844 NEBU-M12W5-K-5-LE5	
	For MSE6-C2M	Straight socket, 5-pin	Angled plug, 5-pin	0.5 m	8003617 NEBU-M12G5-K-0.5-M12W5
			2 m	8003618 NEBU-M12G5-K-2-M12W5	
		Angled socket, 5-pin	Angled plug, 5-pin	0.5 m	570733 NEBU-M12W5-K-0.5-M12W5
			2 m	570734 NEBU-M12W5-K-2-M12W5	

Ordering data – Wall mounting SET MS6-WPG			Technical data → Internet: ms6-wpg	
Description			Part no.	Type
	For MSE6-C2M/D2M/E2M	<ul style="list-style-type: none"> • For connecting modules for wall mounting • Same wall gap for combining series MS6 and MSE6 	8072794	MS6-WPG

Ordering data – Module connector MS6-MV-EX			Technical data → Internet: ms6-mv	
Description			Part no.	Type
	For MSE6-C2M/D2M/E2M	<ul style="list-style-type: none"> • For connecting modules 	541543	MS6-MV-EX

Ordering data – Silencers U			Technical data → Internet: u	
Description			Part no.	Type
	For MSE6-C2M	<ul style="list-style-type: none"> • For noise reduction 	6842	U-1/4-B