SIEB & MEYER

Motion Controller MC2

Hardware Description

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1 About this Manual

This chapter describes symbols, signal words and abbreviations used in this manual.

Note

You can download more documentation from the SIEB & MEYER website under http://www.sieb-meyer.de/downloads.html.

1.1 Illustration of Warnings

In this manual, the warnings listed below are used. Depending on their degree of risk, the risk levels listed below exist:

⚠ DANGER

Imminent risk of injury

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

→ Follow the instructions in this manual to avoid danger.

⚠ WARNING

Risk of injury

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

→ Follow the instructions in this manual to avoid danger.

⚠ CAUTION

Slight risk of injury

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

→ Follow the instructions in this manual to avoid danger.

NOTICE

Notice

Indicates a hazardous situation which, if not avoided, may result in property damage.

→ Follow the instructions in this manual to avoid danger.

1.2 Technical Symbols

Symbol	Description
☀	LED indicator: LED on
○	LED indicator: LED off
☼	LED indicator: LED flashes

2 General Information

This manual describes the motion controller MC2 for drive systems of the series SD2/ SD2S and FC2.

This manual provides information on:

- Safety instructions and application advice
- Category of electromagnetic compatibility
- Description of the device (type plate, device views, dimensional drawings)
- Connectors
- Battery replacement

Note

More documentation can be downloaded from the SIEB & MEYER website under http://www.sieb-meyer.de/downloads.html.

This manual has the following demands on the trained staff of machine manufacturers:

Transport: only by skilled employees familiar with handling electrostatically sensitive components

Installation: only by experts with electrotechnical training

Initial operation: only by experts with experience in the fields of electrical engineering / drive technology

2.1 Scope of Supply

The following articles are supplied when you purchase a motion controller MC2:

- motion controller MC2 (type code 0362156/0362156E)
- connector/cable kit 32299573 with the following content:
  - mating connector for X32 (inputs/outputs, 24 V)
  - USB cable (length = 2 m)
- device version 1.000 and higher: SD card with device software
- software *drivemaster3*
- documentation (German and English)

3 Safety Instructions

Note

These safety instructions include important information regarding your safety and must be observed during installation and operation of SIEB & MEYER devices. Read them carefully and keep them for later use.

Also adhere to safety instructions in the product documentation and on the device.

3.1 Standards and Regulations

SIEB & MEYER devices comply with the regulations of the following standards and directives:

- Low-Voltage Directive 2014/35/EU:
  EU declaration of conformity, DIN EN 61800-5-1
- EMC Directive 2014/30/EU:
  EU manufacturer's certificate, DIN EN 61800-3
- Machinery Directive 2006/42/EC:
  EU manufacturer's certificate, DIN EN 61800-5-2 (safety functions)

Note

SIEB & MEYER products are no products according to the EU Machinery Directive. The appropriate use of SIEB & MEYER devices in machines and installations is prohibited until the manufacturer of the machine or installation confirms the CE conformity of the complete machine or installation.

Note

If the mechanics or the electronics of the device are modified, the conformity with the EC/EEC directives and thus the CE label will expire.

3.2 Working on the Device

⚠ WARNING

trained staff

→ To avoid risks of serious injuries and material damage any works regarding installation, initial operation and maintenance must be carried out by trained staff only! Furthermore, electricians who connect feed-in systems must be approved by the local DSO (distribution system operator).

→ Trained staff, according to this fundamental safety instruction, are persons familiar with the installation, mounting, initial and permanent operation of the product and they are qualified appropriately for the work. The standards DIN VDE 0100 and DIN VDE 0110 as well as the national accident prevention regulations shall be considered!

→ When installing feed-in systems adhere to all applicable regulations, special safety instructions and technical connection conditions of the local DSO.

⚠ DANGER

Risk of serious damage to property and personal injury may occur:

- when covers are removed illegally
- due to improper use
- when either the installation or the operation is incorrect

→ Observe the corresponding notes and information in the product documentation of your device.

⚠ WARNING

Risk of injuries and material damage due to illegal modifications

→ Only change the settings of the device after having contacted SIEB & MEYER vor.

All Information and advice attached to the device, such as safety instructions or danger warnings and technical data (type plate) are:

- not to be removed
- not to be damaged
- to be kept readably (no covers, no paint over or the like)

3.3 Appropriate Use

Use the device according to its appropriate use only. Consider the corresponding information regarding the application fields of the device in the product documentation.

The device is intended for use within an enclosed cabinet by the OEM or end user to comply with pollution degree 2 or equivalent environmental conditions. That means: Ensure to avoid conductive impurities and humidity during the operation.

SIEB & MEYER products are **not** suitable for use in areas exposed to explosion hazards (ATEX zones) without approriate housing.

Terms according to DIN EN 61800

Before initial operation, make sure that the machine will not expose danger (e.g. runaway moves). The conformity with the safety standards DIN EN 60204-1 and DIN EN 61800-5-1 must be ensured.

The manufacturer of the system or the machine has to meet the requirements of the legal values regarding the Electromagnetic Compatibility (EMC). SIEB & MEYER units can be operated in industrial areas, provided that the attached EMC information has been taken into consideration.

SIEB & MEYER tests all products in its own EMC laboratory to ensure that the products meet the respective standards, when they are installed properly.

Installation of the device differing from the product documentation and the manual "EMC Guidelines" means that the machine manufacturer has to carry out new measurements to comply with the regulations.

SIEB & MEYER devices meet the requirements of the Low-Voltage Directive 2014/35/EU. The harmonized standards of DIN EN 50178 and DIN EN 60204-1 in combination with the standards DIN EN 60947 and DIN EN 61800-5-1 are applied consequently.

Technical data and the connection specification can be found in the respective product documents.

Line filters

If adequate interference suppression measures are applied and the appropriate use in industrial applications of the device is ensured SIEB & MEYER devices comply with the Directive EMC Directive 2014/30/EU in terms of the EMC Product Standard (PDS) DIN EN 61800-3.

The use of line filters helps reaching the following:

- Resistance to interference. The electronic system is protected against high-frequency disturbances, possibly infiltrated via the mains cable.
- Protection against radiation. High-frequency disturbances are reduced to legally authorized measure. This prevents effects of the transients to adjacent components or devices.
- Products, not equipped with an integrated AC supply line filter must be operated with an upstream line filter.
- Using SIEB & MEYER devices in residential or business areas as well in small businesses requires additional interference suppression.
  For detailed information refer to the manual "EMC Guidelines", chapter "EMC Product Standard DIN EN 61800-3 for PDS".

Note

Refer to the product documentation of your device to find out whether or not your device is equipped with a line filter. For detailed information on line filters refer to the manual "EMC Guidelines".

3.4 Reasonably Foreseeable Misuse

The Machinery Directive defines a "reasonably foreseeable misuse" as "use of machinery in a way not intended in the instructions but which may result from predictable human behavior".

SIEB & MEYER products are no products according to the EU Machinery Directive.

During design and construction of the machine as well as in the operation manual the machine manufacturer is obliged to give consideration to the intended (appropriate) use of the machine and risks arising from reasonably foreseeable misuse of the machine.

