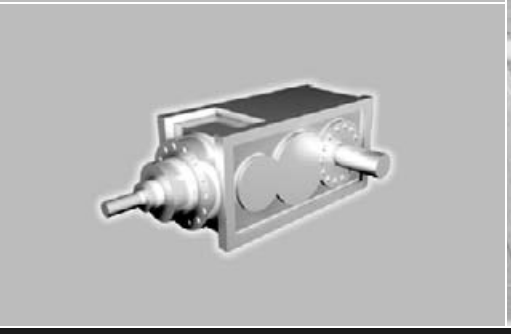
SEW EURODRIVE



MOVIAXIS® MX Multi-Axis Servo Inverter

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Catalog

SEW
EURODRIVE

1 The SEW-EURODRIVE Group of Companies

Introduction

SEW-EURODRIVE is a market leader in the global drive engineering sector. Its global presence, extensive product range and broad spectrum of services make SEW-EURODRIVE the ideal partner for the machinery and plant construction industry when it comes to providing drive systems for demanding applications.

SEW-EURODRIVE possesses many years of experience in drive engineering which it puts to good use when developing, producing and selling all its drives with components from mechanical and electrical engineering and electronics.

The company headquarters are located in Bruchsal, Germany. Components for the SEW-EURODRIVE modular drive system are manufactured to the highest quality standards in production plants sited in Germany, France, Finland, the United States, Brazil and China. The individual drive systems are assembled with a consistently high quality standard and very short delivery times from stocked components in our assembly plants located in more than 30 industrialized countries all over the world. SEW-EURODRIVE sales, consulting, customer and spare parts services are available in more than 50 countries around the globe.

The product range

- Gearmotors, gear units and motors.
  - Helical gear units/gearmotors
  - Parallel shaft helical gear units/gearmotors
  - Helical-bevel gear units/gearmotors
  - Helical-worm gear units/gearmotors
  - Spiroplan® right-angle gearmotors
  - Planetary gearmotors
  - Industrial gear units
  - Low backlash gear units/gearmotors
  - Energy efficient motors
  - Brake motors
  - Drives for overhead trolley systems
  - Geared torque motors
  - Pole-changing gearmotors
  - Helical-bevel servo gear units/gearmotors
  - Planetary servo gear units/gearmotors

- Electronically controlled drives
  - MOVIAXIS® multi-axis servo inverter
  - MOVITRAC® frequency inverters
  - MOVIDRIVE® drive inverters
  - MOVIDYN® servo controllers
  - Technology and communication options for the inverters
  - Asynchronous AC motors and AC gearmotors
  - Asynchronous and synchronous servomotors and geared servomotors
  - DC motors, brake motors and gearmotors
  - Asynchronous and synchronous linear motors
  - Synchronous linear motors

- Components for decentralized installation
  - MOVIMOT® gearmotors with integrated frequency inverter
  - MOVI-SWITCH® gearmotors with integrated switching and protection function
  - Field distributors, fieldbus interfaces

- Mechanical variable speed drives
  - VARIBLOC® wide V-belt variable speed gearmotors
  - VARIMOT® friction disc variable speed gearmotors

- Explosion-proof drives to EU directive 94/9/EC for categories 2 and 3

- Services
  - Technical consulting
  - Application software
  - Seminars and training
  - Extensive technical documentation
  - Worldwide customer service

2 Important Notes

2.1 Meaning of symbols

Safety and warning notes

Always follow the safety and warning notes in this publication.

Electrical hazard
Possible consequences: Severe or fatal injuries.

Hazard
Possible consequences: Severe or fatal injuries.

Hazardous situation
Possible consequences: Slight or minor injuries.

Harmful situation
Possible consequences: Damage to the unit and the environment.

Tips and useful information.

2.2 Operational environment

Caution! Danger of fatal injury

Operation of the MOVIAXIS® MX multi-axis servo inverter is not permitted in potentially explosive areas because it may be the source of an ignition.

Install the MOVIAXIS® MX multi-axis servo inverter under environmental operating conditions as described in the section Technical Data.

Protect the MOVIAXIS® MX multi-axis servo inverter from possible damages

The MOVIAXIS® MX multi-axis servo inverter can be damaged if it is operated under the following environmental conditions for which it has not been designed, such as:

- In areas exposed to harmful oils, acids, gases, vapors, dust, radiation, excessive mechanical vibrations etc.
- In non-stationary applications that are subject to mechanical vibration and shock loads in excess of the requirements in EN 50178.

Install the MOVIAXIS® MX multi-axis servo inverter under environmental operating conditions as described in section 6 "Technical Data." You will prevent damages to the unit and preserve the functionality of the unit.

2.3 Safety functions

Warning of malfunctions of the MOVIAXIS® MX multi-axis servo inverter

The MOVIAXIS® MX multi-axis servo inverter may only perform the safety functions for which it has been explicitly specified. Malfunctions of the MOVIAXIS® MX multi-axis servo inverter can result in damages to persons and material.

Use higher-level safety systems to provide adequate protection for persons and machines, if necessary.

For safety applications, refer to the publication "Safe Disconnection for MOVIAXIS® - Conditions."

Disposal

Please follow the current instructions. Dispose of the following materials in accordance with the regulations in force:

- Electronics scrap (circuit boards)
- Plastic (housing)
- Sheet metal
- Copper

etc.

3 System Description

3.1 System overview

Power components

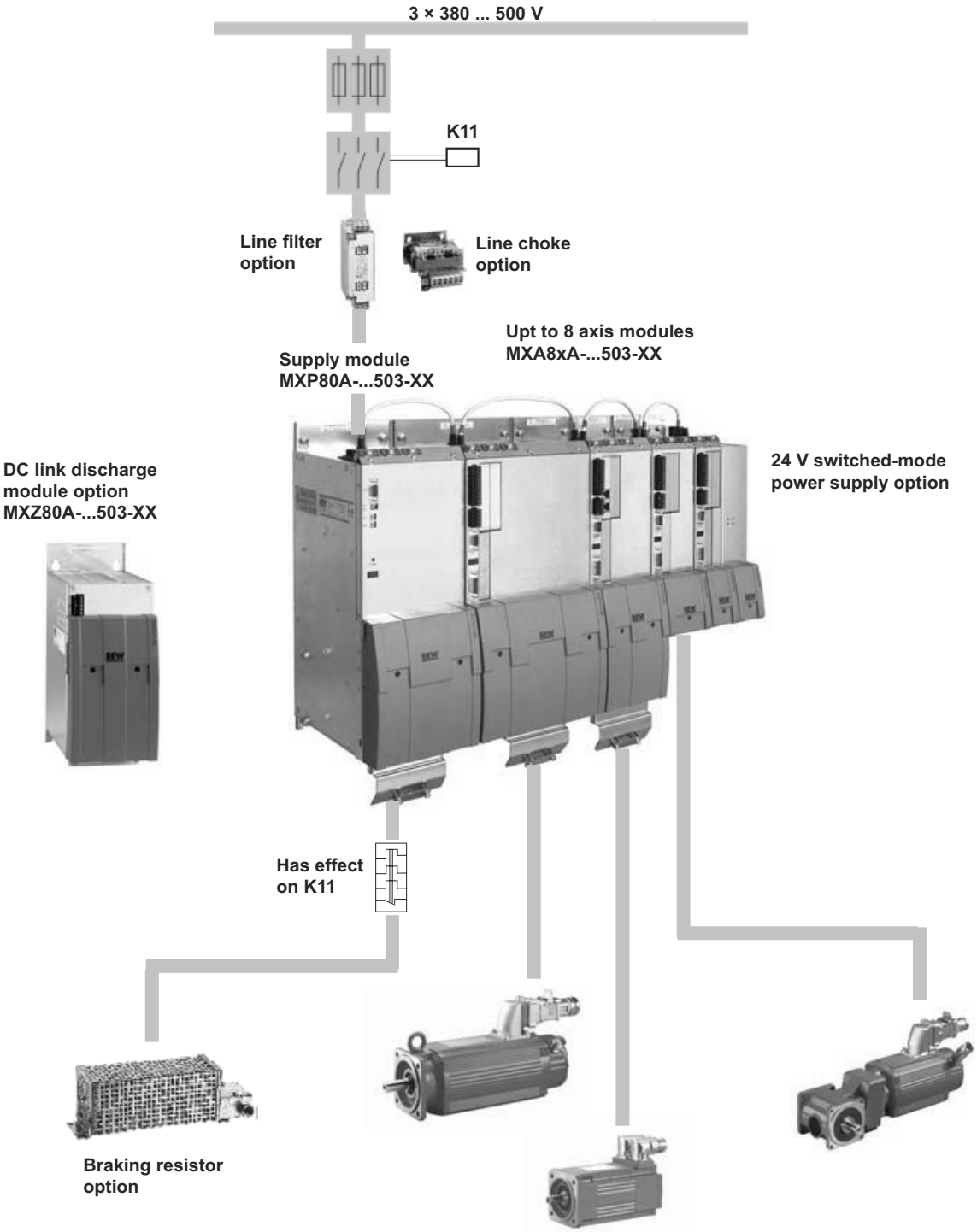


Figure 1: System overview of the power components

3.2 Unit series

MOVIAXIS® is the designation for the new, modular servo inverter series from SEW-EURODRIVE.

The new drive series offers the user optimum performance with maximum adjustment for the specific application with

- technology for motion control and servo applications that matches any application,
- an overload capacity of 250%,
- a compact design for 300 mm control cabinets,
- a scalable bus system consisting of one or two CAN based or one EtherCat based system bus,
- expansion options of the MOVI-PLC® 16 and 32 bit controller generation.

The wide power range of 2 A rated current to 250 A peak current makes the servo inverter suitable for a wide range of applications. The entire system is supported by the "all-in-one" software environment MOVITOOLS® MotionStudio. This software environment implements startup functions and enables the user to easily and quickly perform parameter settings, programming and diagnostics.

Low-emission

The MOVIAXIS® multi-axis servo inverters are produced according to particularly low-emission regulations, but with the usual high level of quality. One particular feature is the consistent use of lead-free soldering materials in the production of electronics products. These lead-free processes are in line with the "RoHS" EU Directive and the planned law on electronic equipment.

Area of application

MOVIAXIS® multi-axis servo inverters have been designed for compact machine and plant automation systems. Thanks to the standard power supply, the powerful standard system bus and the intelligent distribution of functions, all system components can be combined flexibly to form individual drive solutions.

Axis modules can be connected to a central supply module. Synchronous and asynchronous motors as well as synchronous linear motors with suitable encoder system can be operated in controlled mode using the axis modules.

State-of-the-art encoder evaluations and control modes fulfill the highest demands on dynamic properties and speed quality. Comprehensive communication and control options ensure scalable, customer-specific adjustment to virtually any application by taking account of the optimum efficiency.

The unit series

MXP80A-... supply module

The supply module supplies up to eight axis modules with power and regulates the regenerated power according to the selected unit version, that is, power is reduced via a braking resistor, is temporarily stored in storage capacity or is fed back into the supply system.

Features of supply modules:

- 4 power classes: 10 / 25 / 50 / 75 kW.
- Mains supply voltage of the supply module: AC 3 × 380 - 500 V, 50 - 60 Hz.
- High overload capacity of 250 % of the rated power for maximum 1 s.
- Minimized charging currents and high effective current percentage for mains-friendly harmonic behavior.
- Depending on the type equipped with integrated DC link buffer and braking resistor.
- Integrated brake chopper
- Automatic addressing of all axes connected to the CAN1 system bus.

MXA80A-... axis module

The axis modules communicate directly with the controller via the integrated system buses, or are centrally controlled via a master module.[1] The modules can be equipped with up to two safety relays for implementing safe stop to category 3 or 4, see also page 17.

Features of axis modules:

- Finely graded axis sizes:
  - at PWM 4 kHz: 2 / 4 / 8 / 12 / 16 / 32 / 43 / 64 / 85 / 133 A.
  - at PWM 8 kHz: 2 / 4 / 8 / 12 / 16 / 24 / 32 / 48 / 64 / 100 A,
- High overload capacity of 250 % of the rated current for maximum 1 s.
- Up to three motors per axis module can be operated with a separate parameter set; parameter sets are selectable[2].
- Very comprehensive, free of charge technology and motion control functions, such as electronic cam, synchronous operation, virtual encoder, etc.
- Can be controlled with user defined units.
- Central data backup in the master module.
- CAN1 system bus, a CAN2 bus can be configured as CANopen or system bus II.
- Firmware and parameter upgrade via fieldbus.

1) In the fieldbus gateway type

2) In preparation

Master module (not included in scope of delivery)

The master module extends the MOVIAXIS® multi-axis servo system by various control, communication and data management functions.

