

Energy efficiency modules MSE6, MSE series

FESTO



Key features

Overview

The products optimise the use of compressed air as an energy medium in industrial automation technology. They are equipped with measurement, control and diagnostic functions and support the 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 per-

manent (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 an MQTT broker, 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 rise 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 preparing 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 bus node EtherNet/IP via integrated bus node EtherCAT via integrated bus node 	<ul style="list-style-type: none"> PROFINET IO, EtherNet/IP or EtherCAT via the bus node of the MSE6-C2M-...-M actuated via a CPX extension or CPX terminal 	<ul style="list-style-type: none"> PROFIBUS DP via integrated bus node EtherNet/IP via integrated bus node EtherCAT via integrated bus node
System extension/integration	CPX extension interface row 1 for connecting a MSE6-D2M or connecting digital and analogue CPX IO modules (MSE6-C2M-...-M only)	CPX extension interface row 2 for connection to a MSE6-C2M-...-M or to a CPX terminal with CPX extension interface row 1	–

Key features

Functions

Standby detection, automatic shut-off and regulation of the 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 reopened 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 the 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 automati-

cally 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 it 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 it 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. The output data helps to switch the consumption measurement on and off and the consumption value can then 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.

Key features

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

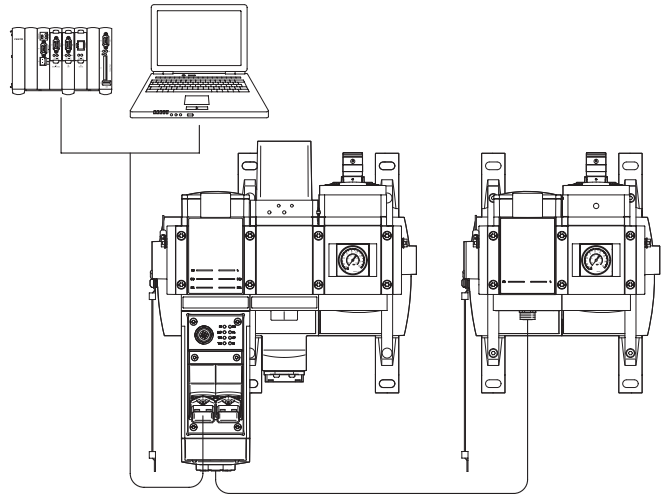
The MSE6-C2M-...-M can be extended with a MSE6-D2M using the CPX extension interface. This combination allows for energy efficiency functions on two separate compressed air systems, actuated via a common bus node.

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 more information, please see the datasheets for these modules on the following pages.

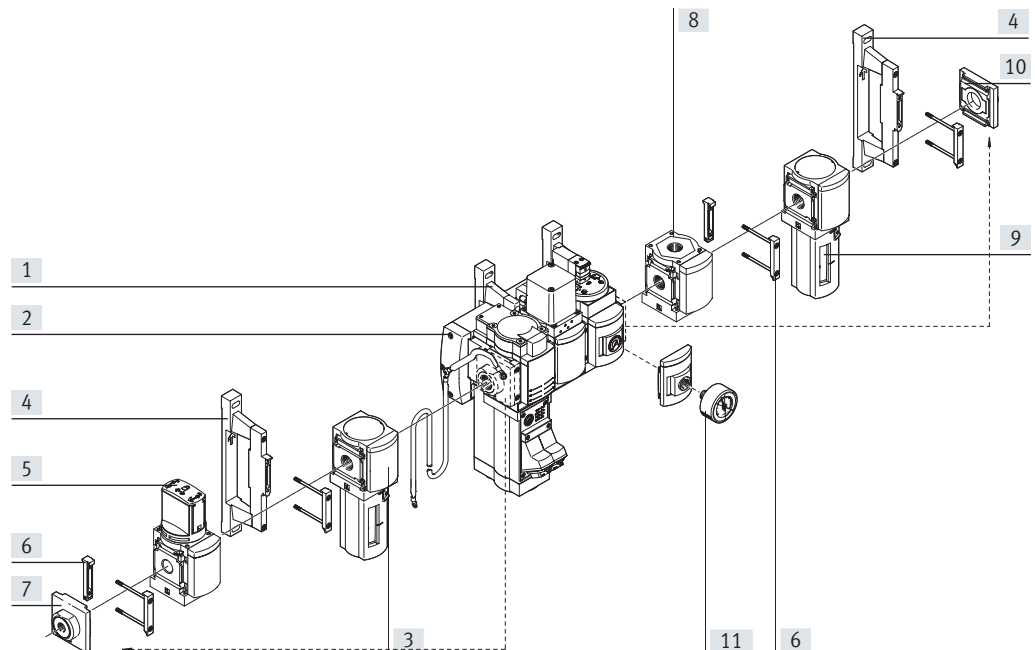


Combination of service unit components from the MS6 and MSE6 series

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 mounting-SET MS6-WPG | [9] Fine filter MS6-LFM |
| | [5] On/off valve MS6-EM1 | [10] Right connecting plate |
| | [6] Module connector MS6-MV-EX | [11] Pressure gauge alternatives |
| | [7] Left connecting plate | |

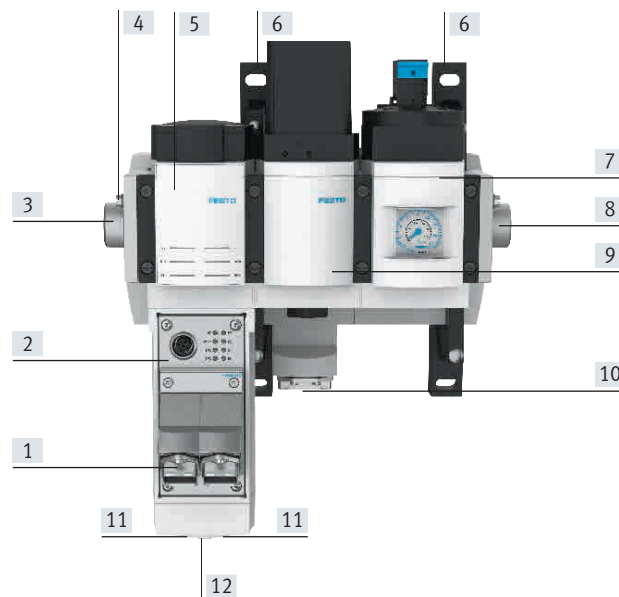
Key features

Configuration

MSE6-C2M

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The main components of the product are: fieldbus node, flow sensor, proportional-pressure regulator and shut-off valve with pressure sensor. The fieldbus interface enables it to be connected 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.

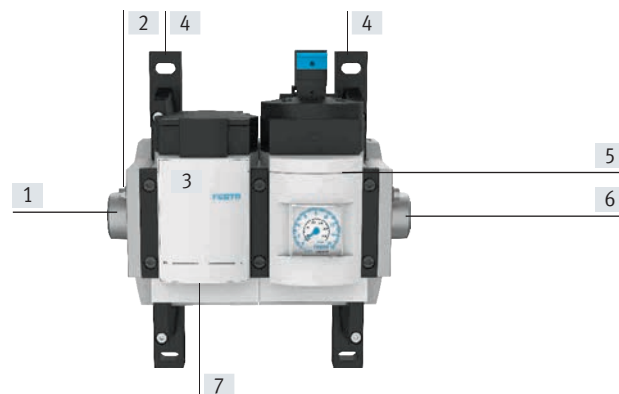


- [1] Fieldbus interface
- [2] Fieldbus node
- [3] Pneumatic connection 1: Compressed air inlet
- [4] Earth connection
- [5] Flow sensor
- [6] Mounting bracket
- [7] Shut-off valve with pressure sensor and pressure gauge
- [8] Pneumatic connection 2: Compressed air outlet
- [9] Proportional pressure 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.

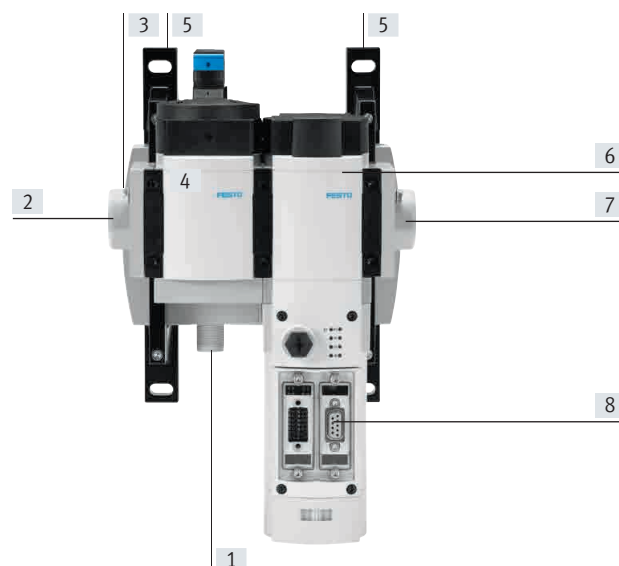


- [1] Pneumatic connection 1: Compressed air inlet
- [2] Earth connection
- [3] Flow sensor
- [4] Mounting bracket
- [5] Shut-off valve with pressure sensor and pressure gauge
- [6] Pneumatic connection 2: Compressed air outlet
- [7] CPX extension connection row 2