To avoid injuries and material damage any use, installation and setup of SIEB & MEYER products by non-experts which exceed the technical data specified in the product documentation (high voltages, temperatures etc.) is considered to be not intended use and forbidden. Adhere to the safety instructions on the device and in the product documentation.

3.5 Transport and Storage

Avoid improper mechanical load of the device. The following points must especially be taken into consideration:

- Protect the device against mechanical damage! Ensure that single shock loads do not exceed 40 m/s^2.
- Protect the device against dirt and humidity.

Make sure that **dust plugs are plugged on optical fiber connectors equipped with them during transport of the device**. Otherwise, recommissioning is potentially not possible.

- Never touch electronic components.

The following climatic conditions apply to the storage. If required, appropriate measures must be taken to ensure these climatic conditions (installation of heating/air conditioning systems etc.):

- The storage area must be clean (dust-free, if possible), dry and well-ventilated.
- No storage in the open.
- The storage temperature must be in the range of −25 °C to +55 °C (−13 °F to +131 °F). Shortly it may be +70 °C (+158 °F).
- The relative humidity on the storage premises must be in the range of 5 % to 75 % (no bedewing).
- Sudden changes of the temperature or the humidity should be prevented.
- Avoid stacking of the devices during transport and storage.

The maximum storage period is 2 years. Electrolytic capacitors produce high leakage currents when a voltage is applied after a long storage period without applied voltage and must be reformed. For this, the operating voltage is applied via a 1 kΩ series resistor for one hour. Please contact the SIEB & MEYER service department for details.

3.6 Installation

NOTICE

Damage of electrostatically sensitive components due to improper handling

→ Never touch electronic components..

Note

Consider specific mounting instructions for your device.

Operating conditions:

The following requirements are to be considered for the installation and the operation of the device. Noncompliance with theses requirements is regarded as **abnormal operating condition**:

- The device is conceived according to DIN EN 61800-1/ DIN EN 50178for the dirt level 2. That means: Ensure to avoid conductive impurities during the operation.
- Devices with air cooling only can be loaded to their maximum up to a height of 1000 m above MSL (3281 ft above MSL). For an operation in areas higher than 1000 m (3281 ft) above MSL the capacity must be reduced by 1.5 % per 100 m (328 ft).
- The device must be protected against harmful gas, oil vapor and salty air at the place of installation.
- The ambient air must not contain aggressive, grinding, electrically conductive or flammable substances as well as any amount of dust.
- The maximum relative humidity during operation is 85 % (no condensation).
- The allowed ambient temperature for the operation is +5 °C to +40 °C (+41 °F to +104 °F). Extreme and sudden changes of the temperature should be prevented.
  - For devices that can be operated in ambient temperatures above +40 °C (+104 °F) (see technical data), you must consider a reduced service life due to increased wear of the components.

– Devices with polyester films: The polyester films must not be exposed to direct sunlight for extended periods of time. In conditions of high humidity (>80 %) the ambient temperature must not exceed +40 °C (+104 °F). The polyester films must not come in contact with benzyl alcohol or methylene chloride.

▸ Make sure that the aeration elements are free and open, so that the air circulation is not restricted.

3.7 Electrical Connection

⚠ DANGER

Risk of serious injuries due to touch voltages

After electric devices have been switched off touch voltages may occur depending on the device up to 4 minutes. Longer construction-related discharge times are possible. Refer to the product documentation of your device.

→ All work at and within the units must only be carried out, when the units are turned off, the mains supply is cut and the DC bus is completely discharged.

→ Never touch energized parts after a device has been switched. off.

→ Consider the VDE regulations and the applicable accident prevention regulations (e.g. VBG 1 and VBG 4).

⚠ DANGER

Risk of serious injuries due to improper connection to earth

Incorrect or insufficient connection of the system to earth may cause dangerous currents.

→ Connection to earth must be realized according to the instructions in the product documentation of your device.

The electrical installation must be carried out according to the relevant electrical codes (e.g. appropriate wire gauges, fuse protection and connections of ground conductors must be considered).

Note

SIEB & MEYERdevices are conceived for connection to symmetrically grounded TN networks. For detailed information regading the connection to TN networks or other networks refer to the manual "EMC Guidelines", chapter "Connection to Different Supply System Types".

Recommendations for the installation complying EMC (e.g. shields, connection to earth and line installations) can be found in the technical manuals of your device (only for machine manufacturers). The manufacturer of the system or machine has to meet the requirements of the legislation regarding the EMC.

1. Consider that the mains supply must be protected via an overload release with restricted guidance for each mains phase. The mains line should not be switched on, before the work is completed.
2. Before turning on the unit the first time, make sure that the connected machine will not have runaway axes.
3. Never connect capacitive loads to the output phases of the servo amplifiers and frequency converters.

4. Prevent cable loops. Therefore, the units must only be connected to earth at the provided PE connection for the mains supply line and the racks only at the provided earth screw.

⚠ DANGER

Connection of the power supply unit

This product may cause touch current in the protective earthing conductor. The current in the protective earthing conductor can exceed 3.5 mA AC or 10 mA DC.

→ Pay attention to the local safety regulations for electric equipment with high leakage currents, in particular the minimum cross-section of the protective earthing conductor.

Operation with residual current device (RCD)

Note

For detailed information regarding the operation with residual current device (RCD) refer to the manual "EMC Guidelines", chapter "Safety-relevant Aspects, Residual Current Device (RCD)".

3.8 Operation

⚠ WARNING

Risk of serious personal injury due to moving machine parts

During the operation of an installation with open doors or removed covers, persons may seriously be injured by moving machine parts.

→ Keep the doors closed during the operation and do not remove covers.

3.9 Maintenance

The unit must be checked regularly for cleanness and functionality depending on the ambient pollution. This applies in particular for installed fans.

3.10 Disposal

Note

Make sure to consider country-specific waste and disposal laws and statutes for the disposal of packing material, used batteries and irreparable devices.

SIEB & MEYERproducts meet the requirements of the following directive:

- 2011/65/EU (EU-directive RoHS 2 on the restriction of the use of hazardous substances in electrical and electronic equipment)

SIEB & MEYERproducts do not exceed the limits of the directive 2011/65/EU for hazardous substances.

SIEB & MEYERproducts labeled with the adjacent symbol also meet the regulations of the following directive:

- SJ/T 11364-2014 (China RoHS 2 on the restriction of the use of hazardous substances in electrical and electronic equipment)

SIEB & MEYERproducts labeled with the symbol above do not exceed the limits of the directive SJ/T 11364-2014 for hazardous substances.

3.11 Legal Warranty

SIEB & MEYER products are liable to a legal warranty of at least one year. Any claims for the products beyond this warranty shall be declared in an additional contractual agreement between SIEB & MEYER and the customer.

Claims for damages are excluded:

- due to improper use of the device
- when the device has been installed nonstandard or improperly, especially by electricians without license
- when the device has been employed although the protection equipment was defective
- when the maximum permissible input voltage has been exceeded
- due to improper operation
- when the device or its equipment have been modified
- when the device was affected by foreign material or force majeure

NOTICE

Due diligence of the machine manufacturer

→ A first programming carried out by SIEB & MEYER does not release the machine manufacturer from his duty to check the programmed values for correctness.