The master module is available as version with MOVI-PLC® Basic (16 bit motion controller), MOVI-PLC® advanced (32 bit motion controller) and fieldbus gateway.

The fieldbus gateways provide sophisticated and transparent communication access to the entire axis system. They replace all fieldbus cards in the individual axis modules. This means the type of the axis module used need not always be adjusted with fieldbus cards which optimizes logistics and parts held in storage. The axis module is equipped with a USB port for parameter setting, a TCP / IP network connection and an SD memory card for central data storage of all axis system data. When an axis is replaced, the entire data record including the parameter setting is loaded to the new axis. This makes restart after a replacement very easy.

The fieldbus gateways communicate with the axis system either via the CAN1/CAN2 or the EtherCAT system bus connection.

All integrated controllers are available with comprehensive libraries. The installed function modules can be programmed in IEC 61131. This means the user can access the drive functions of the servo inverter from the familiar PLC programming environment. All MOVI-PLC® controllers speak the "language" of the servo inverter and control it much better than non-SEW controllers via process data interface. USB and TCP/IP interfaces, local I/Os and central data storage of all data and programs of the axis system are integrated depending on the control class.

Types

Based on the flexible combination options for hardware, functionality, technology and control engineering, the MOVIAXIS® multi-axis servo inverters are ideal for use in different automation topologies.

The primary difference of these structures is where and with which PLC and motion control functionality they are being processed.

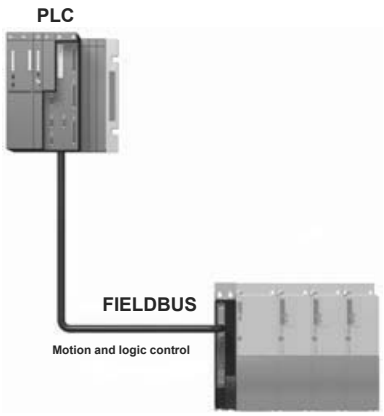
They are also characterized by the use of different master modules according to the automation structure (control/fieldbus gateway).

Following a description of the four automation structures:

1. Master module with fieldbus gateway

Characteristics:

- Centralized and cost optimized communication via integrated fieldbus gateway for all connected axes.
- Communication either via
  - Profibus gateway
  - ProfiNet gateway[1)],
  - Ethernet IP gateway[1)],
  - ModBus TCP gateway[1)],
- Central data storage of all axis parameters and settings.
- Automatic reload of axis parameters if an axis has to be replaced.
- Connection via CAN1 and/or CAN2.
- Optional connection via EtherCAT-based system bus[1)].
- Ethernet-TCP/IP port for connection to company network.
- User-friendly integrated technology and motion control functions of the axis modules.

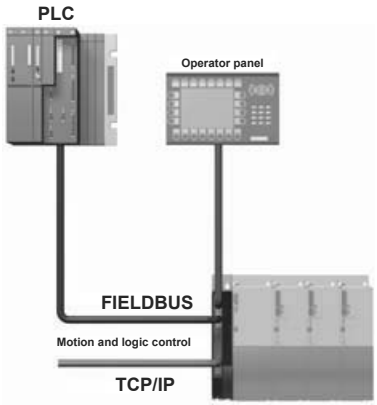


1) in preparation

2. Master module with MOVI-PLC® Basic (integrated 16 bit motion controller)

Characteristics:

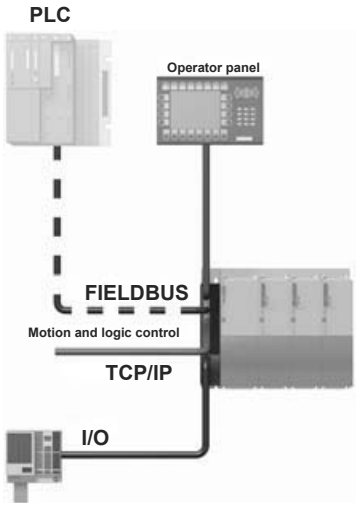
- Centralized, in IEC 61131 freely programmable motion controller for the entire MOVIAXIS® axis system.
- PLC-open certified library concepts from communication functions through to application solutions for all motion control functions of the axis modules.
- Visualization and operator terminals (DOP) can be connected.
- Simple connection of external input/output components.
- Profibus connection to machine control.
- Three technology versions for various automation concepts.
- 16-bit processor platform.
- CAN1 and/or CAN2 for connecting the MOVIAXIS® axis system.



3. Master module with MOVI-PLC® Advanced (integrated 32 bit motion controller)

This version has the following features in addition to those of the "master module with gateway" version:

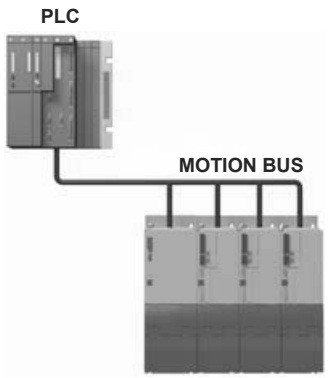
- Centralized, in IEC 61131 freely programmable motion controller for the entire MOVIAXIS® axis system.
- PLC-open certified library concepts from communication functions through to application solutions for all motion control functions of the axis modules.
- 32-bit processor platform.
- Simple integration of external input/output components.
- Various fieldbus connections to higher-level controller.
- CAN1 and/or CAN2 for connecting the MOVIAXIS® axis system.
- Optional EtherCAT master for fast system bus communication in the MOVIAXIS® axis system.



4. Direct connection to the machine control with integrated fieldbus or system bus

Characteristics:

- Control with position and speed setpoints
- CAN system buses without additional option cards
- Optional EtherCAT based system bus
- Profibus DP V1
- Direct utilization of technology functions of all axis modules



24 V switched-mode power supply (not incl. in scope of delivery)

The switched-mode power supply is fed from the DC link voltage and provides the 24 V voltage for supplying the electronics of the axis system and the brakes of the motors with power.

A voltage drop in the DC link can be compensated by the DC 24 V voltage supply for a short time.

The switched-mode power supply is protected against overload during operation in the defined DC link voltage range. The output voltage is applied to three different output terminals at the same time with common ground reference. Each output is separately monitored for a maximum value of 10 A output current, which means the power supply is current limited and short-circuit proof.

If the DC link voltage is not available, operation of the switched-mode power supply can be continued via the external 24 V supply, for example, for configuring the axis system. This means all monitoring functions and the operating display continue to operate.

The same monitoring levels as for the output voltages, which are generated from the DC link, also apply to the 24 V supply.

The current overload at the output terminals is indicated.

DC link discharge module MXZ80A-... (not incl. in scope of delivery)

The DC link discharge module shorts the connected voltage link by means of an electronic switch via braking resistor. This may take place only if the supply of the DC link has been disconnected, i.e. the MOVIAXIS® MXP.. supply module is no longer connected to the power supply system (mains).

Once the discharge process is complete and the discharge current is approaching zero, the electronic switch will open automatically.

A synchronous servomotor connected to the DC link via an axis module generates a speed-dependent braking torque. This means an uncontrolled drive can be decelerated electronically even without servo inverter function.

At the same time, the kinetic energy is converted into heat energy via the braking resistor.

The maximum amount of energy that can be dissipated via the braking resistor will have to be configured because the DC link discharge module and the braking resistor will have to be of appropriate size.

If a motor is driven mechanically, as is the case in a hoist, standstill cannot be accomplished. The DC link discharge module is intended for discharge of kinetically stored energy only. Do not use the DC link discharge module for potential energy (hoist, spring, accumulator).

Optional modules for axis modules

Option	Electronic component
Encoder cards[1)]	• Hiperface • sin/cos • TTL • EnDat
Input/output cards	• XIA11A (binary/analog) • XIO11A (binary)
Fieldbus cards	• XFP11A (Profibus)

1) in preparation

Option combinations

The axis modules include a rack system for up to three options.

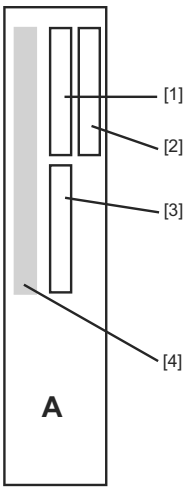


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Figure 2: Slot combinations

[1 - 3] Slots 1 - 3, assignment see following table

[4] Control board - Component of the basic unit

The following option card combinations are possible:

Combination		Option card		
		XFP11A XFA11A	XIO11A XIA11A	XIO11A XIA11A
1	Option slot	**1**	**3**	
2		**1**		
3		**2**	**1**	
4		**2**	**1**	**3**
5			**1**	
6			**1**	**3**

XFP11A: Profibus

XFA11A: K-Net

XIO11A: Binary hybrid module

XIA11A: Analog / binary hybrid module

3.3 Safety technology

For safety applications, refer to the publication "Safe Disconnection for MOVIAXIS®, Conditions"

MOVIAXIS® axis modules are available in three versions:

Unit designation	Safety category / protection type	Version
MXA80A...		Standard version without safety relay
MXA81A...	**Safety category 3 according to EN 954-1**	**One** internal relay (tested according to EN 50205 with positively-driven contact set) ensures that the supply voltages required for the functions of the servo inverter are safely interrupted. This means no rotating field can be generated and automatic restart is prevented.
MXA82A...	**Protection type III according to EN 201. Safety category 4 according to EN 954-1.**	**Two** internal relays (tested according to EN 50205 with positively-driven contact set) ensure that all supply voltages required for the functions of the servo inverter are safely interrupted. This means no rotating field can be generated and automatic restart is prevented.

3.4 Communication options of the basic unit

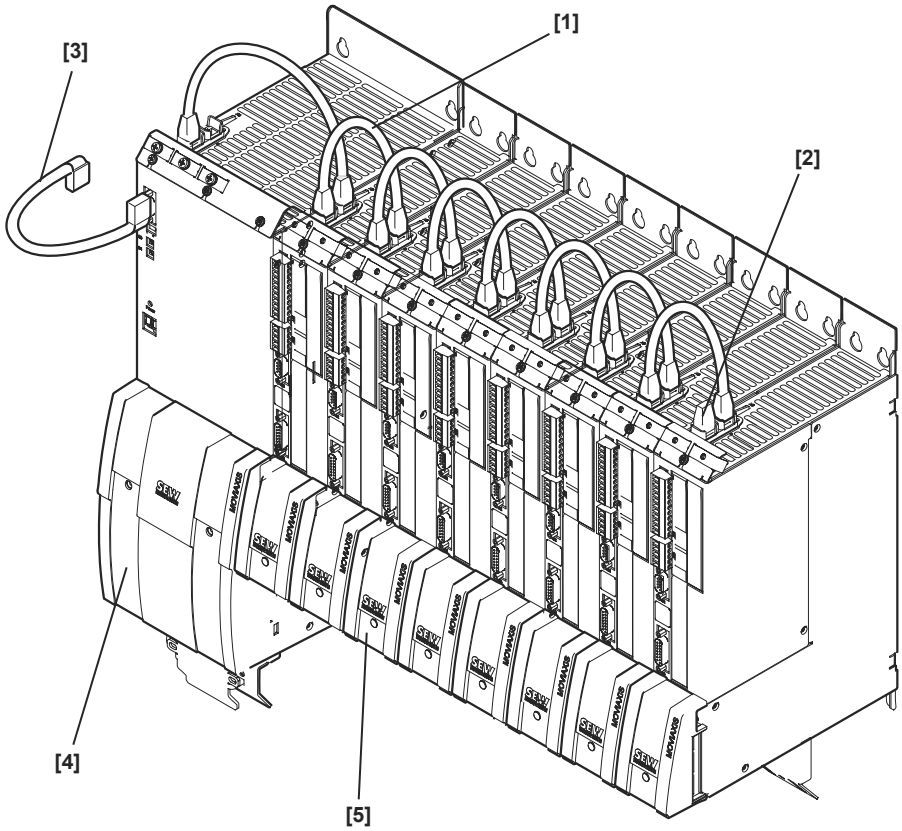

Figure 3: Communication via CAN1 at the supply module

[1]	CAN1	[4]	Power supply module
[2]	Terminating resistor	[5]	Up to 8 axis modules
[3]	Connection to PC		

CAN1 system bus

The individual axis modules are linked with the standard CAN1 system bus. This system bus enables fast data exchange between the individual axes. The unit profile MOVILINK 3.0 (or higher) from SEW-EURODRIVE is used for communication via the system bus. Option cards are available for real-time data transfer.

The CAN1 system bus is not an option and must always be used because of the data exchange via the signaling bus. CAN1 is primarily intended for exchanging engineering data, such as scope data, loading data sets, downloading firmware, etc.