MSE6-E2M

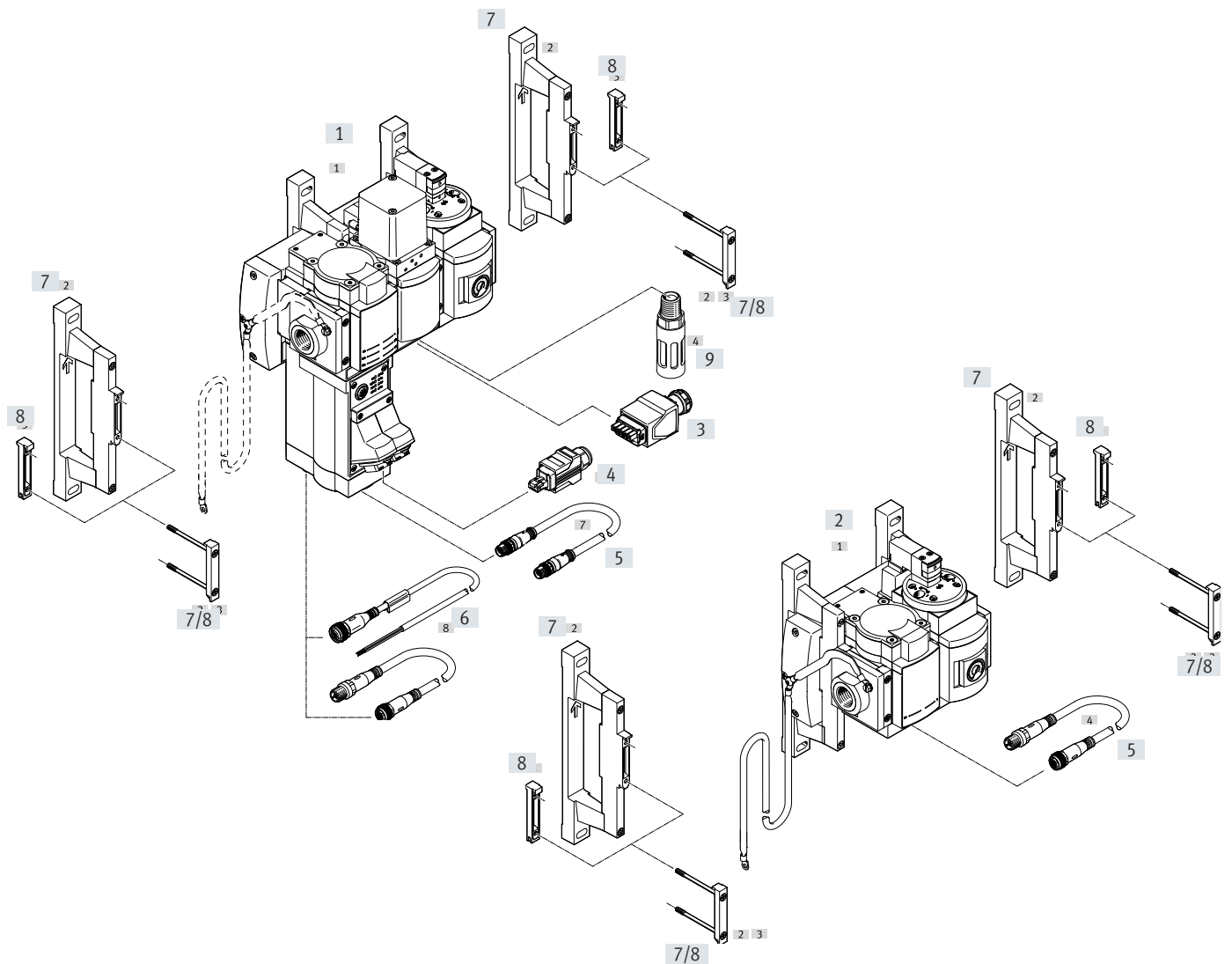
→ page 24

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



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

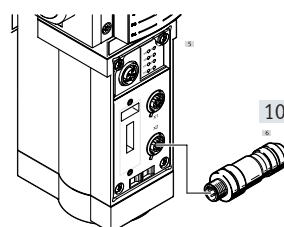
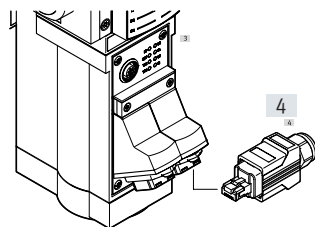
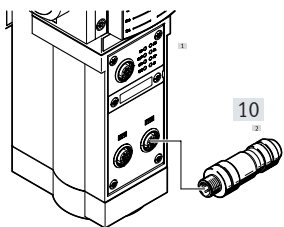
Peripherals overview



Fieldbus node FB43 for PROFINET IO with M12 connection

Fieldbus node FB44 for PROFINET IO with RJ45 connection

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



Peripherals overview

Accessories		→ Page/Internet
[1]	Energy efficiency module MSE6-C2M	9
[2]	Energy efficiency module MSE6-D2M	20
[3]	Power supply socket NECU-M-PP	For system supply 37
[4]	Plug FBS-RJ45	For fieldbus node FB44 for PROFINET IO 37
[5]	Connecting cable NEBC-F12G8	For CPX extension (MSE6-C2M-...-M only) 37
[6]	Connecting cable NEBU-M12	For electrical inputs/outputs 38
[7]	Wall mounting SET MS6-WPG	For same wall gap for combining series MS6 and MSE6 38
[8]	Module connector MS6-MV-EX	For connecting modules 38
[9]	Silencer U	For noise reduction 38
[10]	Plug NECU-M-S-D12G4	For fieldbus node FB43 for PROFINET IO, fieldbus node FB36 for Ethernet/IP, fieldbus node FB37 for EtherCAT 37

Type codes

001	Series	
MSE	Modular standard, electric	
002	Size	
6	Grid dimension 62 mm	
003	Function	
C2M	Energy efficiency module	
004	Flow measuring range	
5000	Max. 5000 l/min	
005	Electrical actuation	
FB36	Fieldbus node for Ethernet/IP	
FB43	Bus node for PROFINET IO with M12 connection	
FB44	Bus node for PROFINET IO with RJ45 connection	
006	Electrical inputs/outputs	
D	2 digital inputs, 2 digital outputs	

007	Electrical system expansion	
	No CPX extension connection	
M	CPX extension connection row 1 (master)	
008	Measured value display	
RG	Integrated pressure gauge with red/green scale	
009	Alternative pressure gauge scale	
BAR	bar	
010	Electrical connection	
AMI	Operating voltage plug push-pull, AIDA	
M12L5	Operating voltage plug M12, L-coded, 5-pin	
M12L4	Operating voltage plug M12, L-coded, 4-pin	
011	Pneumatic connection	
AGD	Connecting plate G1/2	

001	Series	
MSE	Modular standard, electric	
002	Size	
6	Grid dimension 62 mm	
003	Function	
D2M	Energy efficiency module	
004	Flow measuring range	
5000	Max. 5000 l/min	
005	Electrical actuation	
CBUS	Internal electrical control	

006	Electrical system extension	
S	CPX extension connection row 2 (slave)	
007	Measured value display	
RG	Integrated pressure gauge with red/green scale	
008	Alternative pressure gauge scale	
BAR	bar	
009	Electrical connection	
VCB	Power supply via C-bus	
010	Pneumatic connection	
AGD	Connecting plate G1/2	

Key features – MSE6-C2M

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 automatically shuts off after a specified idle time when production isn't running. 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 sav-

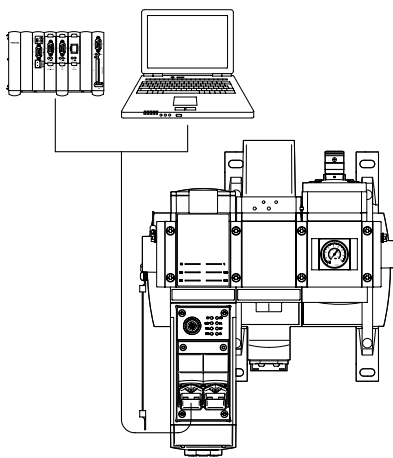
ings without affecting the availability of the machine/system.

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, EtherNet/IP or EtherCAT. 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 inte-

grated 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

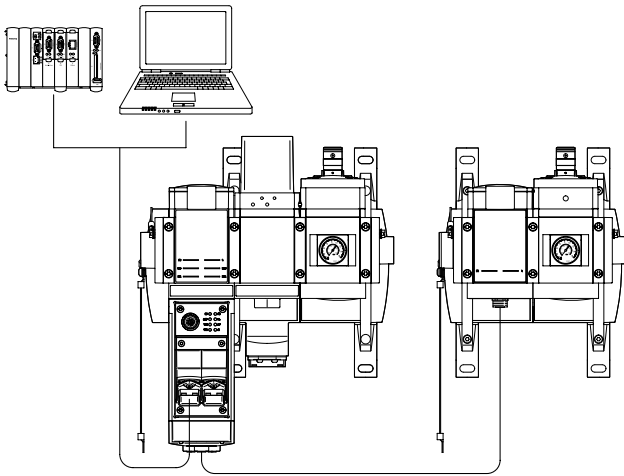
Pressure zones that should not be shut off or reduced must be branched off upstream of the MSE6-C2M. A signal from the PLC is required for a restart after shut-down or standby. There is no automatic restart for safety reasons.



- 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 mode
- Adjustable pressure rise 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

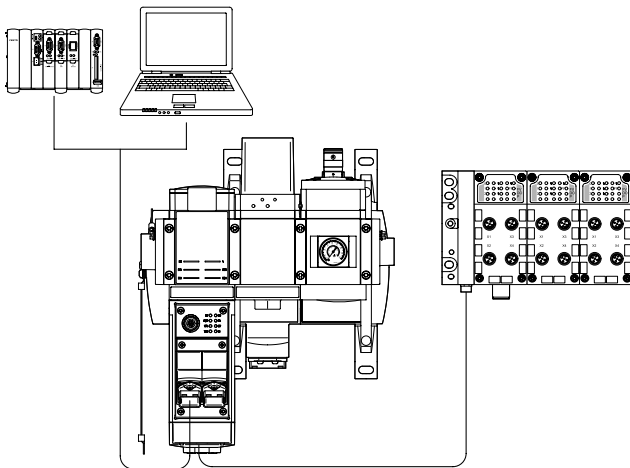
CPX extension

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 stand-by 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 stand-by pressure reduction
- Direct activation/integration of 2 digital inputs (2DI) and 2 digital outputs (2DO), e.g. for valve actuation or for the sensors