4 Unit Assembly Complying EMC

Note

The EU guidelines for electromagnetic compatibility (EMC) must be considered for the initial operation of all SIEB & MEYER devices.

The manual "EMC Guidelines" is available in German and English and includes:

- EMC rules
- information regarding the professional grounding and wiring
- safety-relevant aspects
- extracts from the EMC product standard
- possibilities for the connection to different supply system types

Availability:

- PDF file under www.sieb-meyer.de/downloads.html

4.1 EMC Classification

According to the EMC product standard DIN EN 61800-3, chapter 6 (emission of line interferences), this device meets the interference limit values of the first environment.

5 Motion Controller MC2

The motion controller MC2 is the connective link between a higher-ranking control level (PLC, IPC etc.) and one or more SIEB & MEYER drives (series SD2/SD2S and FC2). It receives and processes data and commands from the higher-ranking control and forwards these to the drive.

Communication

The higher-ranking control is connected to MC2 via Ethernet. It is also possible to use the device as stand-alone solution, which could be controlled e.g. via the internal inputs and outputs.

The communication with the SIEB & MEYER drives is established via SERVOLINK 4 (optical fibers) developed by SIEB & MEYER.

Up to 8 drives can be connected to one MC2.

Real-time transmission

A real-time operating system runs in MC2. Therefore, the data are transmitted synchronously to the drive amplifiers. This makes a controlled spatial movement of the axes possible.

5.1 Connecting MC2

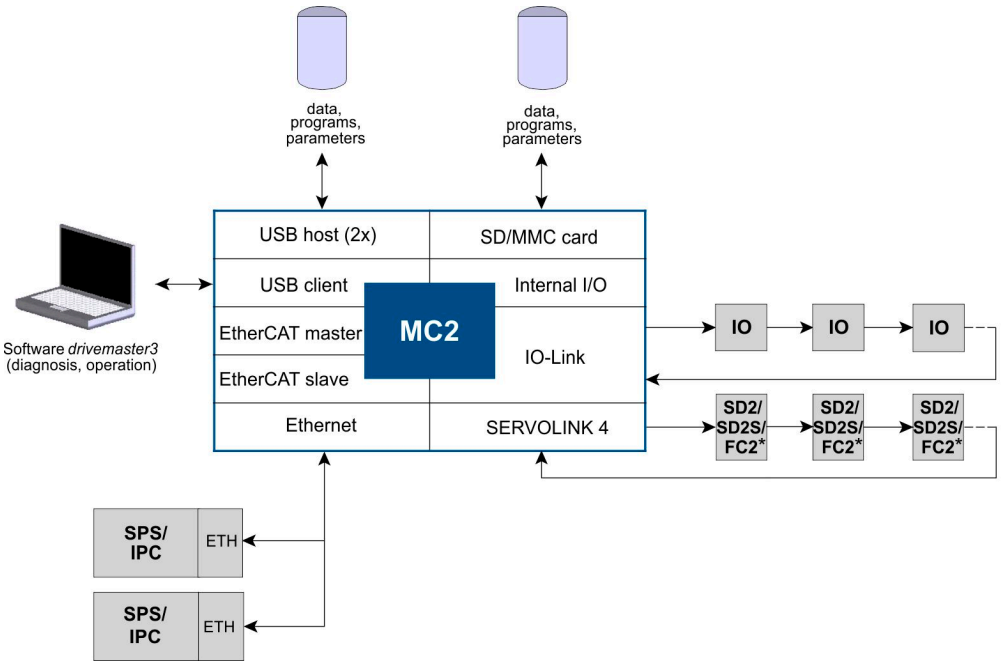


Fig. 1: MC2 Interfaces

[*] You can connect up to 8 drives to SERVOLINK 4.

5.2 Type Plate

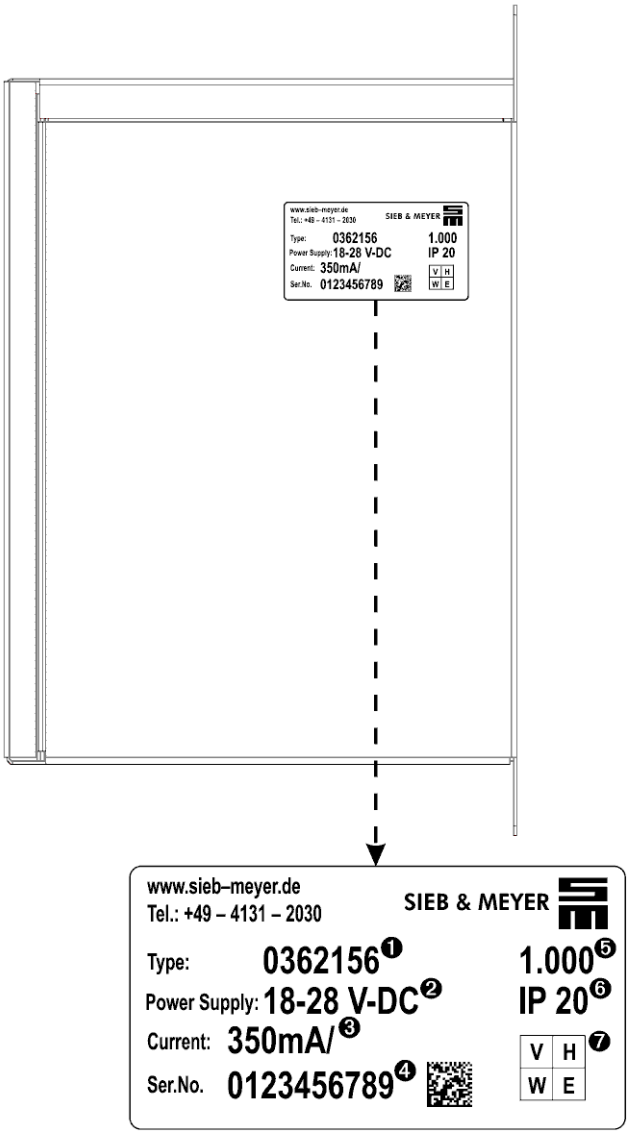


Fig. 2: Type plate MC2

No.	Meaning	Explanation
❶	Device designation	Indicates the device type
❷	Supply voltage	Indicates the maximum voltage range
❸	Current	Indicates the current consumption of the device
❹	Serial number	Indicates the individual number of the device
❺	Device version	Indicates the version of the hardware; if no version is existent, 0.000 is indicated here
❻	IP Code	Indicates the level of protection of the device against touching or intrusion of solid objects (1st digit) and water ingress (2nd digit)
❼	QA label	

6 Device variant 0362156

Fig. 3: Device view 0362156

NOTICE

Restriction of cooling air flow

The device is convection ventilated. If the circulation of air is restricted, the device could overheat and possibly become damaged.

→ When you install the device, make sure that the air inlets and outlets are kept free and the air circulation is not obstructed by other devices.

The device is designed for vertical wall mounting. Other setup positions are possible but you must consult SIEB & MEYER before.