All system connections for CAN1 communication are included in the scope of delivery of the basic unit.

For more information on the CAN1 system bus, refer to the operating instructions, section 5 "Startup."

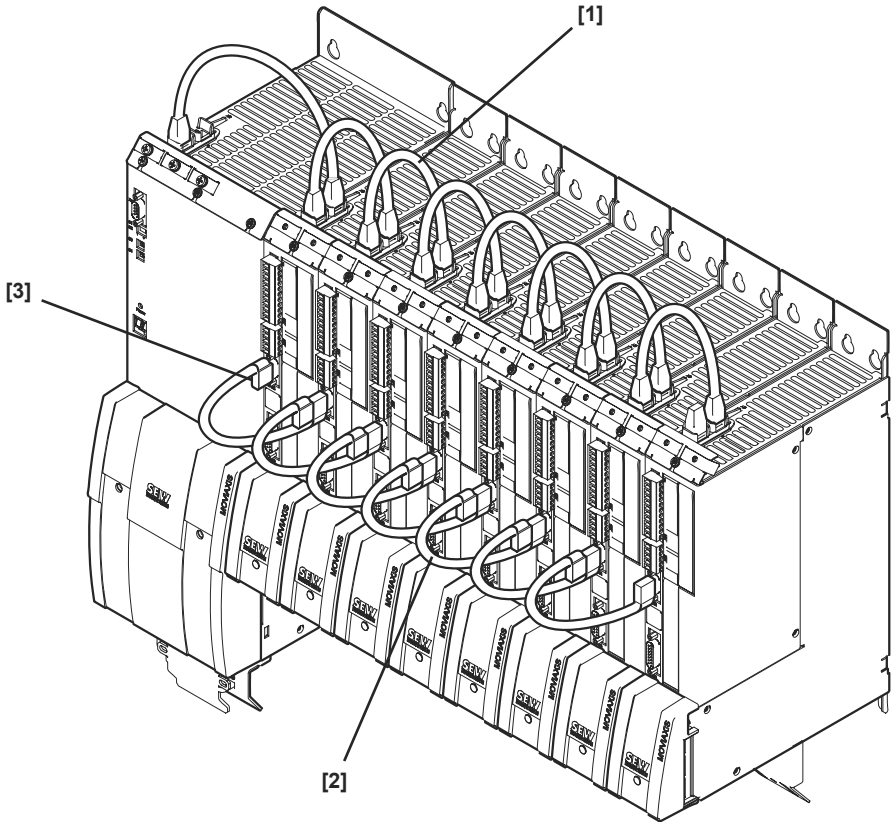

Figure 4: Communication via CAN2 at the axis modules

[1] CAN1
[2] CAN2
[3] Connection to machine control

CAN2 application bus

The CAN2 bus, which is available as standard on the front of the axis module, can be used to implement various additional functions. One option is to extend the bandwidth if the utilization of the CAN1 system bus is too high by also using the CAN2 at the same time, e.g. in conjunction with the master modules of the type fieldbus gateway. This option is also available with MOVI-PLC® controller versions "Basic" or "Advanced."

Another possibility is to use the cross communication between individual axis modules for specific drive tasks, such as master/slave operation, electronic cams, etc.

You can also configure the individual axes via the CAN2 and access them directly via a CAN-USB adapter.

The system connections for the CAN2 system bus are available as accessories.

For more information on the CAN system bus, refer to the operating instructions, section 5 "Startup."

MOVILINK®

MOVILINK® always uses the same message format independent of the selected interface (SBus, RS232, RS485, fieldbus interfaces). This means the control software is independent of the selected interface.

3.5 Operating software

MOVITOOLS® MotionStudio is the new engineering software from SEW-EURODRIVE for use with MOVIAXIS®. MOVITOOLS® MotionStudio offers the following functions and features:

- **General information**

  With MOVITOOLS® MotionStudio, SEW-EURODRIVE provides a comprehensive software solution for all SEW electronics products. Consistent data storage and uniform unit access save time and effort for startup and project planning, diagnostics, optimization and service. The result is an ergonomic and cost-optimized operation of MOVIAXIS® and all other electronics products from SEW-EURODRIVE.

- **Communication**

  You can operate MOVITOOLS® MotionStudio using a variety of communication media (such as Ethernet, PROFIBUS, CAN bus, USB, etc.) to take advantage of the latest developments in industrial communication. All connected units are automatically scanned (online scan) and displayed in a device-Explorer either in hierarchical order or in the order in which the are physically arranged. This means MOVIAXIS® and all other SEW-EURODRIVE electronics products can be accessed via all communication interfaces.

- **Visualization**

  MOVITOOLS® MotionStudio comes equipped with the "ApplicationBuilder", an editor used for creating customized visualizations and application-specific diagnostics. It gives you the option to condense the diverse functionality of drive inverters and controls for specific users so that even "non-specialists" will be able to operate the units.

- **Usability**

  MOVITOOLS® MotionStudio offers optimized and adapted tools for all tasks necessary in the field of innovative drive engineering.

- **Technology Editors**

  Technology editors enable simple guided parameter setting and setting of all functions needed for the specific application. The optimum guided user handling provides the user with a maximum of functions at a minimum effort. Further flexibility is possible in addition by making specific settings on the unit once the technology editor has run.

- **Uniformity**

  All application programs written for control units of the MOVI-PLC series can be used for all units. The program includes editors for parameter setting and programming that can be used for all units.

Select the unit following the unit scan and start the subroutines (PlugIns) by opening the context menu with the right mouse button. The following is a brief selection of user interfaces and software tools for MOVIAXIS® available from the context menu.

- **Plug-in "data maintenance"**

  To save data of parameter files and handling of data records in online and offline mode.

- **Plug-in "Startup"**

  To adapt the servo inverter to the connected motor and optimize speed and position controllers.

- **Plug-in "parameter tree"**

  For configuration and parameter setting of device parameters.

- **Plug-in "PDO Editor"**

  For graphic support during configuration of process data and the interface of the axis module with the machine control.

- **Scope**

  For diagnostic purposes and digital recording of process values in realtime (software oscilloscope).

- All MOVITOOLS® MotionStudio programs up to version 4.30 can be started.

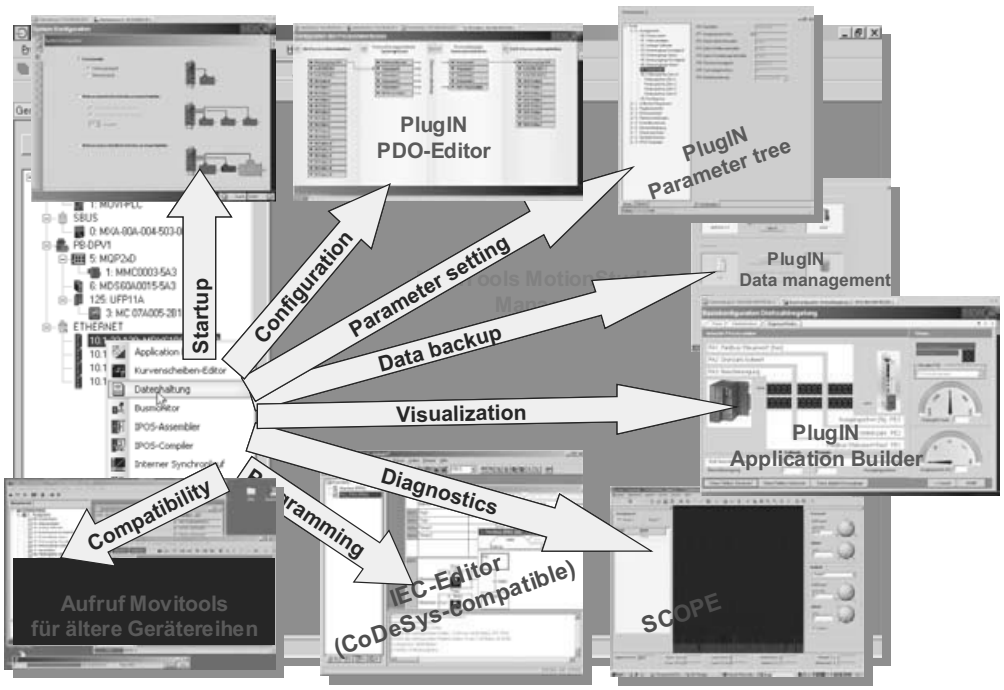

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Figure 5: MOVITOOLS® MotionStudio

3.6 CFC control mode (Current Mode Flux Control)

MOVIAXIS® uses a high performance, current-controlled control mode for asynchronous and synchronous servomotors. This control mode was optimized and further developed particularly for highly dynamic servo applications. Encoder feedback is always necessary to ensure excellent performance.

CFC control mode provides the following features:

- Torque up to the permitted maximum motor torque, even at standstill.
- Maximum precision and concentric running characteristics right down to standstill.
- Maximum servo characteristics and torque control even for standard asynchronous AC motors.
- Highest dynamics of the speed and position control loop due to short sampling intervals up to 250 µs and maximum, effective bandwidth.

The user benefits from high positioning dynamics with very low setpoint deviation. The control values for the torque, speed and position control loops are exactly calculated by the internal profile generators with the accuracy of a 32-bit floating point system.

This is a decisive factor for precise travel to the target position with maximum dynamic properties. Responses to load changes within a few milliseconds allow for optimally moving the drive along the required setpoints.

Another important feature is that the non-linear torque behavior of highly utilized servomotors is taken into account. For a simpler approach, all specified torques and actual torque values are related to the rated motor torque and consequently directly to the application.

The CFC control mode enables MOVIAXIS® to provide the optimized closed-loop control approach for solving the most demanding servo inverter control tasks.

3.7 MOVIAXIS® axis system

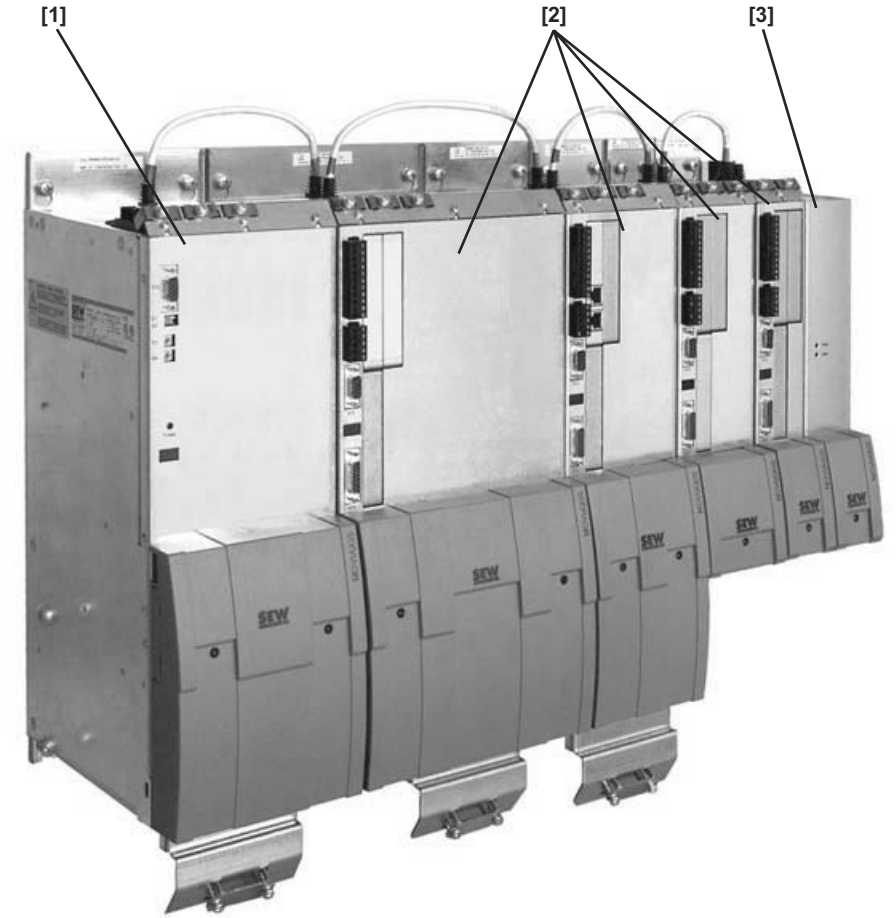

Figure 6: Example of a MOVIAXIS® axis system

[1] Supply module
[2] Up to 8 axis modules
[3] 24 V switched-mode power supply

3.8 The units at a glance

Supply modules

Supply voltage	3 x 380 V - 10 % ... 3 x 500 V + 10 %
Supply frequency	50 ... 60 Hz ± 5 %
Rated DC link voltage	DC 560 V
Overload capacity for max. 1 s	250 %

MXP80A-...	Rated power [kW]	Rated DC link current [A]	Maximum DC link current [A]	Rated mains current [A]	Size	Technical data
010-503-00	10	18	45	15	1	see page 40
025-503-01	25	45	112.5	36	2	
050-503-00	50	90	225	72	3	
075-503-00	75	135	337.5	110	3	

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Figure 7: Supply module

Axis modules

Rated DC link voltage[1)]	DC 560 V
Output voltage	0 - max. V_{mains}
Overload capacity for max. 1 s	250 %

MXA8xA-...	Rated output current[1)] with 8 kHz PWM [A]	Rated output current[1)] with 4 kHz PWM [A]	Maximum output current [A]	Size	Technical data
503-00	2	2	5	1	see page 45
	4	4	10	1	
	8	8	20	1	
	12	12	30	2	
	16	16	40	2	
	24	32	60	3	
	32	43	80	3	
	48	64	120	4	
	64	85	160	5	
	100	133	250	6	

1) with V_{mains} = 400 V

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Figure 8: Axis module

Master module

Rated input voltage • **with direct control of brakes for CP and DS motors** • **otherwise**	DC 24 V -0 % / +10 % DC-24 V ±25 % (EN 61131)

MXM80A-...	**Unit type**	**Technical data**
000-000-00 / DMP11B	MOVI-PLC Basic[1)]	see page 54

1) For technical data and connections of the DMP11B controller, refer to the manual"MOVI-PLC Basic."