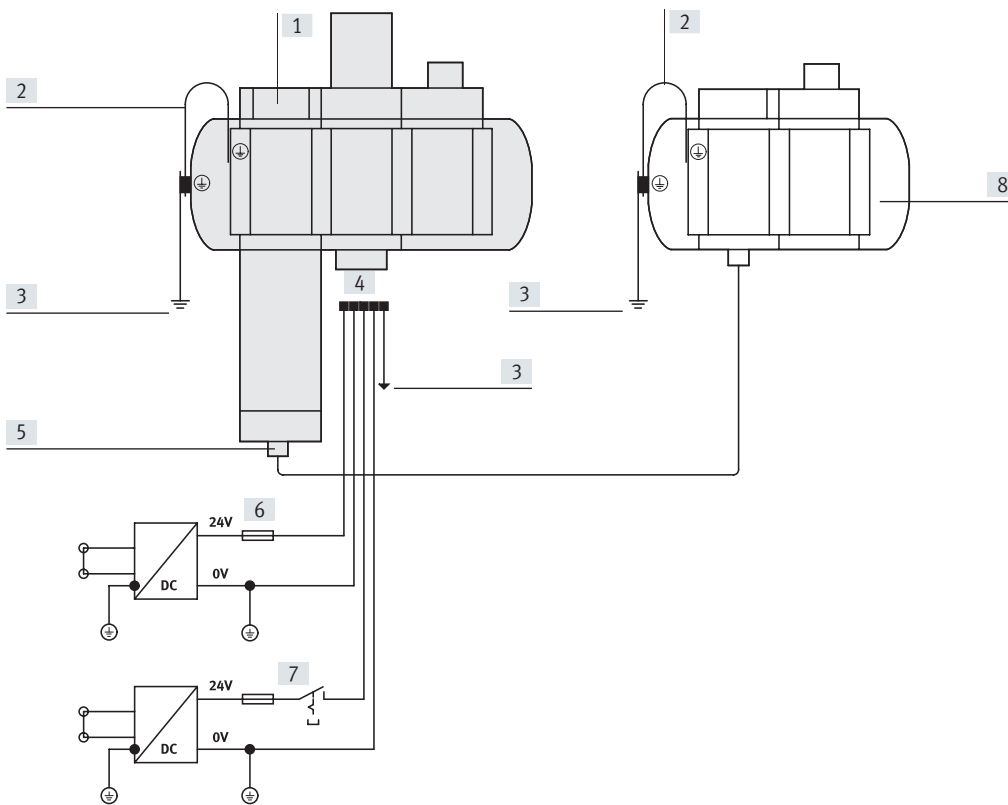
Note

A CPX IO module consists of the electronics module, an interlinking block and a connection block. There are several options that can be selected. 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

Electrical connection example



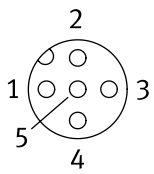
- [1] MSE6-C2M-...(-M)
- [2] Equipotential bonding between the earth terminal of the left pneumatic connecting plate and the left end plate of the electrical interlinking module
- [3] Equipotential bonding for functional earth (FE)
- [4] System supply
- [5] CPX extension connection row 1 (MSE6-C2M-...-M only)
- [6] External fuse
- [7] Supply for actuator technology can be shut down separately
- [8] MSE6-D2M

Pin allocation, system supply

	Pin	Function
RJ45 socket, push-pull, AIDA		
	1	24 V DC Operating voltage supply for the electronics/sensors $U_{EL/SEN}$
	2	0 V Operating voltage electronics/sensors $U_{EL/SEN}$
	3	24 V DC Load voltage supply for actuator technology $U_{OUT/A}$
	4	0 V Load voltage of actuator technology $U_{OUT/A}$
	5	FE Functional earth
M12 socket, L-coded, 5-pin		
	1	24 V DC Supply voltage for electronics/sensors $U_{EL/SEN}$
	2	0 V Ground for actuator/outputs/valves $U_{OUT/A}$
	3	0 V Ground for sensors/electronics $U_{EL/SEN}$
	4	24 V DC Supply voltage for actuators/outputs/valves $U_{OUT/A}$
	FE	FE Functional earth
M12 socket, L-coded, 4-pin		
	1	24 V DC Supply voltage for electronics/sensors $U_{EL/SEN}$
	2	0 V Ground for actuator/outputs/valves $U_{OUT/A}$
	3	0 V Ground for sensors/electronics $U_{EL/SEN}$
	4	24 V DC Supply voltage for actuators/outputs/valves $U_{OUT/A}$

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	Ground
4	Input-0	Input 0
5	FE	Functional earth
Electrical outputs		
1	–	Not assigned
2	Output-1	Output 1
3	0 V	Ground
4	Output-0	Output 0
5	FE	Functional earth


Datasheet – Fieldbus node FB43/44 for PROFINET IO

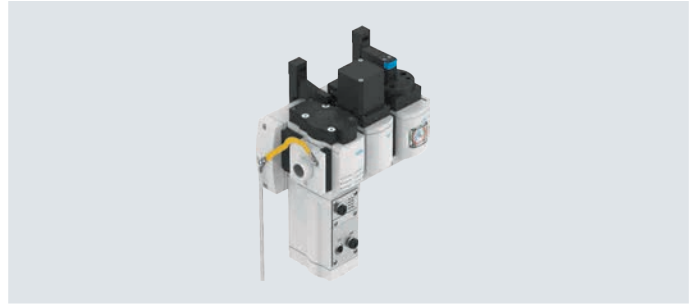
MSE6-C2M-...-FB43/44

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
0.5 ... 1.1 MPa

 Temperature range
0 ... +50°C



General technical data	
Pneumatic connection 1, 2	G1/2 (connecting plate) or G3/4 (connecting plate)
Mounting position	Horizontal ±5°
Flow direction	Unidirectional P1 → P2
Valve function	2/2-way shut-off valve, open, monostable
Pressure regulation range	[MPa] 0.25 ... 1
	[bar] 2.5 ... 10
	[psi] 36.25 ... 145
Max. pressure hysteresis	[MPa] 0.03
	[bar] 0.3
	[psi] 4.35
Reset method	Mechanical spring

Electrical data			
Electrical connection	5-pin, push-pull, AIDA	M12L4: M12 4-pin, L-coded	M12L5: M12 5-pin, L-coded

System supply	
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 the valve is supplied with current and electric pressure regulation is active
Current consumption for electronics/sensors at 24 V	[mA] Max. 320 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 socket, push-pull, AIDA	2x socket, M12x1, 4-pin, D-coded

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 _N ¹⁾		
In main flow direction 1 → 2	[l/min]	7000

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

Datasheet – Fieldbus node FB43/44 for PROFINET IO

Operating and environmental conditions		
Operating pressure	[MPa]	0.5 ... 1.1
	[bar]	5 ... 11
	[psi]	72.5 ... 159.5
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on the operating/ pilot medium	Lubricated operation not possible	
Ambient temperature	[°C]	0 ... +50
Temperature of medium	[°C]	0 ... +50
Storage temperature	[°C]	-10 ... +60
CE marking (see declaration of conformity) ¹⁾	To EU EMC Directive To EU RoHS Directive	
UKCA marking (see declaration of conformity) ¹⁾	To UK EMC regulations To UK RoHS regulations	
Certification	RCM compliance mark	
KC marking	KC-EMV	

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/ms → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of 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 (default)	
	scfm	
Pressure measurement		
Pressure measuring range start value	[MPa]	0
	[bar]	0
	[psi]	0
Pressure measuring range end value	[MPa]	1.4
	[bar]	14
	[psi]	203
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)	mbar (default)	
	kPa	
	psi	
Consumption measurement		
Displayable unit(s)	l (default)	
	m ³	
	scf	

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

Weight		
	FB43	FB44
Product weight	[g]	4455
		4550

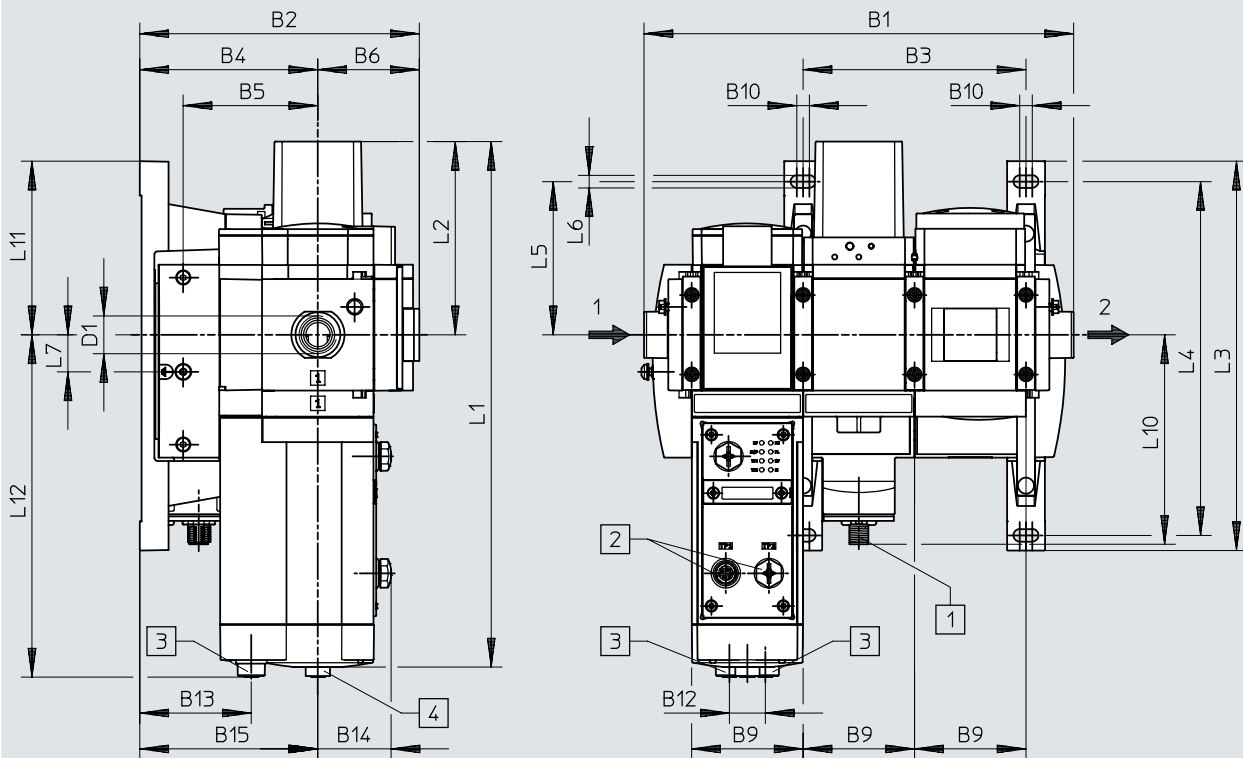
Materials	
Housing	Die-cast aluminium
Cover	Reinforced PA
Covering	Reinforced PA
Seals	NBR
LABS (PWIS) conformity	VDMA24364-B1/B2-L