6.1 Dimensions 0362156

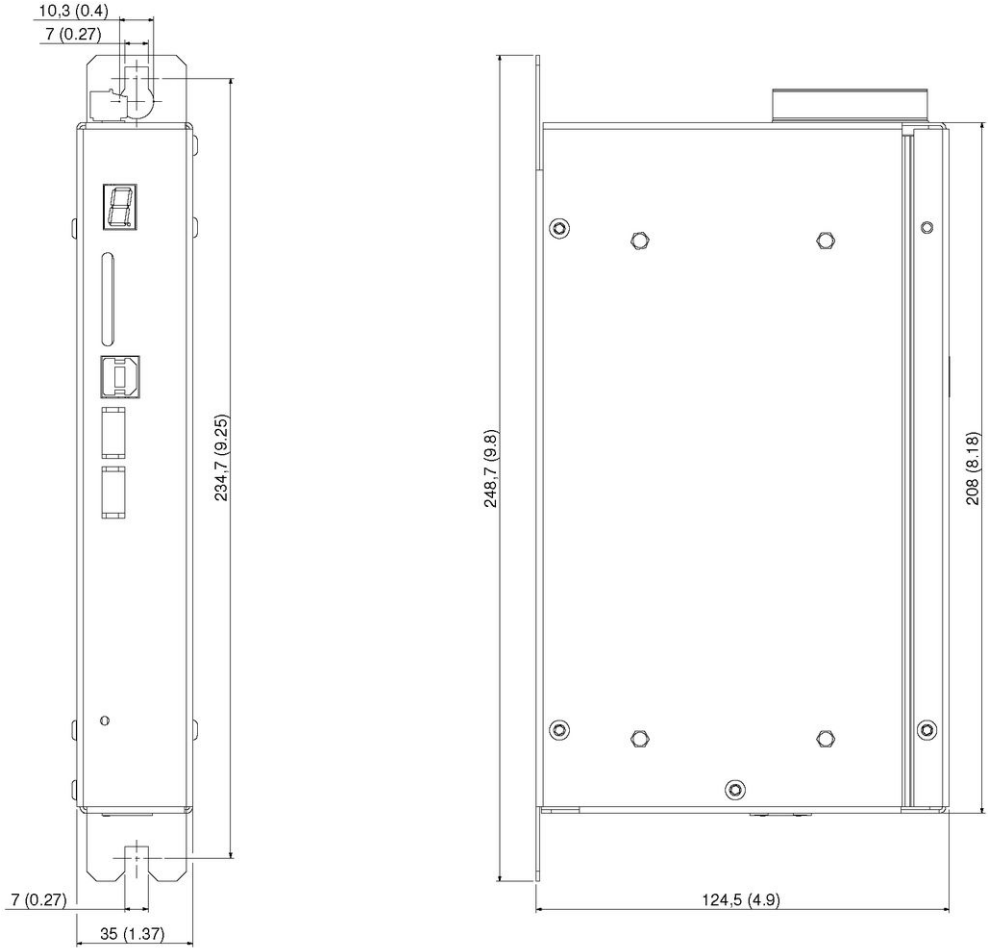


Fig. 4: Dimensions of 0362156 in mm (inch)

6.2 Technical Data

Device variant		0362156	
Device version		**0.XXX**	**1.XXX/ 2.XXX**
Connection		18 to 28 V_{DC} (350 mA)	
Limits	Switch-on voltages	>17 V	
	Switch-off voltages	<12 V	
Processor		Intel Atom Z510	Intel E3815
Clock frequency		1.1 GHz	1.46 GHz
Memory	RAM	512 MB	1 GB
	Flash	512 MB	–
	SD/MMC card	–	4 GB(1)
Interfaces (USB 2.0)		2 × host 1 × device	
Network		100BaseT Ethernet / 1000BaseT Ethernet	
EtherCAT master		–	–
EtherCAT slave		–	–
Others		1 × SERVOLINK 4 1 × IO-Link	

(1) For MC2 device version 1.000 and higher the scope of supply includes an SD card, see chapter 8 “SD Card”, page 25.

Note

Voltage drops under 12 V may occur for 20 ms during 24 V operating voltage!

6.3 Connectors and Displays

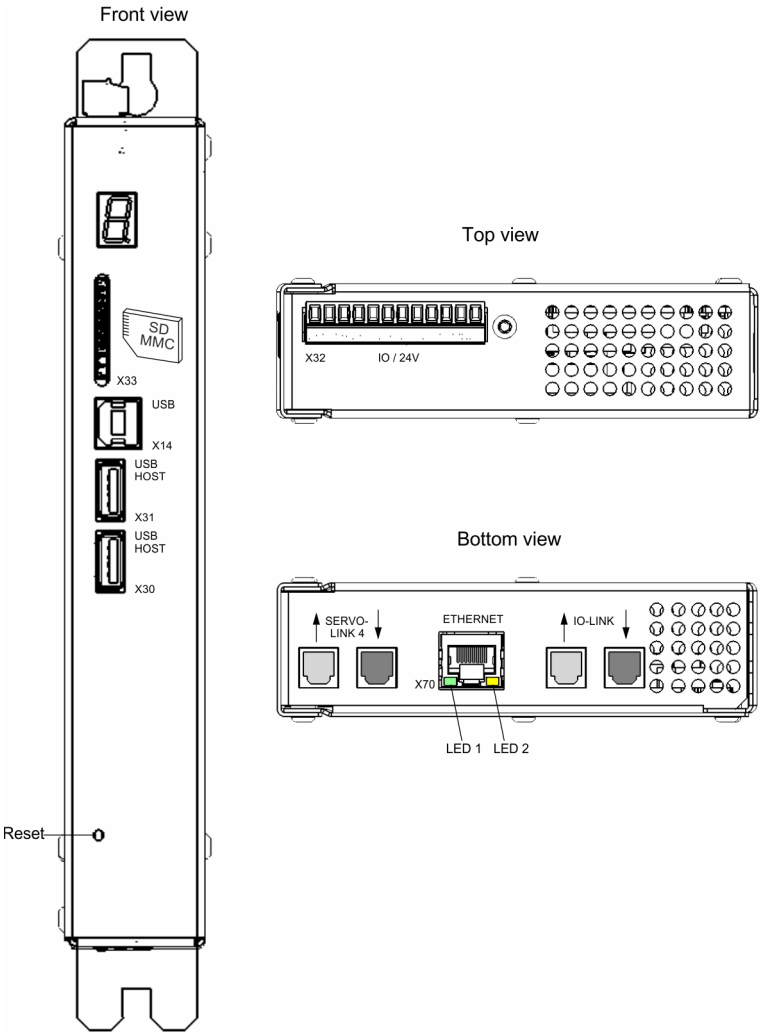


Fig. 5: Connectors and Displays 0362156

Name	Meaning	Description
	Status display of the device	page 34
X14	USB interface for parameter setting	page 26
X30/X31	USB interface for communication	page 26
X32	Digital inputs/outputs	page 27
X33	SD card reader	page 27
X70	Ethernet interface	page 30
SERVOLINK 4	Fiber optic connectors for SERVOLINK 4	page 31
IO-Link	Fiber optic connectors for IO-Link	
Reset	Reset Button	page 33

7 Device Variant 0362156E

Fig. 6: Device view 0362156E

NOTICE

Restriction of cooling air flow

The device is convection ventilated. If the circulation of air is restricted, the device could overheat and possibly become damaged.