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Figure 9: Master module

24 V switched-mode power supply module

Rated DC link voltage[1]	DC 560 V		
Rated input voltage • **with direct control of brakes for CP and DS motors** • **otherwise**	DC 24 V -0 % / +10 % DC 24 V ±25 % (EN 61131)		
Rated output voltage	DC 3 x 24 V (common ground). Tolerance if supplied via DC link: DC 24 -0 % / +10 %. Tolerance if supplied via external 24 V: According to the supplied voltage		
MXS80A-...	**Rated output current [A]**	**Rated output power [W]**	
060-503-00	3 × 10 A[2]	600	

1) with V_{mains} = 400 V

2) Not possible at the same time because total power is limited to 600 W

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Figure 10: 24 V switched-mode power supply module

DC link discharge module

Rated DC link voltage	DC 560 V				
MXZ80A-...	**Convertible energy E [J]**	**Discharging resistor[1] [Ω]**	**Duration of quick discharge [s]**	**Size**	**Technical data**
050-503-00	5000	1	≤ 1	1	see page 52

1) The DC link discharge module must be configured with a suitable discharging resistor for correct operation.

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Figure 11: DC link discharge module

3.9 Function and features

Device properties

- Large voltage range of the power supply connection in the supply module, AC 3 × 380 ... 500 V, 50 - 60 Hz.
- 250 % overload capacity, both supply module and axis module.
- 4, 8 and 16 kHz operation for optimum control characteristics.
- In 4 kHz PWM operation increase in continuous output current of 33 % from size 3.
- Compact, very space-saving book design, for installation in a 300 mm deep control cabinet.
- Two 7-segment displays for convenient visualization of operating and error states at the supply and axis modules.
- 4-quadrant capability due to the brake chopper integrated as standard in the supply module.
- One TF / TH / KTY input for motor protection using a PTC thermistor or thermo-contact.
- Integrated, thermal motor model for optimum protection and maximum utilization.
- Non-linear torque and speed characteristic curves are taken into account.
- Brake test function for regularly checking the braking capability of the motor.
- Inputs and outputs at the axis module
  - 9 isolated binary inputs, one of them with controller inhibit assigned to it, 8 inputs are freely programmable, 2 are touch probe inputs,
  - 4 isolated, freely programmable binary outputs.
- Separable electronics and power terminals up to size 3.
- 3 option slots for additional functions.
- Separate DC 24 V supply for powering the servo inverter electronics. Parameter setting, diagnostics and data storage even when the supply system is switched off.

Control functionality of the axis modules

- Ultra-modern CFC servo control mode for synchronous and asynchronous servomotors, see also section "Control mode", page 22.
- Three complete parameter sets[1)] for alternating operation of three motors at one axis.
- Speed, torque and position control (also interpolating) integrated.
- The brake is automatically activated by the servo inverter.[2)]
- Protective function and motor models for thermal protection of motor and servo inverter.
- Speed monitoring and monitoring of the motor and regenerative limit power.
- Protective functions for complete protection of the servo inverter and motor (short-circuit, overload, overvoltage / undervoltage, low-impedance ground fault, overtemperature in the servo inverter, motor stall prevention, overtemperature in the motor).
- Reference to fixed stop.
- Fault memory with all relevant operating data at the moment of the fault.

1) in preparation

2) 2 conductors DC 24 V brakes up to 2 A switching current

- Different access levels to unit functions by means of a password concept.
- Elapsed-hour counter for hours of operation (unit connected to supply system or DC 24 V) and enable hours (output stage energized).
- Modular option technology allows for application-specific unit configuration.
- Powerful technology functions, such as electronic cam, phase-synchronous operation, user units, etc., are integrated in the basic unit.
- Factory settings can be restored.
- Configurable in-position window.

Communication and operation

- CAN1/CAN2 system bus or EtherCAT based system bus for linking MOVIAXIS®, MOVIDRIVE®, MOVITRAC®.
- Startup and parameter setting via the CAN system bus interface at the supply or axis module, or via USB[1)] at the master module.
- Standardized and uniform handling of programming, startup and diagnostics using MOVITOOLS® MotionStudio.
- User-friendly, graphic linking and selection of device functions using "drag and drop" PDO editor software tools.
- Parameter list with application-specific extension and grouping options as well as search function for quickly locating parameters.
- Central parameter memory module (integrated in the master module) for all axis parameters, programs and settings.
- Automatic data reload of parameter configurations and settings in the case an axis has to be replaced.

Standards / certificates

- UL, cUL, C-Tick approval.
- Safe separation of power and electronic connections according to EN 61800-5-2.
- Fulfills all the requirements for CE certification of machines and plants equipped with MOVIAXIS® units on the basis of the EC Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC. Complies with the EMC product standard EN 61800-3.
- Meets the safety requirement "safe stop" according to EN 954-1, categories 3 and 4 as well as performance levels "D" and "E" to EN 13849.

1) via master module or CAN-USB adapter

3.10 Technology functions

Electronic cam

Complex sequences of motion can be optimally coordinated using the "electronic cam" function. This solution gives you much greater flexibility in comparison to the mechanical cam. As a result, it meets the needs of modern production and processing lines. The technology function "Electronic cam" includes the following features:

- User-friendly electronic cam editor
- Storage and administration of up to 40 electronic cams in the axis module
- Maximum 1000 curve points
- Modulo electronic cam
- Direct processing of user units
- Multiple curve change results can be configured
- Curves can be compressed, extended, added, deducted, etc.
- Jerk limited changeover between electronic cams "on the fly."
- 5th/7th order transition functions between curves can be directly calculated online.
- Curves can be defined as speed or position.
- Any curve can be linked with each other to match the overall process in the automatic operation.

With the electronic cam as it is integrated in MOVIAXIS®, SEW-EURODRIVE pushes the limits of motion control functions even further. Much more flexibility, more power, more curve points and also more combination options of curves open up new areas of applications. This functionality is available at maximum operating ease. The motion controller is integrated in the standard unit.

Application example "Electronic cam": Processing of filled yogurt cups.

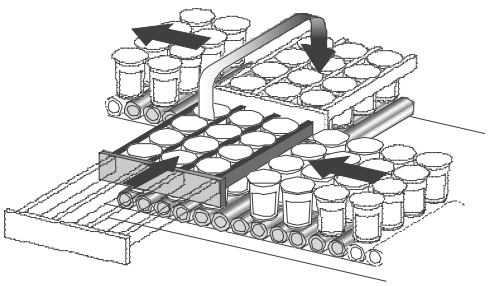

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Figure 12: Shifting yogurt cups

The "Electronic cam" allows for a jerk limited sequence of motion.

Phase-synchronous operation

"Phase-synchronous operation" enables one or several drives to be operated at a synchronous angle in relation to a physical or virtual master (virtual master encoder) with an adjustable proportional relationship (electronic gear). The technology function "Phase-synchronous operation" includes the following features:

- An adjustable proportional relationship
- Offset processing
- User-defined slave length
- Startup cycle curve polynominal 5th order
- Overlapping options

Other technology functions

- Cam control[1)].
- Probe, touch probe with four ring buffers.
- Brake test function (adjustable test duration, test torque, error response, protocol torque, etc.).
- Position control, speed, torque (also interpolating).
- Virtual encoder (various operating modes, endless, modulo, etc.).
- Encoder calibration.
- Jerk limitation (general setting for all ramps, therefore much more flexible than fixed sin/sin^2 shapes).
- Alternate multi-motor operation[1)] for up to three motors can be implemented with various motor encoders by simply selecting the relevant parameter set.
- Auto addressing via CAN1 system bus.
- Flying saw via electronic cam function.
- User units for control in application values.
- Modulo functionality, always calculated simultaneously and available in addition to the position information.
- System and application limits for protecting the mechanics of machinery and the product.
- Fieldbus positioning directly via PDO editor.
- Single-axis positioning using the technology editor.
- KTY temperature protection with motor model processing, limit value measuring or curve point processing.

1) in preparation

3.11 FCB model and process data processing

Basic structure of the FCB model

The operating mode and the task that the drive performs is determined by the status of the axis and the active **F**unction **C**ontrol **B**lock (FCB). Each function has its own FCB, also the output stage enable.

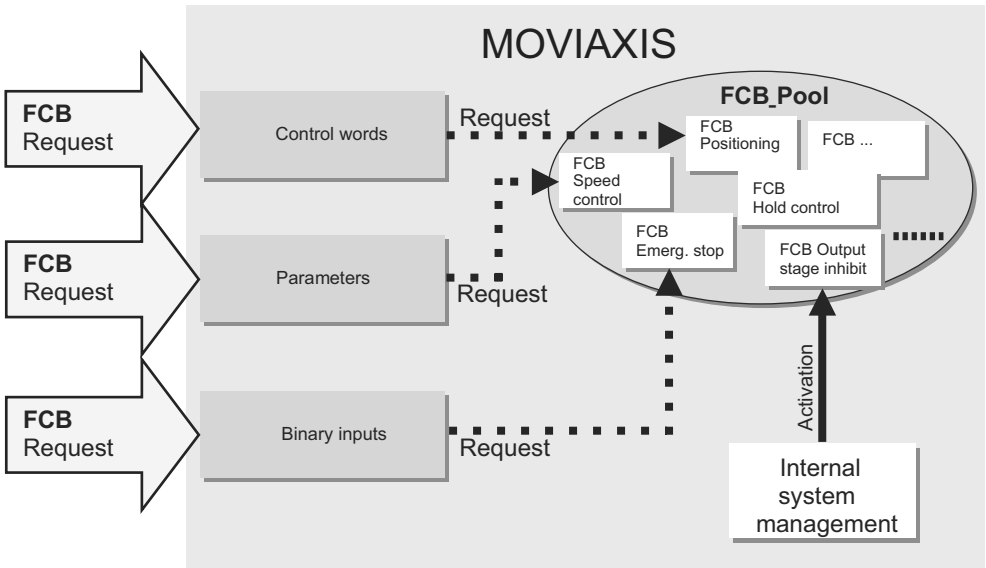

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Figure 13: Structure of the FCB model

Due to external customer requirements, the required FCB (e. g. "FCB positioning") is activated by the internal system management if no higher priority FCB is requested at the same time and if the state of the axis permits this.

If several FCBs are requested at the same time, the FCB with the highest priority will be active.

An FCB can be requested by

- control words (bus system),
- writing parameters,
- binary inputs,
- the internal system management.

Certain FCBs, such as "FCB output stage inhibit", can be requested by the internal system management. These FCBs cannot be configured by the user. All other FCBs have to be configured by the user.

FCB configuration

Except for "FCB output stage inhibit", all other FCBs have input parameters that need to be configured.

Configuration is explained by taking "FCB speed control" as example:

FCB Speed control		
Input parameters	**Transferred setpoint**	
Speed setpoint source	→	Process data
Torque limit source	→	Parameter
Source for acceleration	→	Process data
Source for deceleration	→	Parameter
Source for jerk	→	Parameter

Setpoints for the input parameters of an FCB can be transferred to the FCB using process data or via parameters. This configurability of FCBs makes MOVIAXIS extremely flexible so it can be optimally adjusted to virtually any application.