Datasheet – Fieldbus node FB43/44 for PROFINET IO

Dimensions

Download CAD data → www.festo.com

Fieldbus node FB43 for PROFINET IO with M12x1 connection, 4-pin



- [1] Socket M12L, 4-/5-pin
 - [2] 2x plug M12x1, 4-pin RJ45
 - [3] 2x socket M12x1, 5-pin RJ45
 - [4] 2x plug M12x1, 8-pin
- Flow direction

Type	B1	B2	B3	B4	B5	B6	B9	B10	B12	B13	B14	B15
MSE6-C2M-...-FB43-...	239	155.5	124	99	74.9	56.5	62	7	20	62	40.8	99

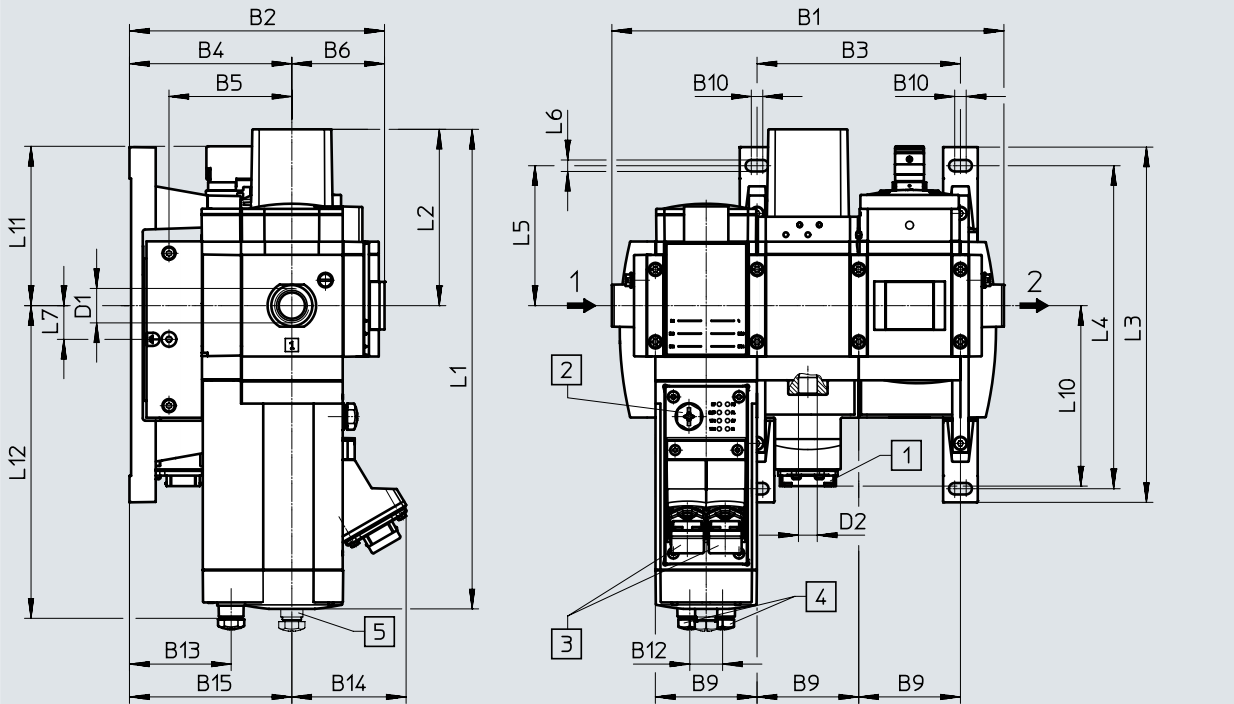
Type	D1	L1	L2	L3	L4	L5	L6	L7	L10	L11	L12
MSE6-C2M-...-FB43-...	G1/2	292.4	107.5	216.6	196.9	85.3	7	20.7	116.5	102	190.4

Datasheet – Fieldbus node FB43/44 for PROFINET IO

Dimensions

Download CAD data → www.festo.com

Fieldbus node FB44 for PROFINET IO with RJ45 connection



- [1] RJ45 socket, push-pull, AIDA
 - [2] Plug M12x1, 5-pin
 - [3] 2x RJ45 socket, push-pull, AIDA
 - [4] 2x plug M12x1, 5-pin
 - [5] Plug M12x1, 8-pin (MSE6-C2M-...-FB44-D-M-RG only)
- Flow direction

Type	B1	B2	B3	B4	B5	B6	B9	B10	B12	B13	B14	B15
MSE6-C2M-...-FB44-D-RG	239	155.5	124	99	74.9	56.5	62	7	20	62	69.2	-
MSE6-C2M-...-FB44-D-M-RG												99

Type	D1	D2	L1	L2	L3	L4	L5	L6	L7	L10	L11	L12
MSE6-C2M-...-FB44-D-RG	G1/2	G1/4	292.4	107.5	216.6	196.9	85.3	7	20.6	110	97.2	190.4
MSE6-C2M-...-FB44-D-M-RG												

Ordering data


Size	Pneumatic connection	Electrical control	Part no.	Type
MSE6	G1/2	Fieldbus node FB44 for PROFINET IO with RJ45 connection	8157909	MSE6-C2M-5000-FB44-D-RG-BAR-AMI-AGD
With CPX extension				
MSE6	G1/2	Fieldbus node FB43 for PROFINET IO with M12 connection, 4-pin, D-coded	8169407	MSE6-C2M-5000-FB43-D-M-RG-BAR-M12L4-AGD-MQ1
		Fieldbus node FB43 for PROFINET IO with M12 connection, 5-pin, D-coded	8157912	MSE6-C2M-5000-FB43-D-M-RG-BAR-M12L5-AGD-MQ1
		Fieldbus node FB44 for PROFINET IO with RJ45 connection	8157908	MSE6-C2M-5000-FB44-D-M-RG-BAR-AMI-AGD

Datasheet – Fieldbus node FB36/37 for EtherNet/IP, EtherCAT

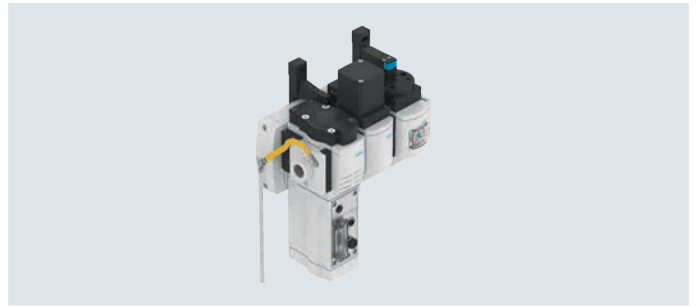
MSE6-C2M-...-FB36/37

consisting of

- Fieldbus node for EtherNet/IP and EtherCAT
- 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
0.5 ... 1.1 MPa

-  - Temperature range
0 ... +50°C



General technical data	
Pneumatic connection 1, 2	G1/2 (connecting plate) or G3/4 (connecting plate)
Mounting position	Horizontal ±5°
Flow direction	Unidirectional P1 → P2
Valve function	2/2-way shut-off valve, open, monostable
Pressure regulation range	[MPa] 0.25 ... 1
	[bar] 2.5 ... 10
	[psi] 36.25 ... 145
Max. pressure hysteresis	[MPa] 0.03
	[bar] 0.3
	[psi] 4.35
Reset method	Mechanical spring

Electrical data	
Electrical connection	5-pin, push-pull, AIDA M12L4: M12 4-pin, L-coded M12L5: M12 5-pin, L-coded
System supply	
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 the valve is supplied with current and electric pressure regulation is active
Current consumption for electronics/sensors at 24 V	[mA] Max. 350 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 M12 connection, 4-pin, D-coded

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 _N ¹⁾	
In main flow direction 1 → 2	[l/min] 7000

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

Datasheet – Fieldbus node FB36/37 for EtherNet/IP, EtherCAT

Operating and environmental conditions		
Operating pressure	[MPa]	0.5 ... 1.1
	[bar]	5 ... 11
	[psi]	72.5 ... 159.5
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on the operating/ pilot medium	Lubricated operation not possible	
Ambient temperature	[°C]	0 ... +50
Temperature of medium	[°C]	0 ... +50
Storage temperature	[°C]	-10 ... +60
CE marking (see declaration of conformity) ¹⁾	To EU EMC Directive To EU RoHS Directive	
UKCA marking (see declaration of conformity) ¹⁾	To UK EMC regulations To UK RoHS regulations	
Certification	RCM compliance mark	
KC marking	KC-EMV	

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/ms → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of 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 (default)	
	scfm	
Pressure measurement		
Pressure measuring range start value	[MPa]	0
	[bar]	0
	[psi]	0
Pressure measuring range end value	[MPa]	1.4
	[bar]	14
	[psi]	203
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)	mbar (default)	
	kPa	
	psi	
Consumption measurement		
Displayable unit(s)	l (default)	
	m ³	
	scf	

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

Weight		
Product weight	[g]	4395

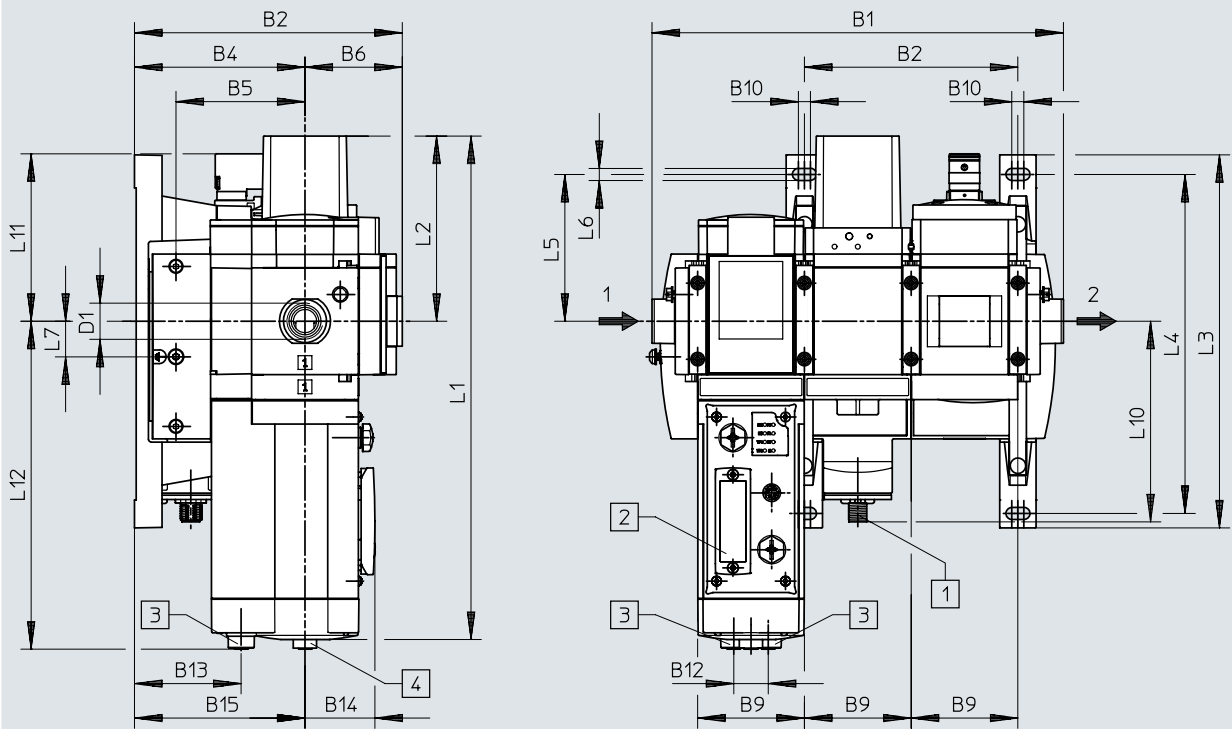
Materials	
Housing	Die-cast aluminium
Cover	Reinforced PA
Covering	Reinforced PA
Seals	NBR
LABS (PWIS) conformity	VDMA24364-B1/B2-L