→ When you install the device, make sure that the air inlets and outlets are kept free and the air circulation is not obstructed by other devices.

The device is designed for vertical wall mounting. Other setup positions are possible but you must consult SIEB & MEYER before.

7.1 Dimensions 0362156E

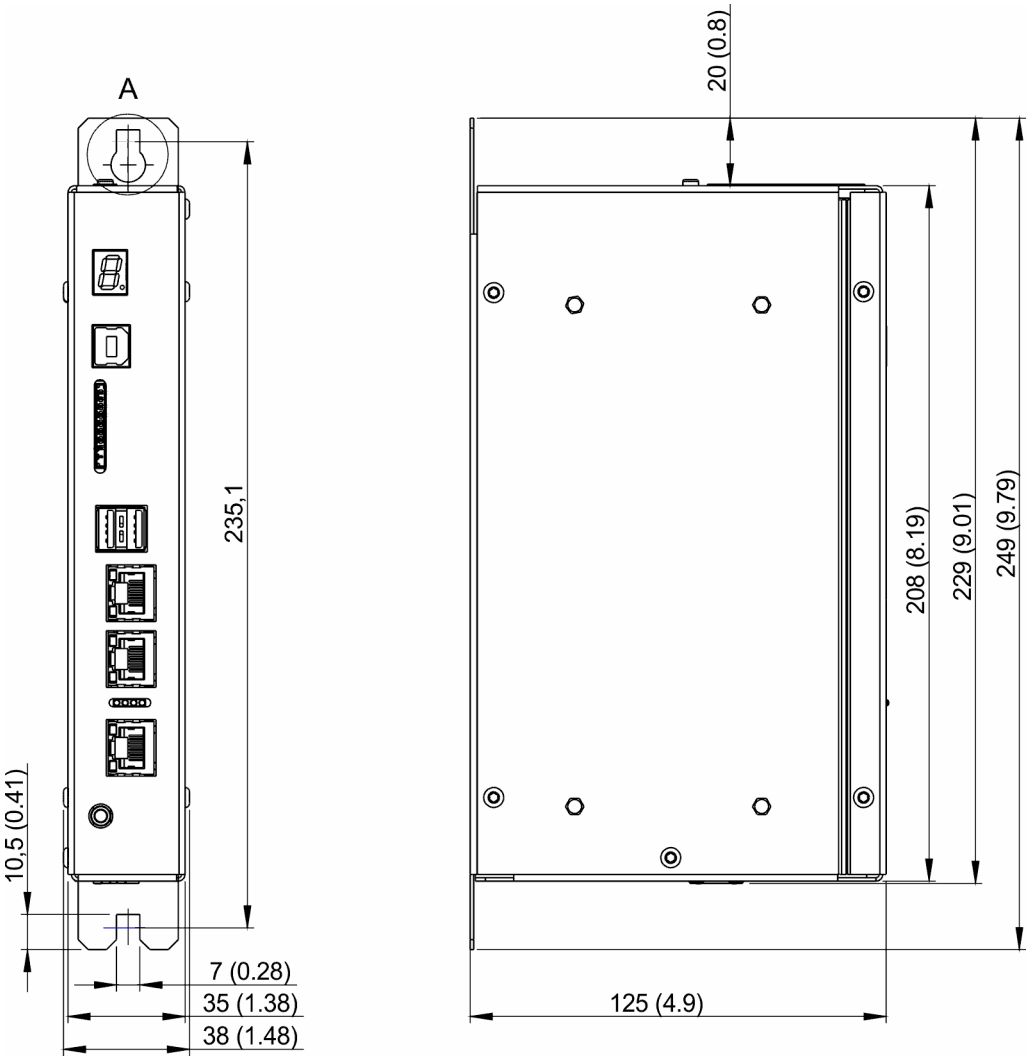


Fig. 7: Dimensions of 0362156E in mm (inch)

7.2 Technical Data

Device variant		0362156E
Device version		**2.XXX**
Connection		18 to 28 V_{DC} (350 mA)
Limits	Switch-on voltages	>17 V
	Switch-off voltages	<12 V
Processor		Intel E3815
Clock frequency		1.46 GHz
Memory	RAM	1 GB
	Flash	–
	SD/MMC card	4 GB[(1)]
Interfaces (USB 2.0)		2 × host 1 × device
Network		100BaseT Ethernet / 1000BaseT Ethernet
EtherCAT master		X
EtherCAT slave		X
Others		1 × SERVOLINK 4 1 × IO-Link

[(1)] For MC2 the scope of supply includes an SD card, see chapter 8 “SD Card”, page 25.

Note

Voltage drops under 12 V may occur for 20 ms during 24 V operating voltage!

7.3 Connectors and Displays

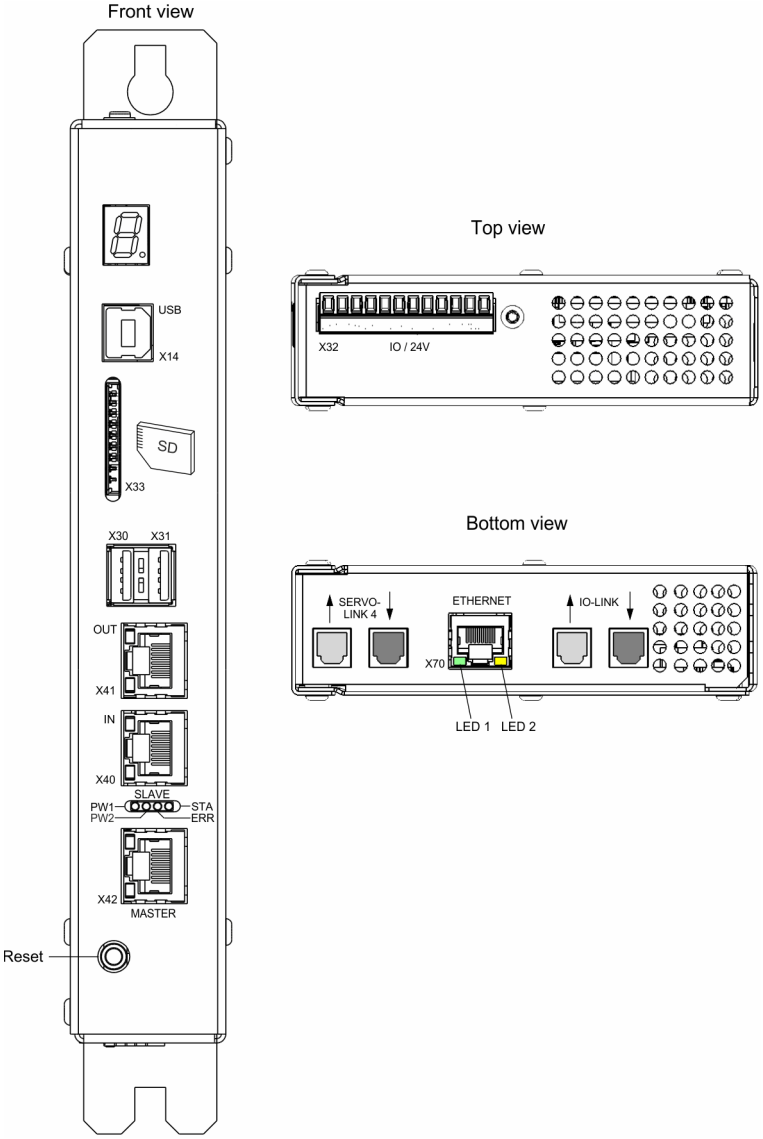


Fig. 8: Connectors and displays of 0362156E

Name	Meaning	Description
	Status display of the device	page 34
X14	USB interface for parameter setting	page 26
X30/X31	USB interface for communication	page 26
X32	Digital inputs/outputs	page 27
X33	SD card reader	page 27
X40	EtherCAT slave interface: input data	page 28
X41	EtherCAT slave interface: output data	
X42	EtherCAT master interface	page 30
X70	Ethernet interface	page 30
SERVOLINK 4	Fiber optic connectors for SERVOLINK 4	page 31
IO-Link	Fiber optic connectors for IO-Link	
Reset	Reset Button	page 33

8 SD Card

For MC2 device version 1.000 and higher the scope of supply includes an SD card.