3.12 User-defined units

MOVIAXIS enables user-friendly setpoint specification in user units, e. g. "cycles / min", "bottles / s", etc.

The user can freely define these units with a maximum length of 255 characters. The MOVITOOLS® MotionStudio graphically simplifies the definition of user units.

Possibly existing gear unit ratios are taken into account and determining them is supported by the graphical user interface of the MOVITOOLS® MotionStudio.

Specified setpoints, such as target positions, machine velocities, etc., are displayed as application-specific values, which means the PLC programmer need not convert them into device units. Conversion is performed by the MOVIAXIS® system management.

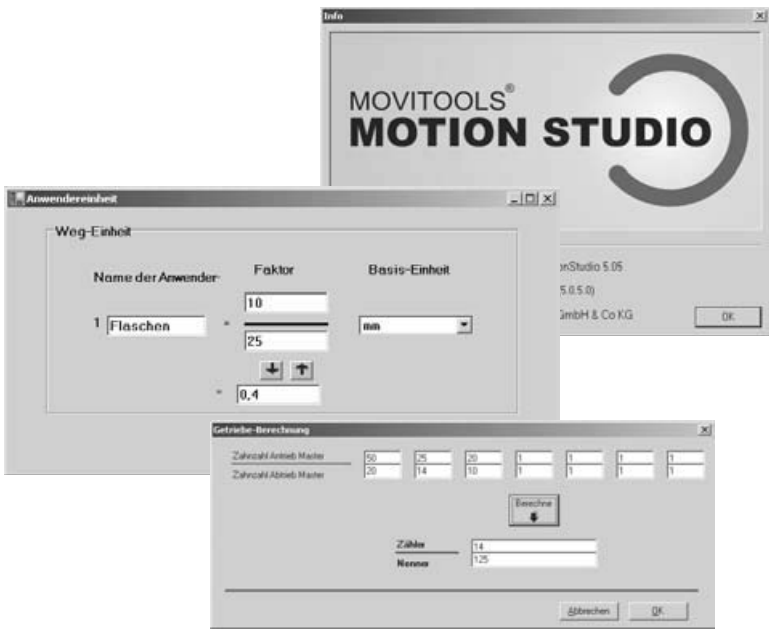

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Figure 14: MOVITOOLS® MotionStudio

For more information about this topic, refer to the operating instructions.

3.13 Application and system limits

Specifying application and system limit values in user units enables the user to separately define limit values for acceleration and velocities. The definition is made once according to the maximum load of the machine mechanics (machine limit value) and according to the product (application limit value).

Doing so ensures optimum protection of the product and the machine or system. Defining these limits is also graphically supported by the MOVITOOLS® MotionStudio.

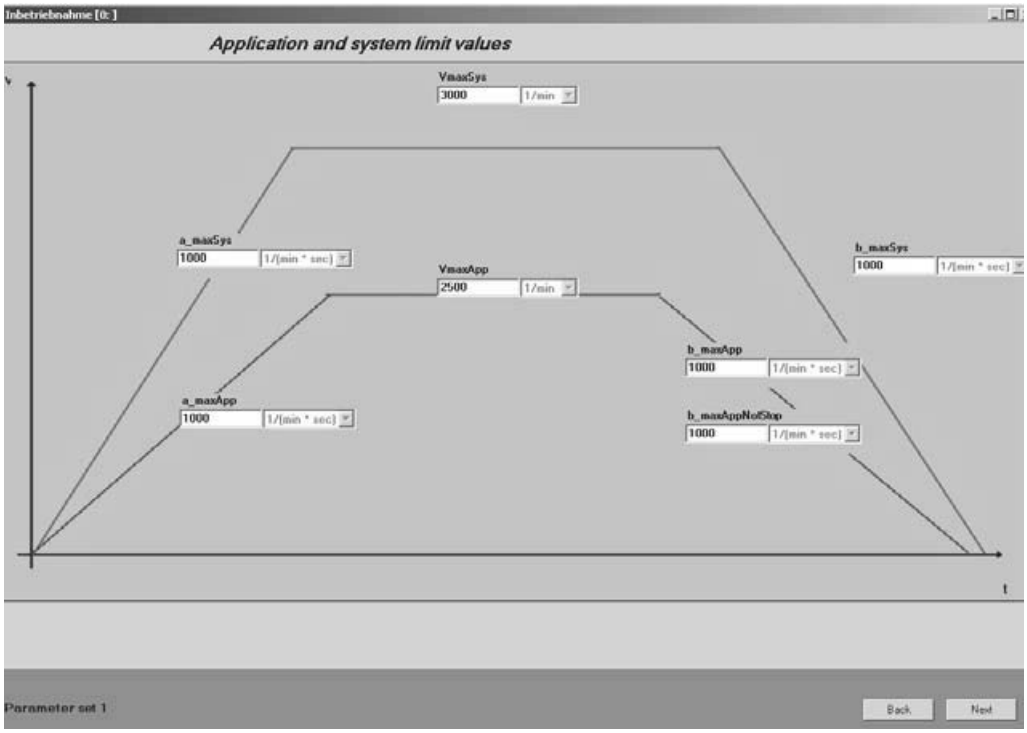

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Figure 15: Application and system limit values

For more information on this topic, refer to the operating instructions, section 5.4 "Description of the startup software and its parameters."

4 Technical Data

4.1 CE marking, UL approval and unit designation

The MOVIAXIS® MX multi-axis servo inverters comply with the following directives and guidelines:

CE marking

- Low voltage directive 73/23/EEC.
- Electromagnetic compatibility 89/336/EEC.

  MOVIAXIS® servo inverters and supply modules are designed for use as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives." Provided the installation instructions are complied with, they satisfy the appropriate requirements for CE marking of the entire machine/system in which they are installed, on the basis of the EMC Directive 89/336/EEC.
- Compliance with limit class A has been tested on a specified test setup. SEW-EURODRIVE can provide detailed information on request.

CE

The CE mark on the nameplate indicates conformity with the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC. We can provide a declaration of conformity on request.

UL approval

c UL us

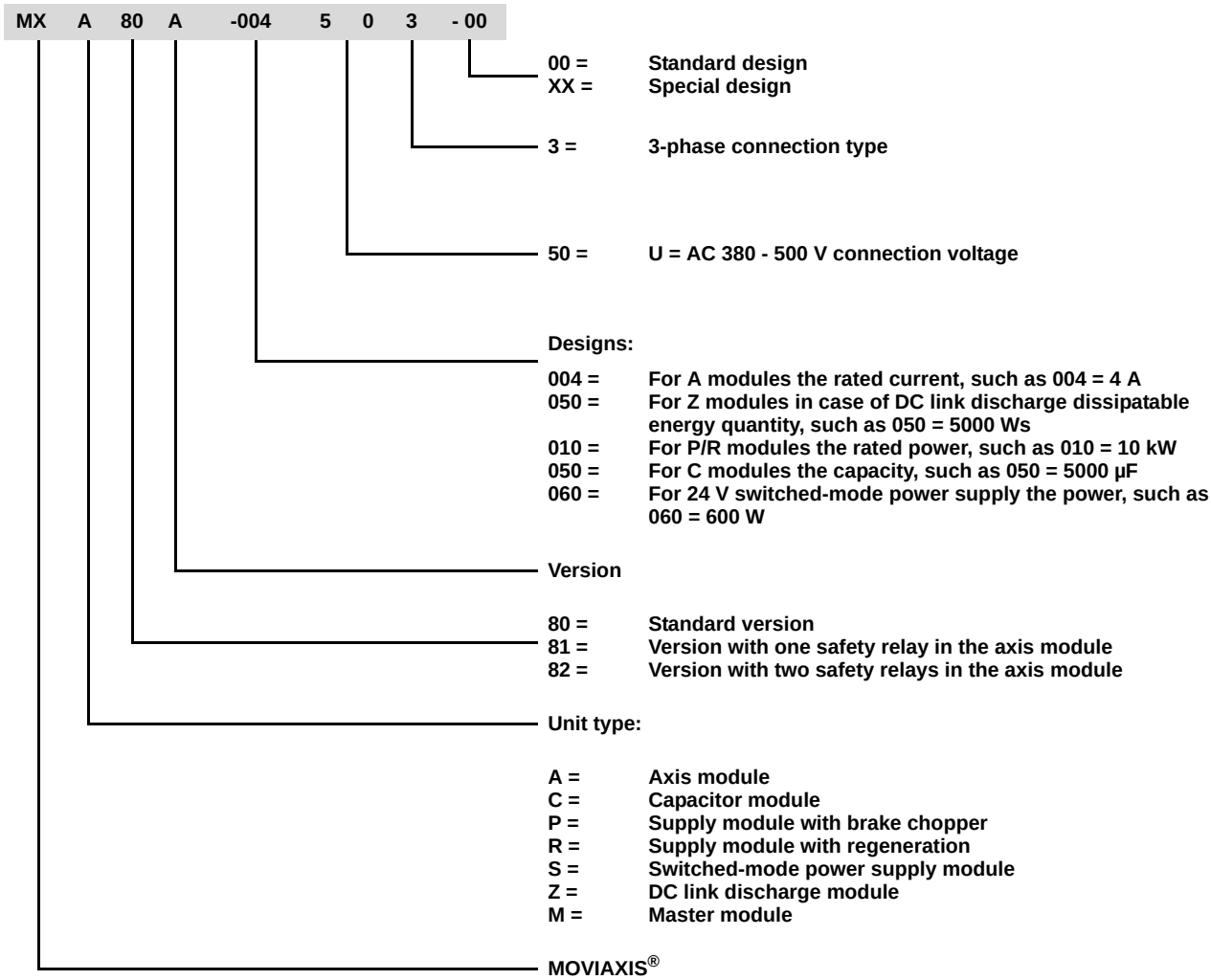
UL and cUL approval has been granted for the entire MOVIAXIS® range of units. cUL is equivalent to CSA approval.

We recommend protection of the braking resistor with a thermal overload relay to implement an UL approved application design. This also applies if the resistor is UL certified.

C-Tick

C-Tick approval has been granted for the entire MOVIAXIS® range of units. C-Tick certifies conformity with ACA (Australian Communications Authority) standards.

Example: Unit designationMOVIAXIS® basic units



Unit designation axis module:

MXA80A-004-503-00	=	Axis module with 4 A rated current

Unit designation supply module:

MXP80A-010-503-00	=	10 kW supply module
MXR80A-025-503-00	=	25 kW supply module with regeneration (in preparation)

Unit designation DC link discharge module option:

MXZ80A-050-503-00	=	DC link discharge module with a dissipatable energy quantity of 5000 Ws

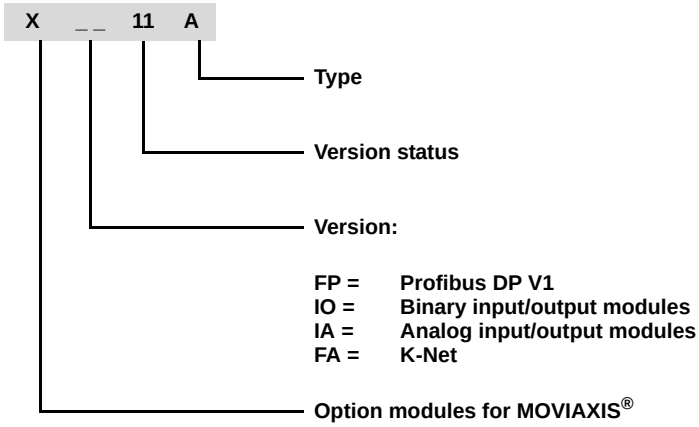
Unit designation master module option:

MXM80A-000-000-00/DHP11B	=	Master module with MOVI-PLC® Basic

Unit designation 24 V switched-mode power supply module option

MXS80A-060-503-00	=	24 V switched-mode power supply module

MOVIAXIS® communication module option



4.2 General technical data

The following tables lists the technical data for all MOVIAXIS® MX multi-axis servo inverters independent of

- type,
- design,
- size,
- and power.

.