Datasheet – Fieldbus node FB36/37 for EtherNet/IP, EtherCAT

Dimensions

Download CAD data → www.festo.com

Fieldbus node FB36/37 for EtherNet/IP and EtherCAT



- [1] Socket M12L, 4-/5-pin
 - [2] 2x plug M12x1, 4-pin RJ45
 - [3] 2x socket M12x1, 5-pin RJ45
 - [4] 2x plug M12x1, 8-pin
- Flow direction

Type	B1	B2	B3	B4	B5	B6	B9	B10	B12	B13	B14	B15
MSE6-C2M-...-FB36/FB37-...	239	155.5	124	99	74.9	56.5	62	7	20	62	40.8	99

Type	D1	L1	L2	L3	L4	L5	L6	L7	L10	L11	L12
MSE6-C2M-...-FB36/FB37-...	G1/2	292.4	107.5	216.6	196.9	85.3	7	20.7	116.5	97.3	190.4

Ordering data

Size	Pneumatic connection	Electrical control	Part no.	Type
------	----------------------	--------------------	----------	------

With CPX extension


MSE6	G1/2	Fieldbus node FB36 for EtherNet/IP with M12 connection, 4-pin, D-coded	8169406	MSE6-C2M-5000-FB36-D-M-RG-BAR-M12L4-AGD
		Fieldbus node FB36 for EtherNet/IP with M12 connection, 5-pin, D-coded	8157913	MSE6-C2M-5000-FB36-D-M-RG-BAR-M12L5-AGD

Datasheet

MSE6-D2M

consisting of

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

 - Operating pressure
0.35 ... 1.3 MPa

 - Temperature range
0 ... +50°C



Key features

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

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

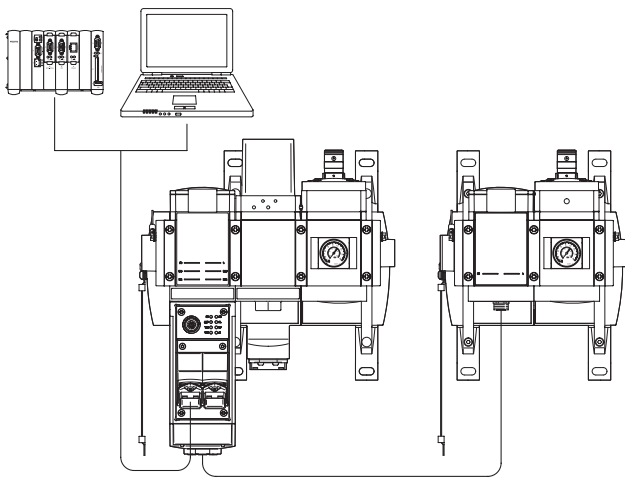
MSE6-C2M-...-M or CPX terminal. All measured values (pressure, flow rate, system parameters, etc.) are available in the PLC/cloud and can be displayed or individually further processed.

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.

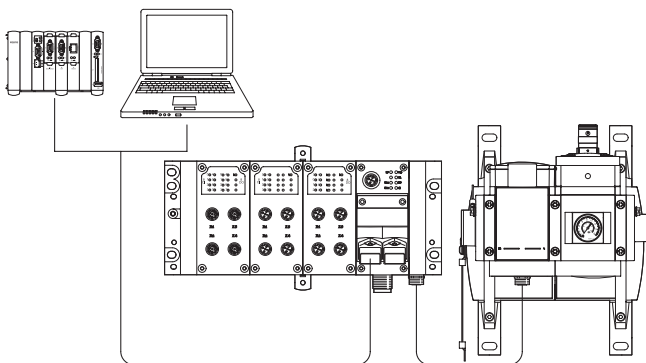
CPX extension

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 measurement
- Fieldbus-controlled pressure regulation with automatic stand-by 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

Datasheet

General technical data	
Pneumatic connection 1, 2	G1/2 (connecting plate) or G3/4 (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 spring

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 $q_{nN}^{1)}$	
In main flow direction 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	[MPa] 0.35 ... 1.3 [bar] 3.5 ... 13
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the 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 CRC ¹⁾	2
CE marking (see declaration of conformity) ²⁾	To EU EMC Directive To EU RoHS Directive
UKCA marking (see declaration of conformity) ²⁾	To UK EMC regulations To UK RoHS regulations
Certification	RCM compliance mark
KC marking	KC-EMV

1) More information www.festo.com/x/topic/crc

2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/ms \rightarrow Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

Datasheet

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 (default) scfm
Pressure measurement		
Pressure measuring range start value	[MPa]	0
	[bar]	0
	[psi]	0
Pressure measuring range end value	[MPa]	1.4
	[bar]	14
	[psi]	203
Accuracy in \pm %FS ¹⁾	[%FS]	3
Displayable unit(s)		mbar (default) kPa psi
Consumption measurement		
Displayable unit(s)		l (default) m ³ scf

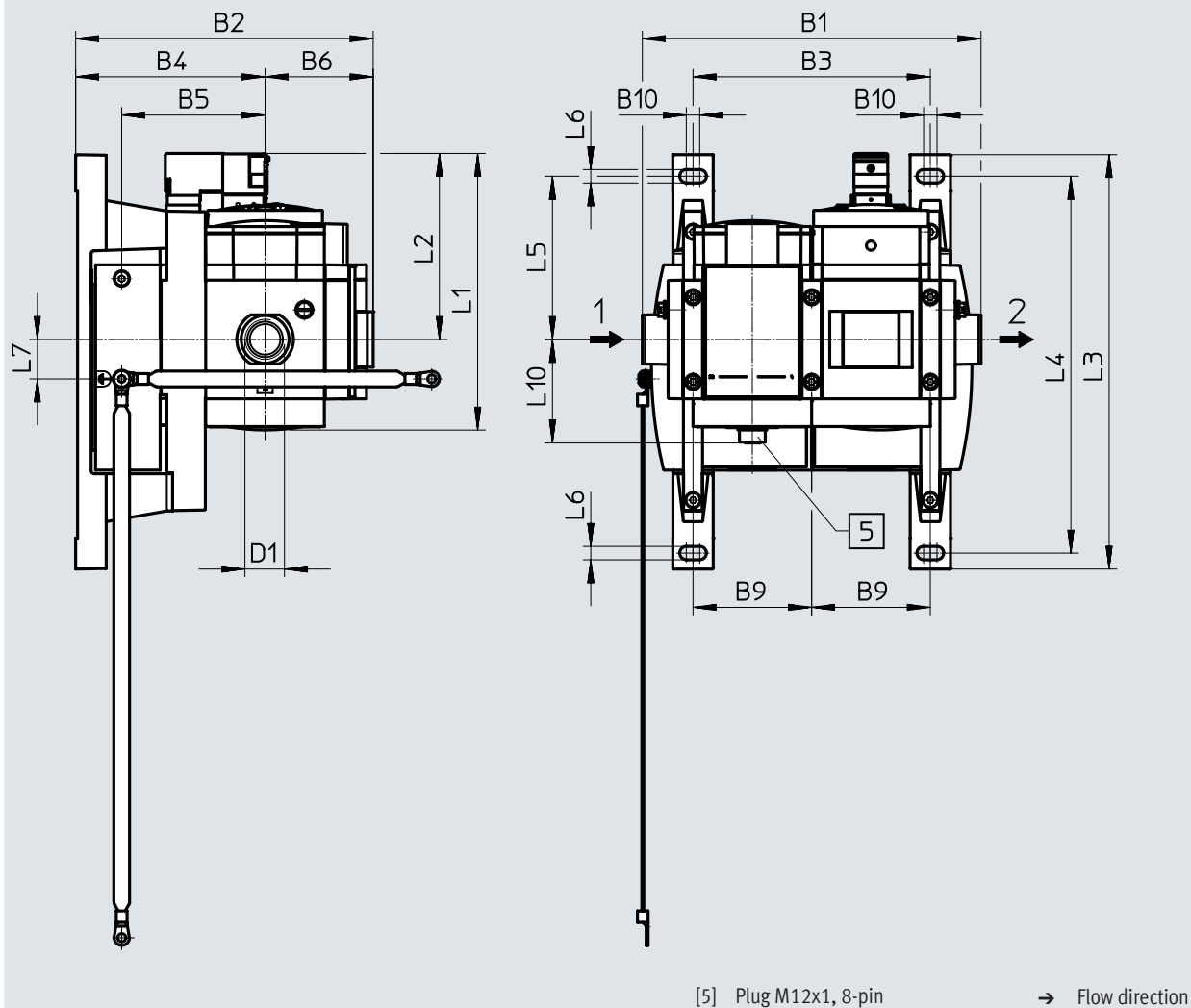
1) % FS = % of measuring range end value (full scale)

Weight		
Product weight	[g]	2700
Materials		
Housing		Die-cast aluminium
Cover		Reinforced PA
Covering		Reinforced PA
Seals		NBR
LABS (PWIS) conformity		VDMA24364-B1/B2-L