The SD card contains the device software (firmware, application and device settings) and must be inserted in the card reader X33. For this purpose refer to the chapter 9.4 “X33 – SD/MMC Card”, page 27. Without this memory card MC2 cannot work.

SD card	
Min. memory size	4 GB
Speed class rating	Class 10 (at least 10 MB/s)

By means of the external memory the user can duplicate all machine data. For this purpose the SD card is simply copied at a PC (Linux/Windows), e.g. using the freeware „USB Image Tool“.

Note

If you exchange the SD cards of several MC2 devices, the device versions must match.

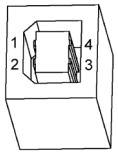
9 Connector Pin Assignment

9.1 X14 – USB Client (Parameterization)

Communication interface to the connected PC

Diagnosis of the device via the software *drivemaster3*

4-pole female USB connector, type B

X14	Pin	I/O	Name	Description
	1	-	VCC	5 V voltage supply for USB
	2	I/O	D−	Data−
	3	I/O	D+	Data+
	4	I/O	GND	Ground

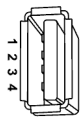
Note

A USB cable to the PC (length = 2 m) is included in the scope of supply of the MC2.

9.2 X30 / X31 – USB Host

Communication interface for USB flash drives or monitors with DisplayLink interface

4-pole female USB connector, type A

X30/X31	Pin	I/O	Name	Description
	1	-	VCC	5 V voltage supply for USB
	2	I/O	D−	Data−
	3	I/O	D+	Data+
	4	–	GND	Ground

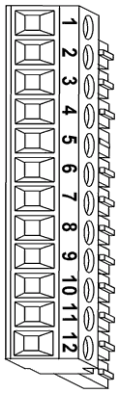
9.3 X32 – Inputs/Outputs, 24 V Connection

The available functions of the digital inputs and outputs are different depending on the drive function.

Note

You must connect pin 9 to 24 V to supply the device. For this purpose use an external 24 V source.

12-pole Mini-Combicon connector, suitable for mating connector MC 1,5/ 12-ST-3,81 (Phoenix)

Mating connector X32	Pin	Coding	I/O	Name	Description
	1	-	I/O	IN0 / OUT0[1]	Digital input or output
	2	-	I/O	IN1 / OUT1[1]	Digital input or output
	3	-	I/O	IN2 / OUT2[1]	Digital input or output
	4	Coded	I/O	IN3 / OUT3[1]	Digital input or output
	5	-	I/O	IN4 / OUT4[1]	Digital input or output
	6	-	I	IN5 / OUT5(1)	Digital input or output
	7	-	I	IN6	Digital input
	8	-	I	IN7	Digital input
	9	-	I	VCC_IN	24 V supply for device (nom. 8 W, self-resetting fuse)
	10	-	O	VCC_OUT(2)	24 V output for inputs/outputs (max. 1.1 A, self-resetting fuse)
	11	-	I/O	GND	Ground
	12	-	I/O	GND	Ground

(1) Via the software *drivemaster3* you can set whether the pin will operate as digital input or output (default = output).

(2) VCC_OUT is optional and can be used e.g. as auxiliary voltage for the inputs and outputs.

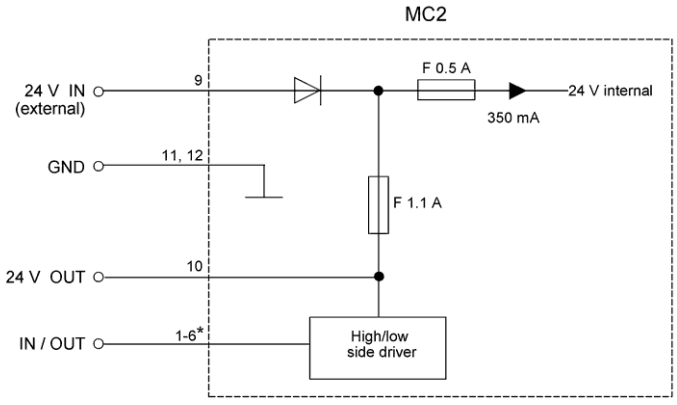


Fig. 9: Connection example: digital inputs

[*] Each input/output can be loaded with max. 150 mA.

9.4 X33 – SD/MMC Card

The card reader X33 can read SD/SDHC/SDIO cards and MMC cards.

NOTICE

Incorrect or forced insertion of the memory card

→ To avoid damage to the memory card and the card reader, make sure that you push the card without force and the right way around (see arrow direction) into the reader.

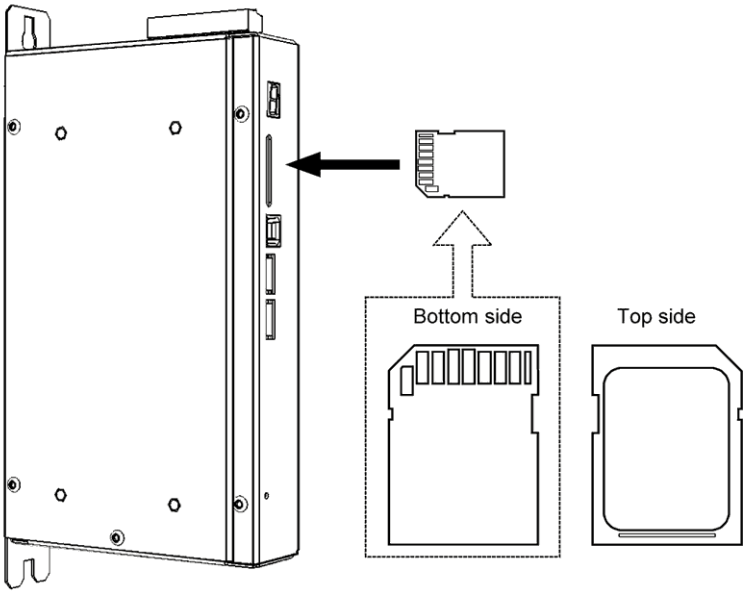
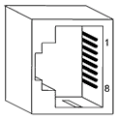