MOVIAXIS® MX		
Interference immunity		Meets EN 61800-3
Interference emission with EMC-compliant installation		According to class A limit to EN 55011 and EN 55014 Meets EN 61800-3
Ambient temperature **Climate class**	ϑ_U	0 °C...+ 45 °C at I_D = 100 % I_N and f_{PWM} = 8 kHz
Storage temperature	ϑ_L	– 25 °C...+70 °C (EN 60721-3-3, class 3K3)
Storage life		up to two years without special measures, longer periods see operating instructions section 5.3 Maintenance
Cooling type (DIN 51751)		Forced cooling and convection cooling, depending on size
Enclosure EN 60529 (NEMA1)[1)] **Axis module sizes 1 ... 3** **Axis module size 4 - 6** **Supply module sizes 1, 2** **Supply module size 3**		 IP20 IP10 IP20 IP10
Duty type		DB (EN 60034-1)
Pollution class		2 according to IEC 60664-1 (VDE 0110-1)
Overvoltage category		III according to IEC 60664-1 (VDE 0110-1)
Installation altitude	**h**	Up to h ≤ 1000 m without restrictions. The following restrictions apply at heights ≥ 1000 m: – From 1000 m to max. 2000 m: I_N reduction by 1% per 100 m (330 ft)

1) - The protection covers of the units are equipped with VDE covers on the left and right.
- All cable lugs are insulated.

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Figure 16: Example of a MOVIAXIS® axis system

4.3 Technical data supply module

Power component supply module

MOVIAXIS® supply module MXP80A-...-503-00	1)	2)	Size			
			1	2	3	
Type			010	025[3]	050	075
INPUT						
Supply voltage AC V_{mains}	U	V	3 × 380 V-10% ... 3 × 500 V+10%			
Rated supply current[4] AC I_{mains}	I	A	15	36	72	110
Rated power P_N	P	kW	10	25	50	75
Mains frequency f_{mains}	f	Hz	50... 60 ±5%			
Cross section[3] and contacts		mm^2	COMBICON PC4 pluggable, max. 4 (AWG12)	COMBICON PC6 pluggable, max. 6 (AWG10)	Screw bolt M8 max. 50 (AWG1/0)	
OUTPUT (DC LINK)						
Rated DC link voltage[4] U_{NZK}	U	V	DC 560			
Rated DC link current[5] DC I_{NZK}	I	A	18	45	90	135
Max. DC link current DC $I_{ZK\ max}$	I_{max}:	A	45	112.5	225	337.5
Overload capacity for max. 1 s			250 %			
Brake chopper power		kW	Peak power: 250 % × P_N continuous power: 0.5 × P_N			
Mean regenerative power capacity		kW	0.5 x P_N			
Cross section[6] and contacts		mm	CU rails 3 × 14 mm, M6 screw fitting			
BRAKING RESISTOR						
Minimum permitted braking resistor value R (4-Q operation)		Ω	26	10	5.3	3.5
Integrated, continuous power		W	250	–	–	–
Cross section[6] and contacts		mm^2	COMBICON PC4 pluggable, max. 4 (AWG12)	COMBICON PC6 pluggable, max. 6 (AWG10)	M6 screw bolts max. 16 (AWG6)	
GENERAL INFORMATION						
Power loss at nominal capacity		W	30	80	160	280
Permitted number of mains on/off		min^{-1}	< 1/min			
Minimum switch-off time for mains off		s	> 10			
Weight		kg		10.2	10.7	12.1
Dimensions: B		mm	90	120	150	
Dimensions: H		mm	300	400		
Dimensions: T		mm	254			

1) Nameplate information

2) Unit

3) In preparation

4) The system and output currents must be reduced by 20 % from the nominal values for V_{mains} = 3 × AC 500 V.

5) Decisive value for planning the assignment of supply and axis modules.

6) Material strength [mm] × width [mm].

Special design supply module

MOVIAXIS® MX supply module MXP80A-...-503-01	1)	2)	Size 3
Type			025
INPUT			
Supply voltage AC V_{mains}	U	V	3 × 380 -10% .... 3 × 500 +10%
Rated supply current[3] AC I_{mains}	I	A	36
Rated power P_N	P	kW	25
Mains frequency f_{mains}	f	Hz	50... 60 ±5%
Cross section[3] and contacts		mm^2	Screw bolt M8 max. 50 (AWG1/0)
OUTPUT (DC LINK)			
Rated DC link voltage[3] U_{NZK}	U	V	DC 560
Rated DC link current[4] DC I_{NZK}	I	A	45
Max. DC link current DC $I_{ZK\ max}$	I_{max}:	A	112,5
Overload capacity for max. 1 s			250 %
Brake chopper power		kW	Peak power: 250 % × P_N continuous power: 0.5 × P_N
Mean regenerative power capacity		kW	0.5 x P_N
Cross section[5] and contacts		mm	CU rails 3 × 14 mm, M6 screw fitting
BRAKING RESISTOR			
Minimum permitted braking resistor value R (4-Q operation)		Ω	10
Integrated, continuous power		W	–
Cross section 3) and contacts		mm^2	M6 screw bolts max. 16 (AWG6)
GENERAL INFORMATION			
Power loss at nominal capacity		W	80
Dimensions: B		mm	150
Dimensions: H		mm	400
Dimensions: T		mm	254

1) Nameplate information

2) Unit

3) The system and output currents must be reduced by 20 % from the nominal values for V_{mains} = 3 × AC 500 V.

4) Decisive value for planning the assignment of supply and axis modules

5) Material strength [mm] × width [mm]

Control section supply module

MOVIAXIS® supply module	General electronics data	
CAN interface 1	**CAN1**: 9-pin sub-D connector	CAN bus to CAN specification 2.0, parts A and B, transmission technology to ISO 11898, max. 64 stations, Terminating resistor (120 Ω) has to be implemented externally, Baud rate can be set from 125 kBaud ... 1 MBaud, expanded MOVILINK protocol, see operating instructions section 5.4 "Communication via CAN adapter"
Cross section and contacts		
DC 24V voltage supply	24V DC ± 25% (EN 61131) COMBICON 5.08 One core per terminal: 0.20...2.5 mm^2 (AWG24...13) Two cores per terminal: 0.25...1 mm^2 (AWG23...17)	

Electronics data MOVIAXIS® MXP

The power and current data refer to DC 24 V. The losses of the internal switched-mode power supply modules have been taken into account.

Power consumption MOVIAXIS® MXP supply modules

Supply module	Size 1 10 kw	Size 3 50 kW	Size 3 75 kW
Power P	9 W	12 W	

Dimension drawing BG1

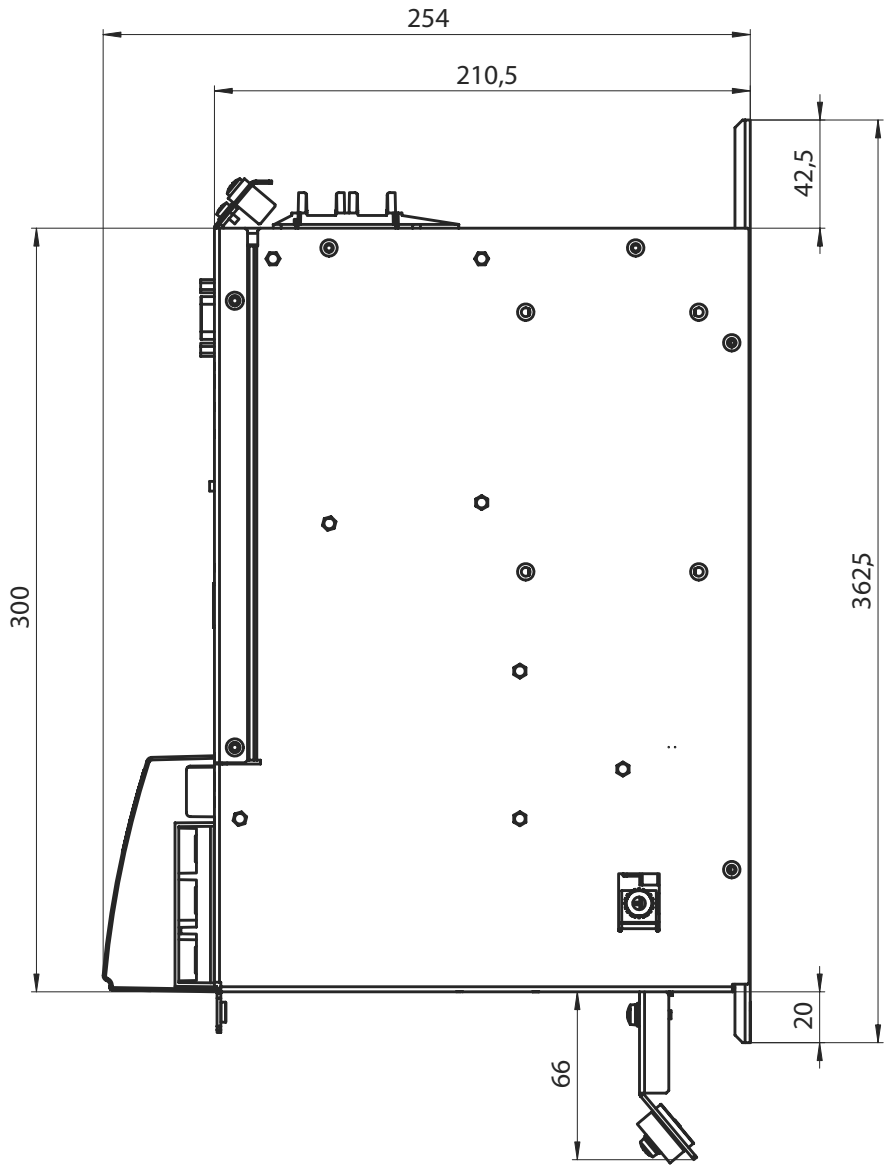

Figure 17: Dimensions supply module BG1

Dimension drawing BG2, BG3

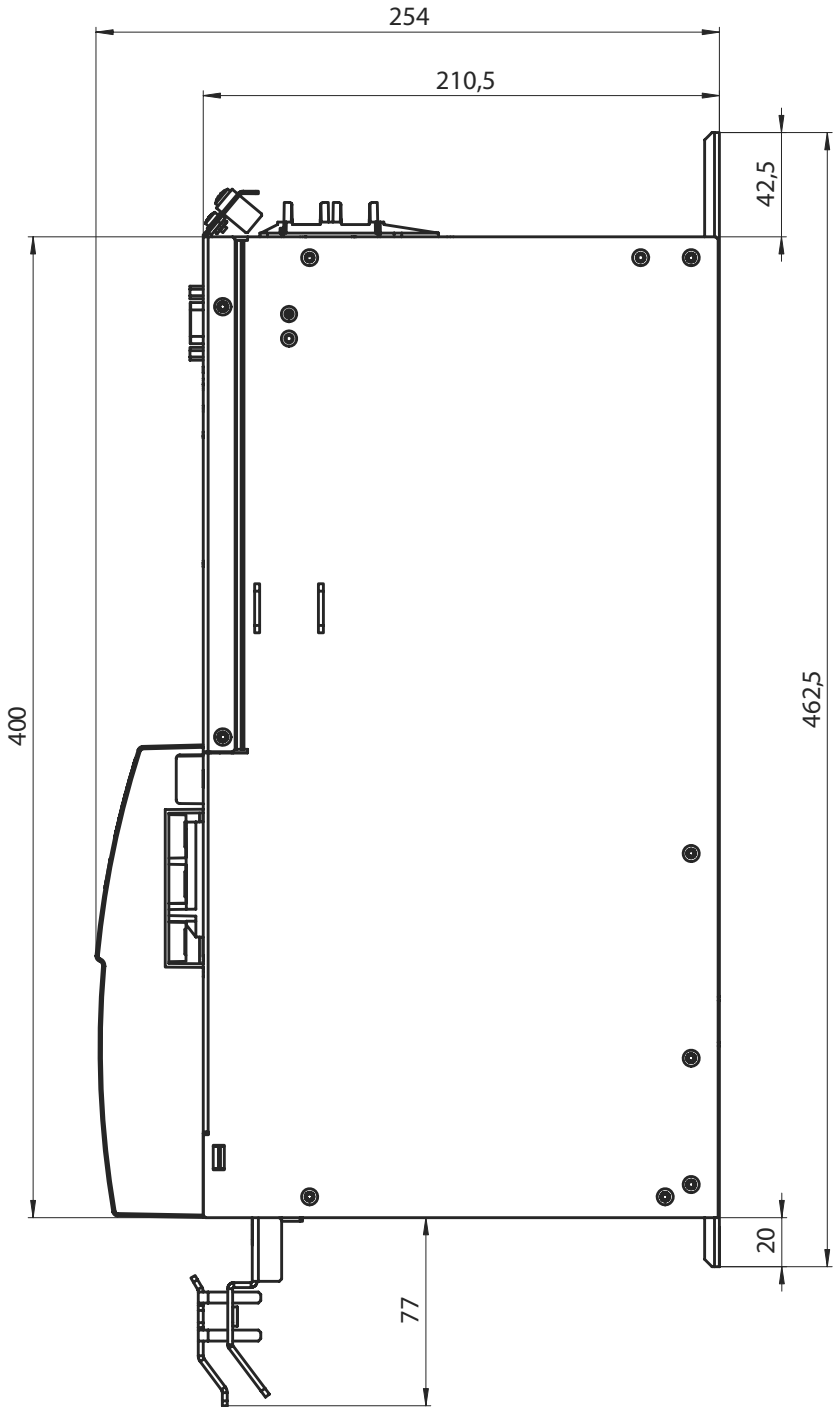

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Figure 18: Dimensions supply module BG2, BG3