Datasheet

Dimensions

Download CAD data → www.festo.com



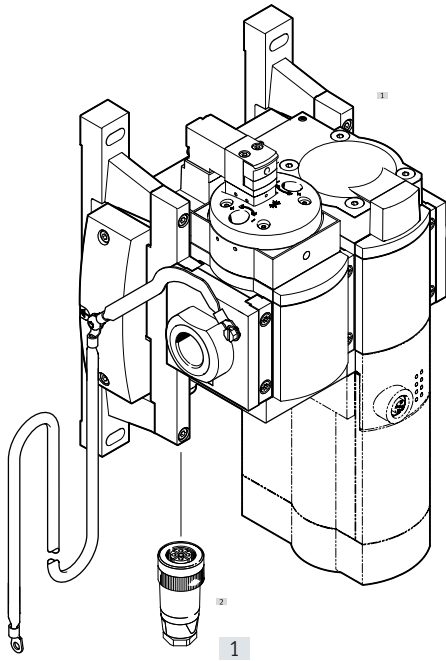
Type	B1	B2	B3	B4	B5	B6	B9	B10
MSE6-D2M-...-CBUS-S-RG	177	155.5	124	99	74.9	56.5	62	7

Type	D1	L1	L2	L3	L4	L5	L6	L7	L10
MSE6-D2M-...-CBUS-S-RG	G1/2	144.6	97.3	216.6	196.9	85.3	7	20.6	54.1

Ordering data				
Size	Pneumatic connection	Electrical control	Part no.	Type
With CPX extension row 2				
MSE6	G1/2	Internal electrical actuation	8085453	MSE6-D2M-5000-CBUS-S-RG-BAR-VCB-AGD

Peripherals overview

Peripherals overview

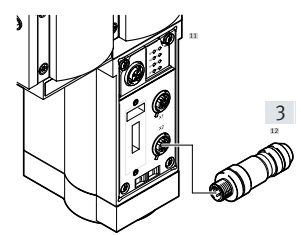
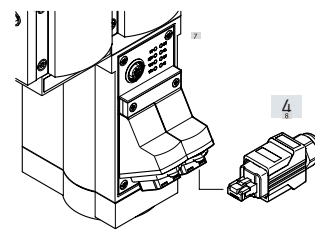
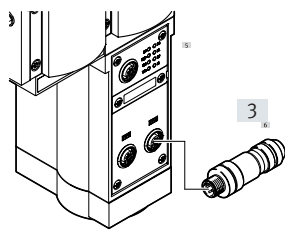
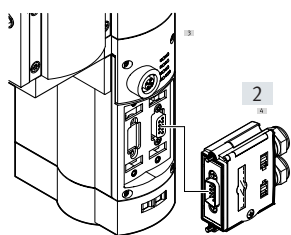


Fieldbus node FB13 for PROFIBUS DP

Fieldbus node FB43 for PROFINET IO with M12 connection

Fieldbus node FB44 for PROFINET IO with RJ45 connection

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



Accessories

→ Page/Internet

[1]	Plug socket NTSD	For system supply	37
[2]	Plug FBS-SUB-9	For bus node FB13 for PROFIBUS DP	37
[3]	Plug NECU-M-S-D12G4	For fieldbus node FB43 for PROFINET IO, fieldbus node FB36 for Ethernet/IP, fieldbus node FB37 for EtherCAT	37
[4]	Plug FBS-RJ45	For fieldbus node FB44 for PROFINET IO	37
–	Wall mounting SET MS6-WPG	For same wall gap for combining series MS6 and MSE6	38
–	Module connector MS6-MV-EX	For connecting modules	38

Type codes

001	Series
MSE	Modular standard, electric

002	Size
6	Grid dimension 62 mm

003	Function
E2M	Energy efficiency module

004	Flow measuring range
5000	Max. 5000 l/min

005	Electrical actuation
FB13	Fieldbus node for PROFIBUS DP
FB36	Fieldbus node for Ethernet/IP
FB37	Fieldbus node for EtherCAT®
FB43	Bus node for PROFINET IO with M12 connection
FB44	Bus node for PROFINET IO with RJ45 connection


006	Pneumatic connection
AGD	Connecting plate G1/2

Datasheet – 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 measurement data, actuating valves and controlling energy efficiency functions
- Bus node for PROFIBUS DP

 - Operating pressure
0.35 ... 1 MPa

 - Temperature range
0 ... +50°C



General technical data

Pneumatic connection 1, 2	G1/2 (connecting plate) or G3/4 (connecting plate)
Mounting position	Horizontal ±5°
Flow direction	Unidirectional P1 → P2
Valve function	2/2-way shut-off valve, open, monostable
Reset method	Mechanical spring

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_N¹⁾

In main flow direction 1 → 2 [l/min]	4500
--------------------------------------	------

1) Measured at p₁ = 6 bar and p₂ = 5 bar, Δp = 1 bar

Datasheet – Fieldbus node FB13 for PROFIBUS DP

Operating and environmental conditions		
Operating pressure	[MPa]	0.35 ... 1
	[bar]	3.5 ... 10
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on the 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 CRC ¹⁾	2	
CE marking (see declaration of conformity) ²⁾	To EU EMC Directive To EU RoHS Directive	
UKCA marking (see declaration of conformity) ²⁾	To UK EMC regulations To UK RoHS regulations	
Certification	RCM compliance mark	
KC marking	KC-EMV	

1) More information www.festo.com/x/topic/crc

2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/ms → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of 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 (default)	
	scfm	
Pressure measurement		
Pressure measuring range start value	[MPa]	0
	[bar]	0
	[psi]	0
Pressure measuring range end value	[MPa]	1.4
	[bar]	14
	[psi]	203
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)	mbar (default)	
	kPa	
	psi	
Consumption measurement		
Displayable unit(s)	l (default)	
	m ³	
	scf	

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

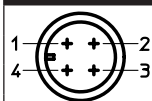
Weight		
Product weight	[g]	3300

Materials	
Housing	Die-cast aluminium
Cover	Reinforced PA
Covering	Reinforced PA
Seals	NBR
LABS (PWIS) conformity	VDMA24364-B1/B2-L

Datasheet – Fieldbus node FB13 for PROFIBUS DP

Pin allocation, system supply

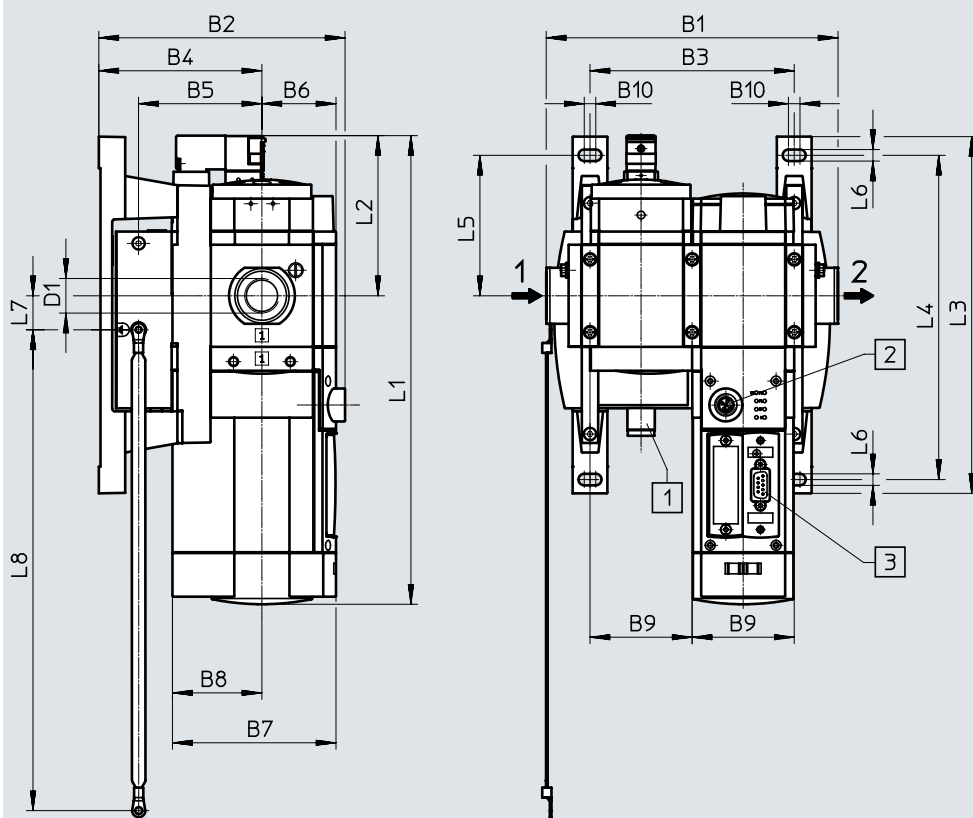
Plug M18x1, 4-pin



Pin	Purpose
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] Socket M12x1, 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	G1/2	285	98	217	197	86	7	21	292

Ordering data



Size	Pneumatic connection	Electrical control	Part no.	Type
MSE6	G1/2	Fieldbus node FB13 for PROFIBUS DP	2465321	MSE6-E2M-5000-FB13-AGD

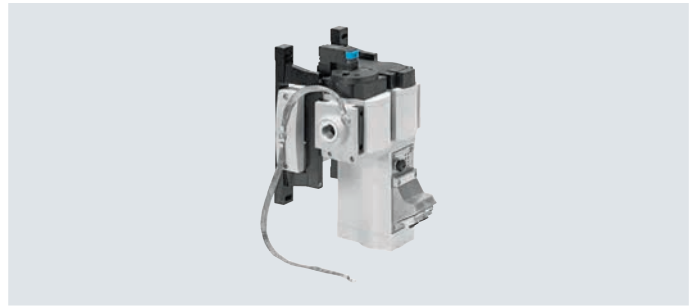
Datasheet – Fieldbus node FB43/FB44 for PROFINET IO