Fig. 10: Inserting the SD/MMC card into the card slot of MC2

9.5 X40/X41 – EtherCAT Slave Interfaces

- X40: input data EtherCAT
- X41: output data EtherCAT

8-pole female RJ45 connectors

X40/X41	Pin	IO	Name	Description
	1	O	TX+	Transmit data +
	2	O	TX-	Transmit data-
	3	I	RX+	Receive data +
	4		n.c.	
	5		n.c.	
	6	I	RX-	Receive data-
	7			Not assigned
	8			Not assigned

9.5.1 LED Display of EtherCAT Slave Interfaces

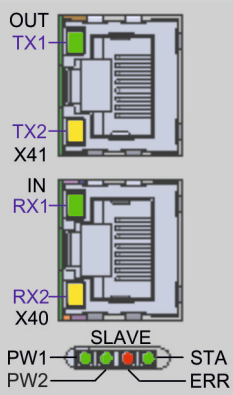
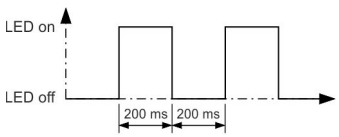
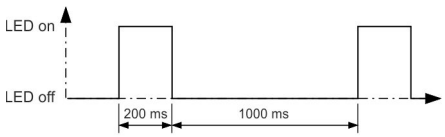


Fig. 11: LEDs of EtherCAT slave interface

LED	Color	Status	Meaning
TX1	Green	●	Data transmission (TX) active
TX2	Yellow	●	Speed = 100 MBit
RX1	Green	●	Data reception (RX) active
RX2	Yellow	●	Speed = 100 MBit

LED	Color	Status	Meaning
STA	Green	○	Init: Communication between master and slave (drive) is not possible
		☼ (fast)	Pre-operational: Only SDO communication is possible. No process data are transmitted. The LED flashes at the following intervals: 
		☼ (slow)	Safe-operational: As process data only actual values are transmitted from the slave (drive) to the master. SDO communication is possible. The LED flashes at the following intervals: 
		●	Operational: The complete data channel is active.
ERR	Red	●	Communication error
PW1	Green	☼	Processor watchdog: Processor is active. (PW1 and PW2 flash alternately.)
PW2	Green	☼	

9.6 X42 – EtherCAT Master Interface

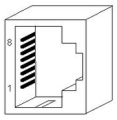
Data transmission rate: 100 Mbit, 1 Gbit

Note

Make sure that you use a suitable patch cable for Ethernet or a corresponding Ethernet switch:

- 100-Mbit transmission: communication via 4 wires
- 1-Gbit transmission: communication via 8 wires

8-pole female RJ45 connector

X42	Pin	I/O	Name	Description
	1	O	A+	Transmit data +
	2	O	A−	Transmit data −
	3	I	B+	Receive data +
	4	O	C+	Transmit data +
	5	O	C−	Transmit data −
	6	I	B−	Receive data −
	7	I	D+	Receive data +
	8	I	D−	Receive data −

Note

The LED description can be found below the Ethernet interface X70, see page 31.

9.7 X70 – Ethernet

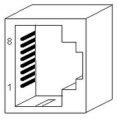
Data transmission rate: 100 Mbit, 1 Gbit

Note

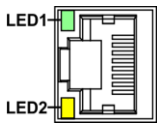
Make sure that you use a suitable patch cable for Ethernet or a corresponding Ethernet switch:

- 100-Mbit transmission: communication via 4 wires
- 1-Gbit transmission: communication via 8 wires

8-pole female RJ45 connector

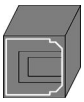
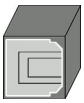
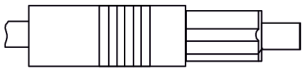
X70	Pin	I/O	Name	Description
	1	A	A+	Transmit data +
	2	O	A−	Transmit data −
	3	I	B+	Receive data +
	4	O	C+	Transmit data +
	5	O	C−	Transmit data −
	6	I	B−	Receive data −
	7	I	D+	Receive data +
	8	I	D−	Receive data −

9.7.1 LED Display of Ethernet Interface

View	LED	Color	Status	Meaning
	LED 1	Green	☼	Data exchange active
		Yellow	●	Ethernet speed = 1 Gbit
	LED 2	Yellow	●	Ethernet connection OK
			☼	Data exchange active

9.8 SERVOLINK 4 and IO-Link

The fiber optic connectors for SERVOLINK 4 and IO-Link are located at the bottom side of the device.

Connector		SIEB & MEYER article number
	Inputs (black)	12540102
		12540103
	Outputs (gray or white)	12540202
		12540203
	Cable connector (TOSLINK F05)	32022900

NOTICE

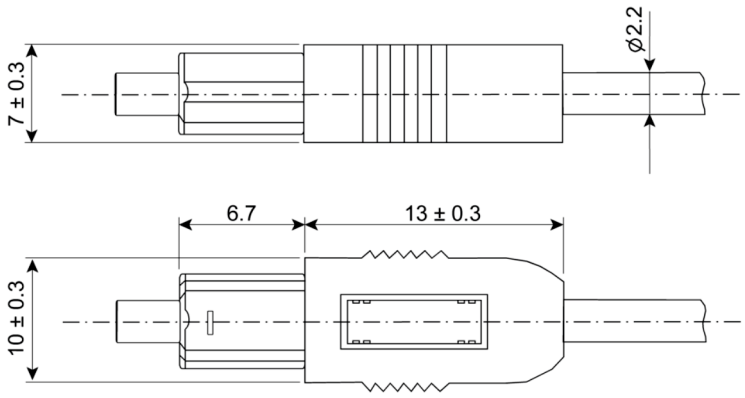
Risk of cable damage

If you pull the optical fiber cable with its connector too fast out of the connector, the cable may be damaged.

→ When unplugging the cable, hold the fiber optic connector and pull the cable carefully out of the connector.

9.8.1 Preparation of Optical Fiber Cables with Connector

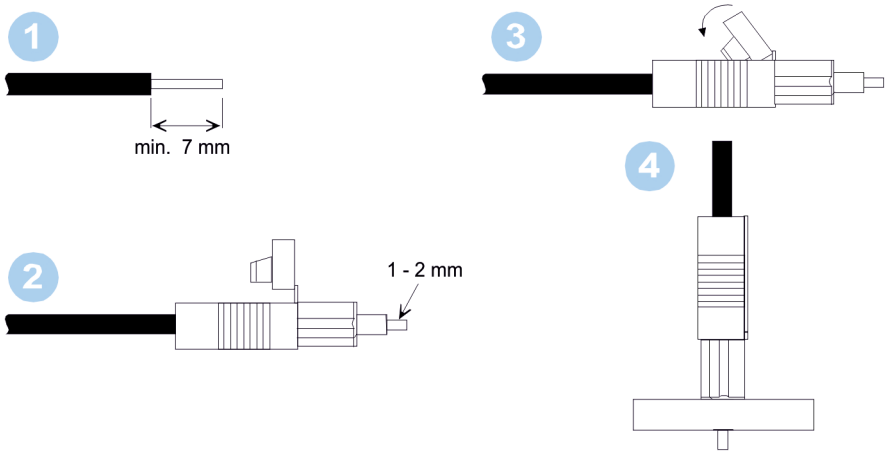
Every optical fiber connector requires an optical fiber cable with a male connector. The following information apply for connectors used in applications with 1 mm standard plastic optical fibers (POF).