4.4 Technical data axis module

Power section axis module

MOVIAXIS® axis module MXA80A-...-503-00	1)	2)	Size									
			1			2		3		4	5	6
Type			002	004	008	012	016	024	032	048	064	100
INPUT (DC link)												
Rated DC link voltage U_{NZK}	U	V	DC 560									
Rated DC link current I_{NZK} 3)	I	A	2	4	8	12	16	24	32	48	64	100
Cross section 4) **and contacts**		mm	CU rails 3 × 14 mm, M6 screw fitting									
OUTPUT												
Output voltage U	U	V	0...max. U_{mains}									
Continuous output current AC I PWM = 4 kHz	I	A	2	4	8	12	16	32	42	64	85	133
Rated output current AC I_N PWM = 8 kHz	I	A	2	4	8	12	16	24	32	48	64	100
Max. unit output current I_{max} 5)	I_{max}:	A	5	10	20	30	40	60	80	120	160	250
Overload capacity for max. 1 s			250 %									
Rated apparent output power P_{NAus} 6)	S	kVA	1.4	2.8	5.5	8.5	11	17	22	33	44	69
PWM frequency f_{PWM}		kHz	Can be set: 4/8; factory setting 8									
Maximum output frequency f_{max}	f	Hz	600									
Motor connection		mm^2	COMBICON PC4 pluggable, max. 4 (AWG12)					7)	8)	Screw bolts M6 max. 16 (AWG6)		9)
Brake connection	U_{BR} / I_{BR}	V / A	1 binary output brake control					Suitable for direct operation of brake, short-circuit proof. External 24 V required. Tolerance depends on installed brake type, see project planning manual. **See example for maximum load under the footnotes.**				
			Signal level: "0" = 0 V "1" = +24 V **Caution:** Do not apply external voltage!									
			Function: fixed assignment with "/Brake"									
Brake connection contacts			COMBICON 5.08									
		mm^2	One core per terminal: 0.20...2.5 (AWG24...13) Two cores per terminal: 0.25...1 (AWG23...17)									
Shield clamps			Shield clamps for control lines exist									

Table continued on next page. Footnotes on next page.

MOVIAXIS® axis module MXA80A-...-503-00		1)	2)	Size									
				1			2		3		4	5	6
GENERAL INFORMATION													
Power loss at nominal capacity[10)]			W	30	60	100	150	210	283	375	450	670	1050
Weight			kg	4.2	4.2	4.2	5.2	5.2	9.2	9.2	9.2	15.6	15.6
Dimensions:	**B**		mm	60			90		90		120	150	210
	H		mm	300			300		400		400	400	400
	T		mm	254									

1) Nameplate information
2) Unit
3) With simplification: $I_{NZK} = I_N$ (typical motor application)
4) Material strength [mm] × width [mm]
5) Indicated values apply to motor operation. Motor and regenerative have the same peak performance.
6) With V_{mains} = 400 V
7) COMBICON PC6 pluggable, max. 6 mm^2 (AWG12)
8) IPC16 pluggable, one conductor per terminal: 0.5...16 mm^2 (AWG20...AWG6); two conductors per terminal: 0.5...6 mm^2 (AWG20...AWG10)
9) Screw bolts M8, max. 50 mm^2 (AWG1/0)
10) Applies to mains voltage 400V and 50Hz / PWM = 8 kHz

Notes on brake control

Note on tolerance requirement for the brake voltage!

The brake voltage has to be configured. See project planning manual, section 2.8.

Direct control is only designed for the following motors with brake:
- CMP40 / 50 / 63
- DS56

Permitted load of brake control and brake

One complete breaking operation (application and release) may be repeated a maximum of every 2 seconds. The minimum switch-off time is 100 ms.

Special design axis module

MOVIAXIS® MX axis module MXA8A-...-503-01	1)	2)	Size		
			4		6
Type			024	032	064
INPUT (DC link)					
Rated DC link voltage U_{NZK}	U	V	DC 560		
Rated DC link current I_{NZK} 3)	I	A	24	32	64
Rated power P_N	P	kW	13.4	17.9	35.8
Cross section 4) **and contacts**			CU rails 3 × 14 mm, M6 screw fitting		
OUTPUT					
Output voltage U	U	V	0...max. U_{mains}		
Rated output current AC I_N	I	A	24	32	64
Max. unit output current I_{max} 5)	I_{max}:	A	60	80	160
Overload capacity for max. 1 s			250 %		
Rated apparent output power P_{NAus} 6)	S	kVA	17	22	44
PWM frequency		kHz	Can be set: 4/8; factory setting 8		
Max. output frequency	f	Hz	600		
Motor connection		mm^2	Screw bolts M6 max. 16 (AWG6)		Screw bolts M8 max. 50 (AWG1/0)
Brake connection	U_{BR} / I_{BR}	V / A	1 binary output brake control	Suitable for direct operation of brake, short-circuit proof. External 24 V required. Tolerance depends on installed brake type, see project planning manual. **See example for maximum load under the footnotes of the table "Power section axis module".**	
			Signal level: "0" = 0 V "1" = +24 V **Caution:**Do not apply external voltage!		
			Function: fixed assignment with "/Brake"		
Brake connection contacts		mm^2	COMBICON 5.08		
			One core per terminal: 0.20...2.5 (AWG24...13) Two cores per terminal: 0.25...1 (AWG23...17)		
Shield clamps			Shield clamps exist for control lines and power connections		

Table continued on next page. Footnotes on next page.

MOVIAXIS® MX axis module MXA8A-...-503-01		1)	2)	Size 4		6
GENERAL INFORMATION						
Power loss at nominal capacity 7)			W	285	375	670
Dimensions:	**B**		mm	120		210
	H		mm	400		
	T		mm	210		

1) Nameplate information
2) Unit
3) With simplification: $I_{NZK} = I_N$ (typical motor application)
4) Material strength [mm] × width [mm]
5) Indicated values apply to motor operation. Motor and regenerative have the same peak performance.
6) With V_{mains} = 400 V
7) Applies to mains voltage 400V and 50Hz / PWM = 8 kHz

Control section axis module

MOVIAXIS® MX axis module	General electronics data	
DC 24V voltage supply	24V DC ± 25% (EN 61131)	
X10:1 and X10:10 binary inputs **Internal resistance**	Isolated (optocoupler), PLC compatible (EN 61131), sampling interval 1 ms $R_i \approx 3.0$ kΩ, $I_E \approx 10$ mA	
Signal level	+13 V...+30 V = "1" = contact closed -3 V – +5 V = "0" = contact open	meets EN 61131
Function	DIØØ: With fixed assignment "Output stage enable" DIØ1...DIØ8: Selection option → parameter menu DIØ1 and DIØ2 suitable for Touch-Probe function (latency period < 100 µs)	
4 binary outputs	PLC compatible (EN 61131-2), response time 1 ms, short-circuit proof, I_{max} = 50 mA	
Signal level	"0"=0 V, "1"=+24 V, **Caution: Do not apply external voltage.**	
Function	DOØØ ... DOØ3: Selection option → parameter menu	
Connection contacts for safety functions	Safety relay integrated in unit as option Suitable for operation as device of stop category 0 or 1 according to EN 60204-1 with prevention of restart for safety applications in: • Category 3 according to EN 954-1 • Protection type III according to EN 201	
Cross section and contacts	COMBICON 5.08 One core per terminal: 0.20...2.5 mm^2 (AWG24...13) Two cores per terminal: 0.25...1 mm^2 (AWG23...17)	
Shield clamps	Shield clamps for control lines exist	

Electronics data MOVIAXIS® MXA

The power and current data refer to DC 24 V. The losses of the internal switched-mode power supply modules have been taken into account.

Power consumption MOVIAXIS® MXA axis modules

Axis module	Size 1 2, 4, 8 A	Size 2 12, 16 A	Size 3 24, 32 A	Size 4 48 A	Size 5 64 A	Size 6 100 A
Power	12 W	13 W	16 W	16 W	21 W	36 W