MSE6-E2M-...-FB43/FB44

consisting of

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

-  - Operating pressure
0.35 ... 1 MPa
-  - Temperature range
0 ... +50°C



General technical data		
Pneumatic connection 1, 2	G1/2 (connecting plate) or G3/4 (connecting plate)	
Mounting position	Horizontal ±5°	
Flow direction	Unidirectional P1 → P2	
Valve function	2/2-way shut-off valve, open, monostable	
Reset method	Mechanical	
Electrical data		
Type	MSE6-E2M-...-FB43	MSE6-E2M-...-FB44
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. 270	
Reverse polarity protection	For operating voltage connections	
Degree of protection	IP65 with plug socket	
Duty cycle [%]	100	
Fieldbus connection		
Fieldbus interface	2x socket M12x1, 4-pin, D-coded	2x RJ45 socket, push-pull, AIDA
Standard nominal flow rate q _N ¹⁾		
In main flow direction 1 → 2 [l/min]	4500	

1) Measured at p₁ = 6 bar and p₂ = 5 bar, Δp = 1 bar

Datasheet – Fieldbus node FB43/FB44 for PROFINET IO

Operating and environmental conditions		
Operating pressure	[MPa]	0.35 ... 1
	[bar]	3.5 ... 10
	[psi]	50.75 ... 145
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on the operating/ pilot medium	Lubricated operation not possible	
Ambient temperature	[°C]	0 ... +50
Temperature of medium	[°C]	0 ... +50
Storage temperature	[°C]	-10 ... +60
CE marking (see declaration of conformity) ¹⁾	To EU EMC Directive To EU RoHS Directive	
UKCA marking (see declaration of conformity) ¹⁾	To UK EMC regulations To UK RoHS regulations	
Certification	RCM compliance mark	
KC marking	KC-EMV	

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/ms → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of 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 (default)	
	scfm	
Pressure measurement		
Pressure measuring range start value	[MPa]	0
	[bar]	0
	[psi]	0
Pressure measuring range end value	[MPa]	1.4
	[bar]	14
	[psi]	203
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)	mbar (default)	
	kPa	
	psi	
Consumption measurement		
Displayable unit(s)	l (default)	
	m ³	
	scf	

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

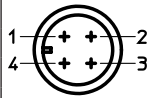
Weight		
Type	MSE6-E2M-...-FB43	MSE6-E2M-...-FB44
Product weight	[g] 3250	3450

Materials	
Housing	Die-cast aluminium
Cover	Reinforced PA
Covering	Reinforced PA
Seals	NBR
LABS (PWIS) conformity	VDMA24364-B1/B2-L

Datasheet – Fieldbus node FB43/FB44 for PROFINET IO

Pin allocation, system supply

Plug M18x1, 4-pin



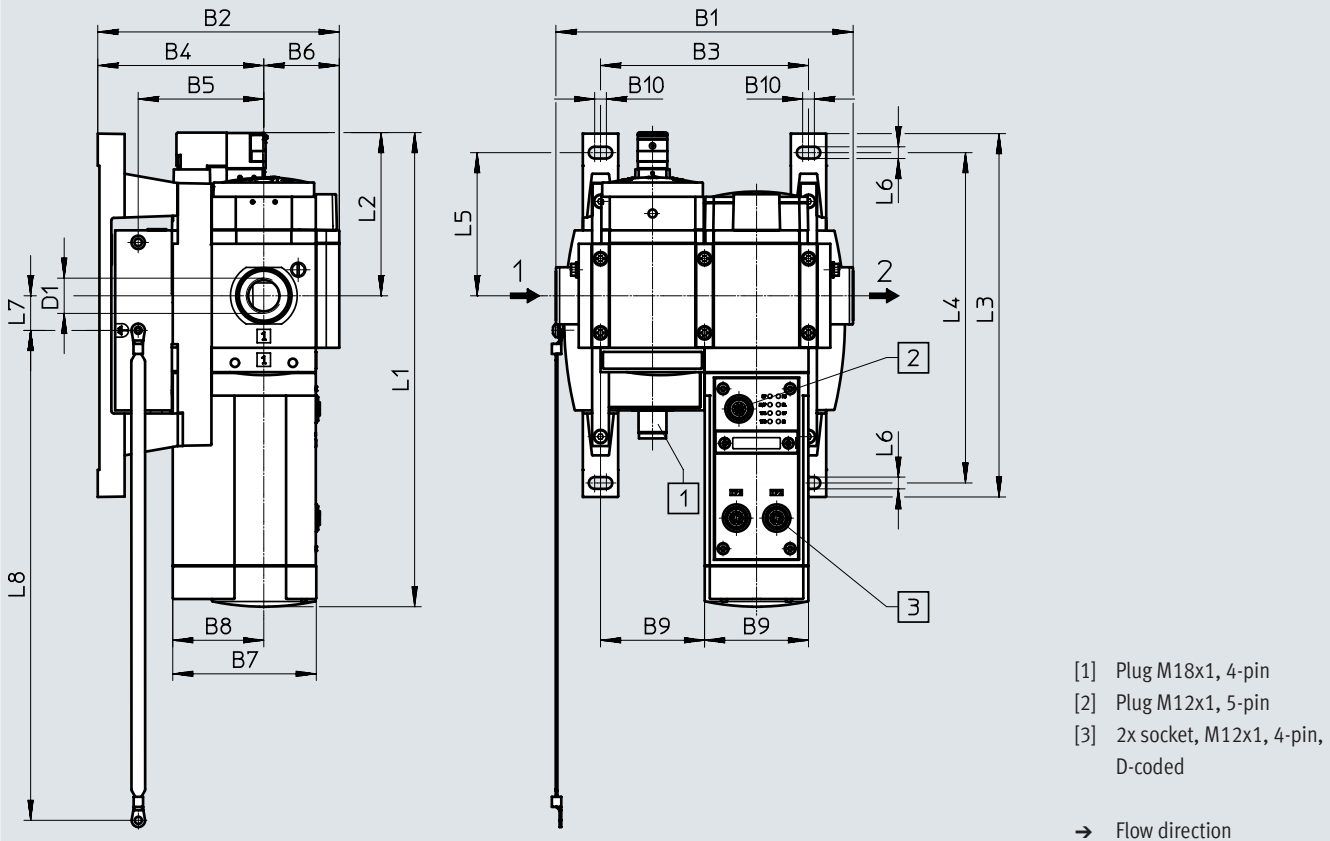
Pin Purpose

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 FB43 for PROFINET IO with M12 connection



Type	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
MSE6-E2M-...-FB43	178	145	124	99	75	45	86	55	62	7

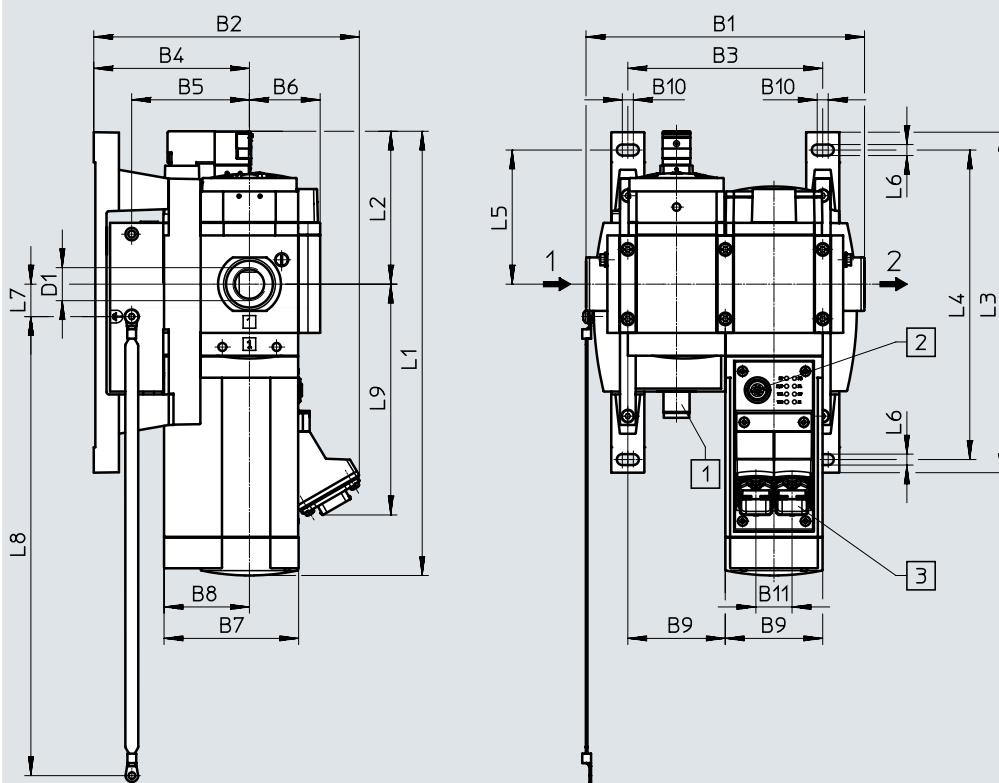
Type	D1	L1	L2	L3	L4	L5	L6	L7	L8
MSE6-E2M-...-FB43	G1/2	285	98	217	197	86	7	21	292

Datasheet – Fieldbus node FB43/FB44 for PROFINET IO

Dimensions

Download CAD data → www.festo.com

Fieldbus node FB44 for PROFINET IO with RJ45 connection



- [1] Plug M18x1, 4-pin
- [2] Plug M12x1, 5-pin
- [3] MS6-E2M-...-FB44: 2x RJ45 socket, push-pull, AIDA

→ Flow direction

Type	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
MSE6-E2M-...-FB44	178	170	124	99	75	45	86	55	62	7	23

Type	D1	L1	L2	L3	L4	L5	L6	L7	L8	L9
MSE6-E2M-...-FB44	G1/2	285	98	217	197	86	7	21	292	147

Ordering data


Size	Pneumatic connection	Electrical control	Part no.	Type
MSE6	G1/2	Fieldbus node FB43 for PROFINET IO with M12 connection	8157910	MSE6-E2M-5000-FB43-AGD
		Fieldbus node FB44 for PROFINET IO with RJ45 connection	8157911	MSE6-E2M-5000-FB44-AGD


Datasheet – Fieldbus node FB36/37 for EtherNet/IP, 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 measurement data, actuating valves and controlling energy efficiency functions
- Bus node for EtherNet/IP or EtherCAT

 Operating pressure
0.35 ... 1 MPa

 Temperature range
0 ... +50°C



General technical data	
Pneumatic connection 1, 2	G1/2 (connecting plate) or G3/4 (connecting plate)
Mounting position	Horizontal ±5°
Flow direction	Unidirectional P1 → 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 socket M12x1, 4-pin, D-coded

Standard nominal flow rate $q_{nN}^{1)}$	
In main flow direction 1 → 2 [l/min]	4500