Technical data		Rated value
Storage temperature		-40 to 70 °C
Operating temperature		-20 to 70 °C
Tensile stress	Between optical fiber cable and connector	19.6 N
	Optical fiber cable	49 N
Bending radius When bending the optical fiber cable to install it, note that the recommended bending radius is six to ten times greater than the minimum bending radius.		Min. 25 mm

Procedure

1. Remove at least 7 mm of the optical fiber cable's plastic sheat (diameter 2.2 mm); see figure, [1]). Take care that the dismantled end of the optical fiber cable is not contaminated. If necessary, clean it gently with a dry tissue paper.
2. Insert the dismantled optical fiber cable carefully as shown in the figure into the connector. The polymer fiber of 1 mm should stand out from the connector about 1 to 2 mm (see figure, [2]).
3. Press the clip of connector so that the polymer fiber is hold in the connector. The connector and the clip must interlock audibly (see figure, [3]).
4. Insert the connector with the optical fiber cable into a polishing disk and grind the outstanding end of the fiber by means of a polishing sheet on an even surface (e.g. glass sheet), see figure, [4]). Remove grinding residues.



You can order the following materials at SIEB & MEYER:

Article	SIEB & MEYER article number
Polishing disk for optical fiber cables	47000001

Article	SIEB & MEYER article number
Dismantling tool for optical fiber cables	47000002
Grinding paper	47000003

9.9 Reset Button

On the front panel of the device you find a small circular opening. The reset button is located behind this opening. When the reset button is pushed, the module is restarted.

(As an alternative you can also disconnect the 24 V supply for a short time.)

1. In order to trigger a reset push the button using a pointed object (e.g. ball pen).

10 Status Display of the Device

The 7-segment display shows the status of MC2.

Depending on the application the device status is either displayed as one digit or as sequential message. The messages end with dot behind the last letter.

List of device states:

Display		Meaning
Digit	Message	
	-	Boot phase of the device ▸ During the boot phase the device can not be accessed.
		Connection establishment / no communication with higher-ranking control ▸ MC2 waits for the connection with the higher-ranking control or ▸ Heartbeat bit is deactivated.
		Ready for operation ▸ Communication with higher-ranking control is active. ▸ No error. ▸ Heartbeat bit is operated by the control.

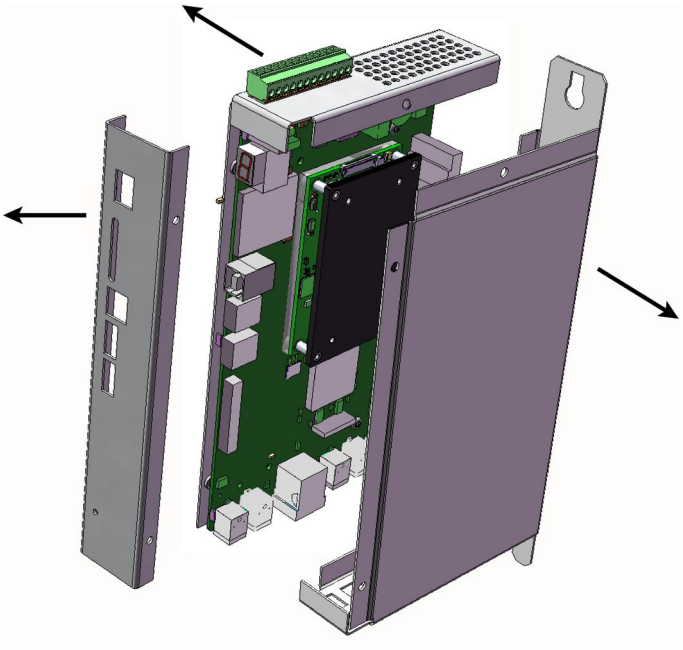
11 Battery Replacement

Check the date and the time regularly. If the data are not correct, the battery is low. Then, replace the battery as described in the following:

- Disconnect the device from the power supply.
- Open the housing of the module.

  a. Remove the front panel at first: Unscrew the 4 bolts (M3 Torx, pan head) on the sides of the front panel. Then pull the panel off to the front.

  b. Unscrew the bolt on the right side and the 3 bolts (M3 Torx, pan head) on the left side of the device housing. Then pull the two housing parts apart. The PCB with the battery is fastened to the left housing part.



- Remove the used battery from the holder and put a new one in place (CR2032 lithium coin cell, 3 V).
- Close the housing and take care that all bolts are tightened firmly.
- Put the module into operation again.
- Set date and time (e.g. using the software *drivemaster3*).

12 Appendix

A Manufacturers

A.1 SIEB & MEYER Accessories

In the following you find all accessories for MC2 that you can order at SIEB & MEYER.

Note

Consider the information on accessories suitable for your device in the technical manual.

A.1.1 Connectors of the Series MC2

Connector/cable kit

The following connector/cable kit is supplied with MC2:

SIEB & MEYER article number	Description
32299573	Mating connector for X32 (inputs/outputs, 24 V) and USB cable (length = 2 m)

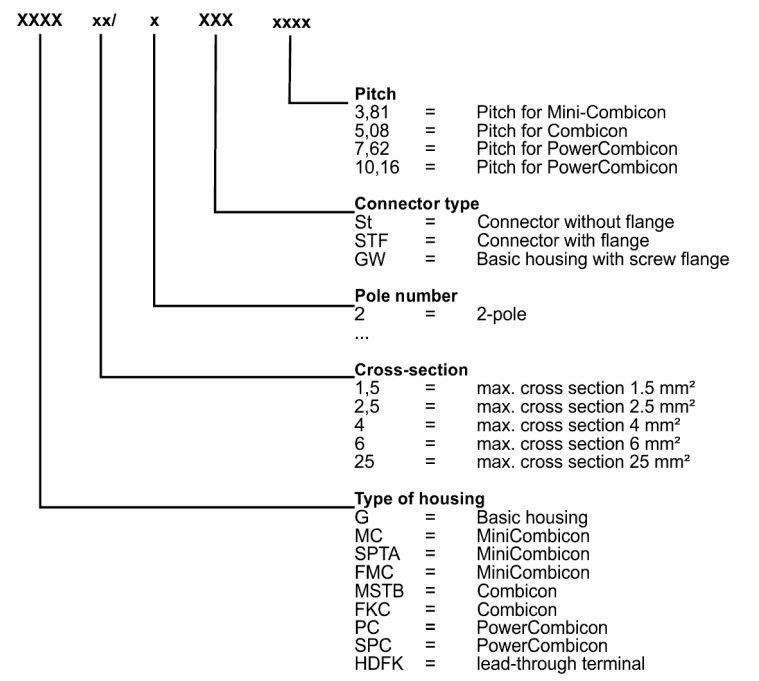
Fiber optic connectors

SIEB & MEYERarticle number	Description
12540102	Female connector, input (black)
12540202	Female connector, output (gray)
32022900	Cable connector (Toslink F05)
47000001	Polishing disk for optical fiber cables
47000002	Dismantling tool for optical fiber cables
47000003	Grinding paper

A.2 Phoenix Contact

http://www.phoenixcontact.com

Order key for Phoenix connectors



Note

Labeled connectors can be ordered at SIEB & MEYER.

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