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

Datasheet – Fieldbus node FB36 for EtherNet/IP and FB37 for EtherCAT

Operating and environmental conditions		
Operating pressure	[MPa]	0.35 ... 1
	[bar]	3.5 ... 10
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on the 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 CRC ¹⁾	2	
CE marking (see declaration of conformity) ¹⁾	To EU EMC Directive To EU RoHS Directive	
UKCA marking (see declaration of conformity) ¹⁾	To UK EMC regulations To UK RoHS regulations	
Certification	RCM compliance mark	
KC marking	KC-EMV	

1) More information www.festo.com/x/topic/crc

2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/ms → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of 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 (default)	
	scfm	
Pressure measurement		
Pressure measuring range start value	[MPa]	0
	[bar]	0
	[psi]	0
Pressure measuring range end value	[MPa]	1.4
	[bar]	14
	[psi]	203
Accuracy in ±%FS ¹⁾	[%FS]	3
Displayable unit(s)	mbar (default)	
	kPa	
	psi	
Consumption measurement		
Displayable unit(s)	l (default)	
	m ³	
	scf	

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

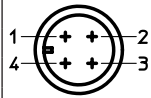
Weight		
Product weight	[g]	3300

Materials	
Housing	Die-cast aluminium
Cover	Reinforced PA
Covering	Reinforced PA
Seals	NBR
LABS (PWIS) conformity	VDMA24364-B1/B2-L

Datasheet – Fieldbus node FB36 for EtherNet/IP and FB37 for EtherCAT

Pin allocation, system supply

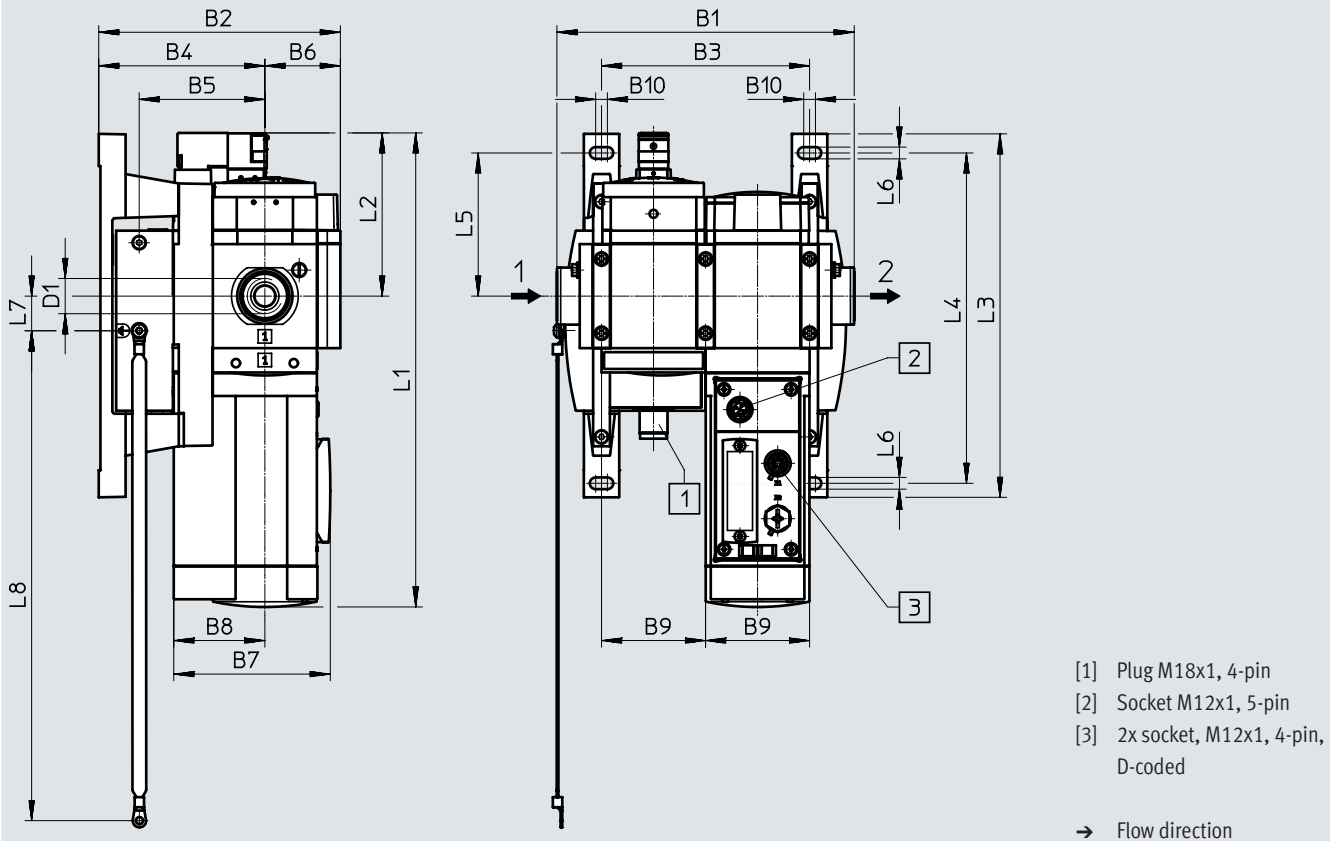
Plug M18x1, 4-pin



Pin	Purpose
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



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	G1/2	285	98	217	197	86	7	21	292

Ordering data

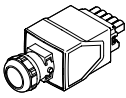


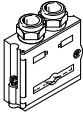
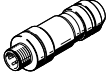
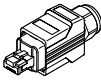
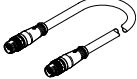
Size	Pneumatic connection	Electrical control	Part no.	Type
MSE6	G1/2	Fieldbus node FB36 for Ethernet/IP	3990296	MSE6-E2M-5000-FB36-AGD
		Fieldbus node FB37 for EtherCAT	3992150	MSE6-E2M-5000-FB37-AGD

Ordering data – Modular product system

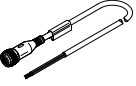

Ordering table		Conditions	Code	Enter code
Module no.	2839638			
Series	Modular Standard Electric		MSE	MSE
Size	6		...	
Function	Condition Monitoring and Control Module (Prop. Valve)		-C2M	-C2M
	Condition Monitoring and Energy Efficiency Extension (R2)		-D2M	-D2M
	Energy saving (2/2-way function DE, V24)		-E2M	-E2M
Flow measuring range	5000 l/min		-5000	
Electrical control / inputs and outputs	Internal electrical control	[2]	-CBUS	
	Fieldbus node for Profibus DP	[5] [6]	-FB13	
	Fieldbus node for Ethernet/IP, 2 x M12, metal version	[5]	-FB36	
	Fieldbus node for EtherCAT, 2 x M12, metal design	[5]	-FB37	
	Fieldbus node for ProfiNet IO, 2 x M12, metal version	[5]	-FB43	
	Fieldbus node for PROFINET IO, 2 x RJ45, metal version	[5]	-FB44	
Electrical inputs and outputs	No digital I/Os			
	Digital I/Os	[4]	-D	
Electrical system extension	No bus extension			
	Bus extension R1 (master)	[4]	-M	
	Bus extension R2 (slave)	[3]	-S	
Measured value display	Without pressure gauge			
	Adapter for EN pressure gauge 1/4, without pressure gauge	[1]	-A4	
	Adapter for EN pressure gauge 1/8, without pressure gauge	[1]	-A8	
	MS pressure gauge standard scale	[1]	-AG	
	Cover plate		-VS	
	MS pressure gauge, red/green scale	[1]	-RG	
Pressure gauge scale	No pressure gauge scale			
	bar	[1]	-BAR	
	MPa	[1]	-MPA	
Electrical connection	Standard (operating voltage supply plug M18 4-pin)			
	Power supply via C-bus	[3]	-VCB	
	Operating voltage supply plug AIDA/ push-pull	[4]	-AMI	
	Operating voltage supply plug 5-pin	[4]	-M12L5	
	Operating voltage supply plug 4-pin	[4]	-M12L4	
Additional software	None			
	Data readout software MQTT (for FB43/44)	[5]	-MQ1	
Pneumatic connection	Connecting plate G3/4		-AGE	
	Connecting plate G1/2		-AGD	

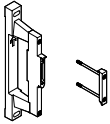
- | | |
|---------------------------------------|---|
| [1] AG, RG, BAR, MPA | Only in combination with C2M, D2M |
| [2] CBUS | Max. operating pressure: 10 bar. |
| [3] S, VCB | Must be selected in combination with CBUS |
| | Only in combination with D2M |
| [4] D, M, AMI, M12L4, M12L5, T | Only in combination with C2M |
| [5] FB13, FB36, FB37, FB43, FB44, MQ1 | Not in combination with D2M |
| [6] FB13 | Not in combination with C2M |


Accessories

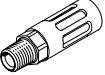
Ordering data – Power supply socket NECU-M-PP				Datasheets → Internet: necu	
Description		Electrical connection	Part no.	Type	
	For MSE6-C2M	5-pin, push-pull, plug pattern PP, fulfils requirements to AIDA	5195383	NECU-M-PPG5PP-C1-PN	
Ordering data – Plug socket NTSD				Datasheets → Internet: ntsd	
Description		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				Datasheets → 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				Datasheets → Internet: necu	
Description		Electrical connection	Part no.	Type	
	For fieldbus node FB43 for PROFINET IO, for fieldbus node FB36 for EtherNet/IP, for fieldbus node FB37 for EtherCAT	Plug M12x1, 4-pin, D-coded	Screw terminal, can be shielded	543109	NECU-M-S-D12G4-C2-ET
Ordering data – Plug FBS-RJ45				Datasheets → Internet: fbs	
Description		Electrical connection	Part no.	Type	
	For fieldbus node FB44 for PROFINET IO	RJ45 plug, 8-pin, push-pull	552000	FBS-RJ45-PP-GS	
Ordering data – Connecting cable NEBC-F12G8				Datasheets → 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

Accessories

Ordering data – Connecting cable NEBU-M12				Datasheets → 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				Datasheets → 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 combinations of series MS6 and MSE6 		8072794	MS6-WPG	

Ordering data – Module connector MS6-MV-EX				Datasheets → 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				Datasheets → Internet: u		
Description				Part no.	Type	
	For MSE6-C2M	<ul style="list-style-type: none"> For noise reduction 		6842	U-1/4-B	

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