Power consumption options

Option	
XFP	2.5 W
XIO	0.6 W
XIA	0.7 W
K-Net	2 W

Dimension drawing BG1, BG2

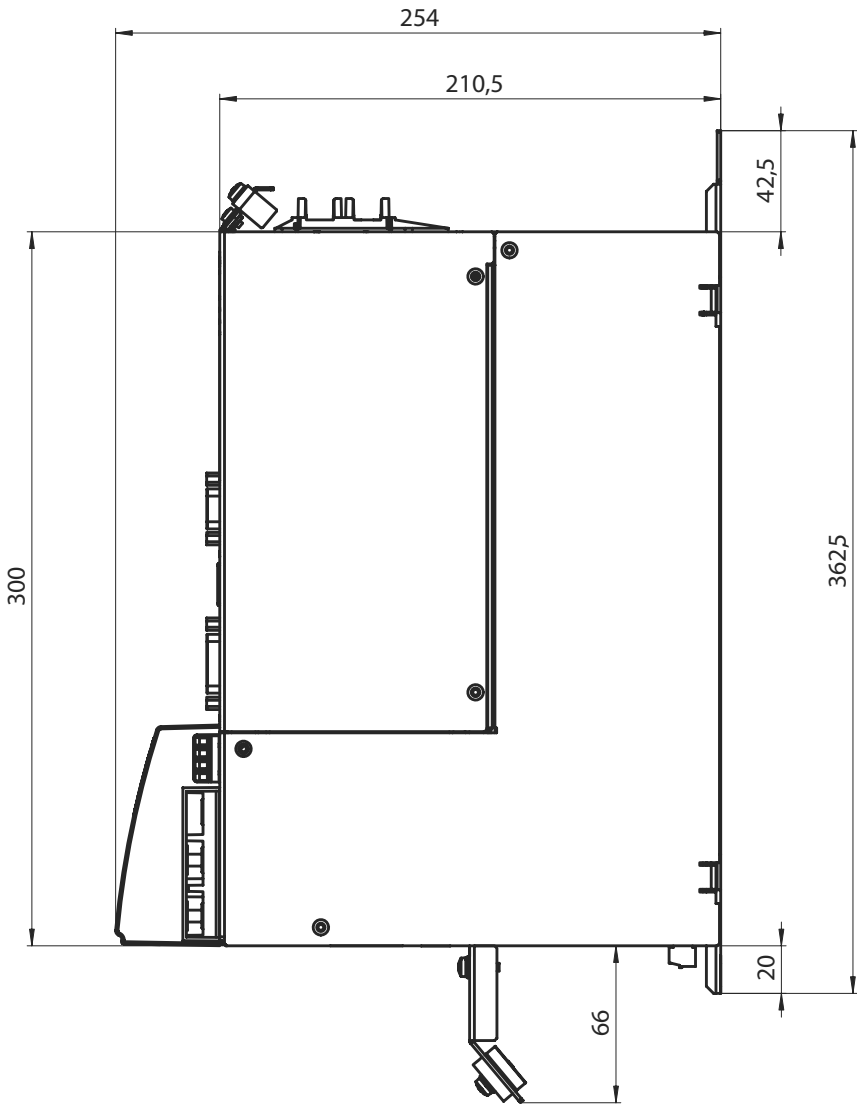

Figure 19: Dimensions axis module BG1, BG2

Dimension drawing BG3, BG4, BG5, BG6

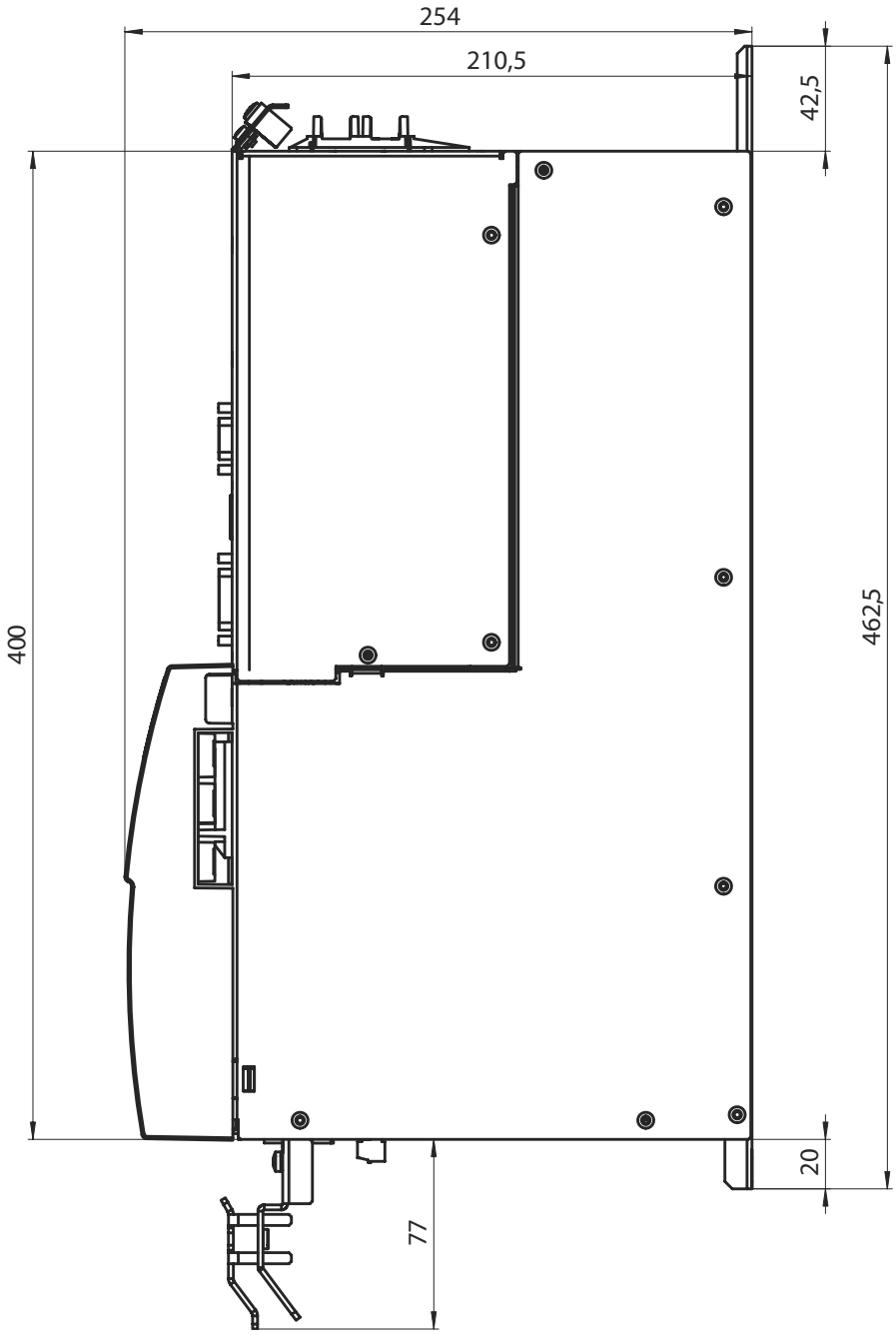

Figure 20: Dimensions axis module BG3, BG4, BG5, BG6

4.5 Technical data DC link discharge module option

Power section DC link discharge module

MOVIAXIS® MX DC link discharge module MXZ80A-...-503-00 Type	1)	2)	Size 1 050
INPUT (DC link)			
Rated DC link voltage[3] U_{NZK}	U	V	DC 560
Cross section[4] and contacts			CU rails 3 × 14 mm, M6 screw fitting
Convertible energy E	E	J	5000
OUTPUT			
Braking resistor R	R	Ω	1
Discharge connection			Specific screw fitting by SEW
Cross section[3] and contacts		mm^2	M6 screw bolts, max. 16 (AWG6)
GENERAL INFORMATION			
Ready for operation after power on and 24V		s	≤ 10
Ready for operation after short circuit		s	Depends on application
Repeatability of quick discharge		s	60
Duration of quick discharge		s	≤ 1
Shutdown temperature		°C	70
Weight		kg	3.8
Dimensions: B		mm	120
Dimensions: H		mm	235
Dimensions: T		mm	254

1) Nameplate information

2) Unit

3) The system and output currents must be reduced by 20 % from the nominal values for V_{mains} = 3 × AC 500 V.

4) Material strength [mm] × Width [mm]

Control section DC link discharge module

MOVIAXIS® DC link discharge module	1)	General electronics data
Inhibit		Control signal for discharge process
DC 24V voltage supply	V	DC 24± 25 % (EN 61131-2)
Cross section and contacts	mm^2	COMBICON 5.08 One core per terminal: 0.20...2.5 (AWG24...13) Two cores per terminal: 0.25...1 (AWG23...17)

1) Unit

Electronics data MOVIAXIS® MXZ

The power and current data refer to DC 24 V. The losses of the internal switched-mode power supply modules have been taken into account.

Power consumption MOVIAXIS® MXZ DC link discharge module

Electronic component	Power consumption
Power	2.4 W / 0.1 A

Dimension drawing

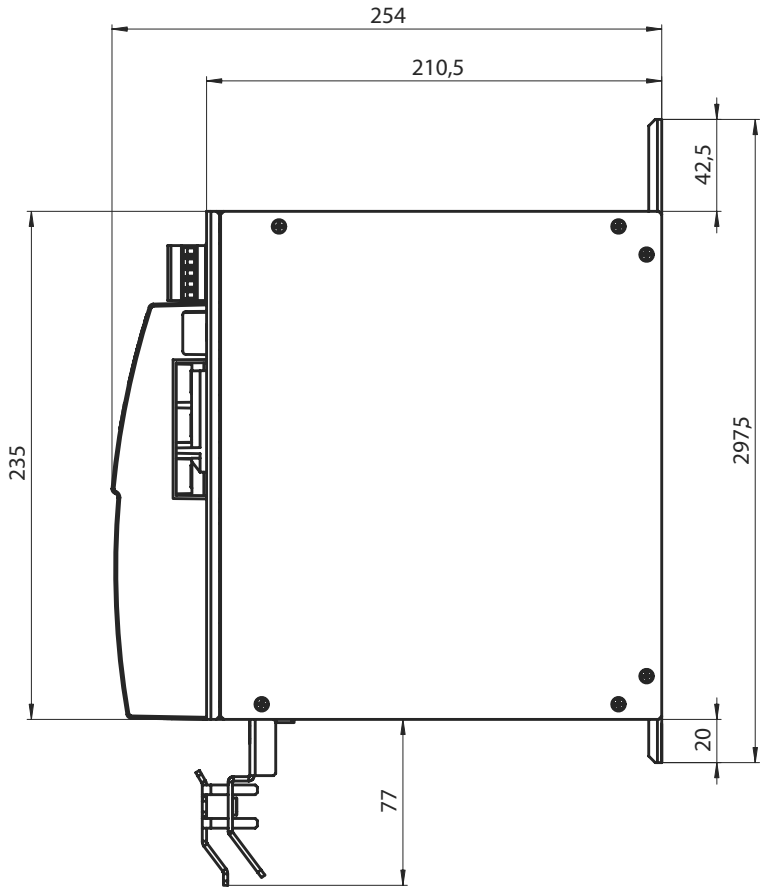

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Figure 21: Dimensions DC link discharge module

4.6 Technical data master module option

MOVIAXIS® MX master module MXM80A-...-000-00 Type	1)	2)	Size 1 000
Supply voltage U	U	V	DC 24 V ± 25 % according to EN 61131
Cross section and contacts	COMBICON 5.08 One core per terminal: 0.20...2.5 mm² (AWG24...13) Two cores per terminal: 0.25...1 mm² (AWG23...17)		
GENERAL INFORMATION			
Weight		kg	2.3
Dimensions: B		mm	60
Dimensions: H		mm	300
Dimensions: T		mm	254

1) Nameplate information

2) Unit

For more technical data, see manual "MOVI-PLC® DHP11B Control Card", publication number 11350717.

Electronics data MOVIAXIS® MXM

Power consumption MOVIAXIS® MXM master module

Master module	
Power	See technical data plus 85 % of the switched-mode power supply integrated in the master module

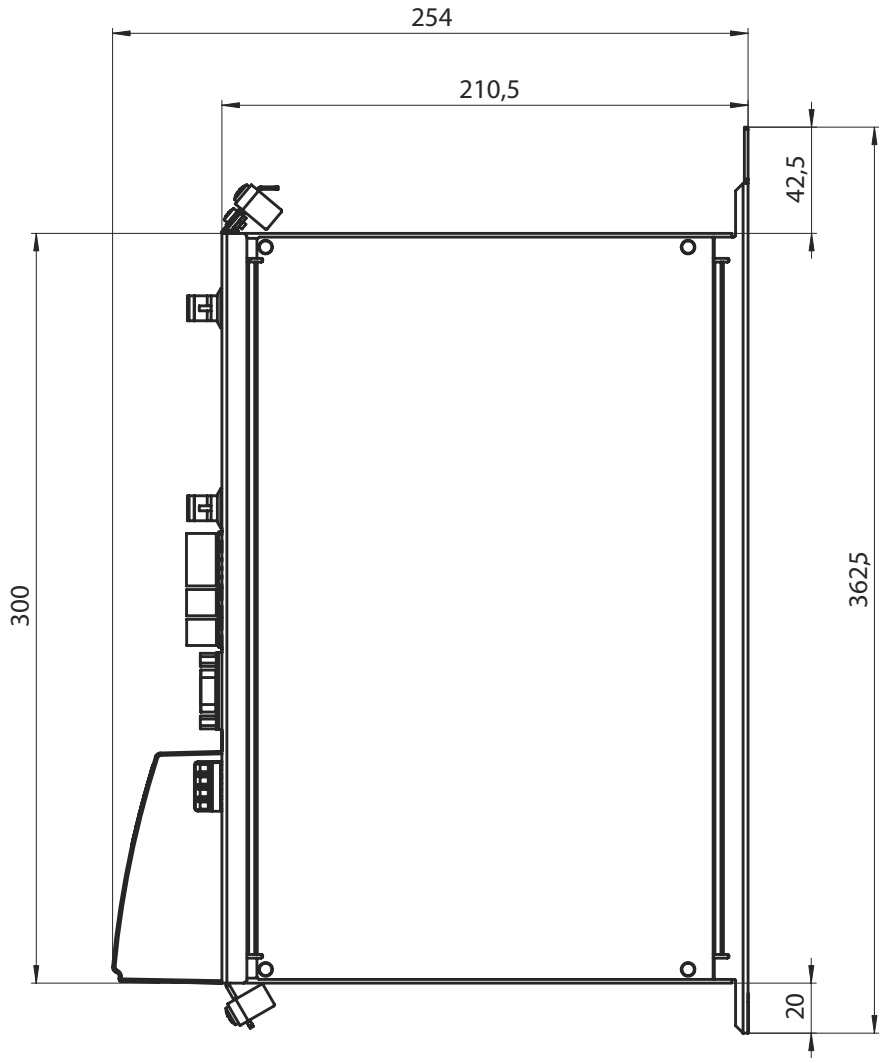

Figure 22: Dimensions master module

4.7 Technical data 24 V switched-mode power supply module option

MOVIAXIS® 24 V switched-mode power supply MXS80A-...-503-00 Type	1)	2)	060
INPUT via DC link			
Rated DC link voltage U_{NZK}	U	V	DC 560
Cross section[3] and contacts			CU rails 3 × 14 mm, M6 screw fitting
INPUT via external 24 V			
Rated input voltage U_N • **with direct control of brakes for CP and DS motors** • **otherwise**	U	V	DC-24 -0 % / +10 % DC-24 ±25 % (EN 61131)
Cross section[3] and contacts		mm^2	PC6 One core per terminal: 0.5...6 (AWG20...10) Two cores per terminal: 0.5...6 (AWG20...10)
OUTPUT			
Rated output voltage U	U	V	DC 3 x 24 (common ground) Tolerance when supplied via DC link: DC-24 -0 % / +10 % Tolerance when supplied via external 24 V: According to the fed voltage
Rated output current I	I	A	3 x 10[4]
Rated output power P	P	W	600
Cross section[3] and contacts			COMBICON 5.08 One core per terminal: 0.20...2.5 (AWG24...13) Two cores per terminal: 0.25...1 (AWG23...17)
GENERAL INFORMATION			
Compensation time if U_Z drops[5]	t	s	Rated power during 10 ms
Efficiency			Approx. 80 %
Weight		kg	4.3
Dimensions **B**		mm	60
H		mm	300
T		mm	254

1) Nameplate information
2) Unit
3) Material strength [mm] × Width [mm]
4) Not possible at the same time because total power is limited to 600 W
5) Only applies if: (dU_{ZK} / dt) > (200 V / 1 ms); applies if: $U_{ZK} \geq 460$ V

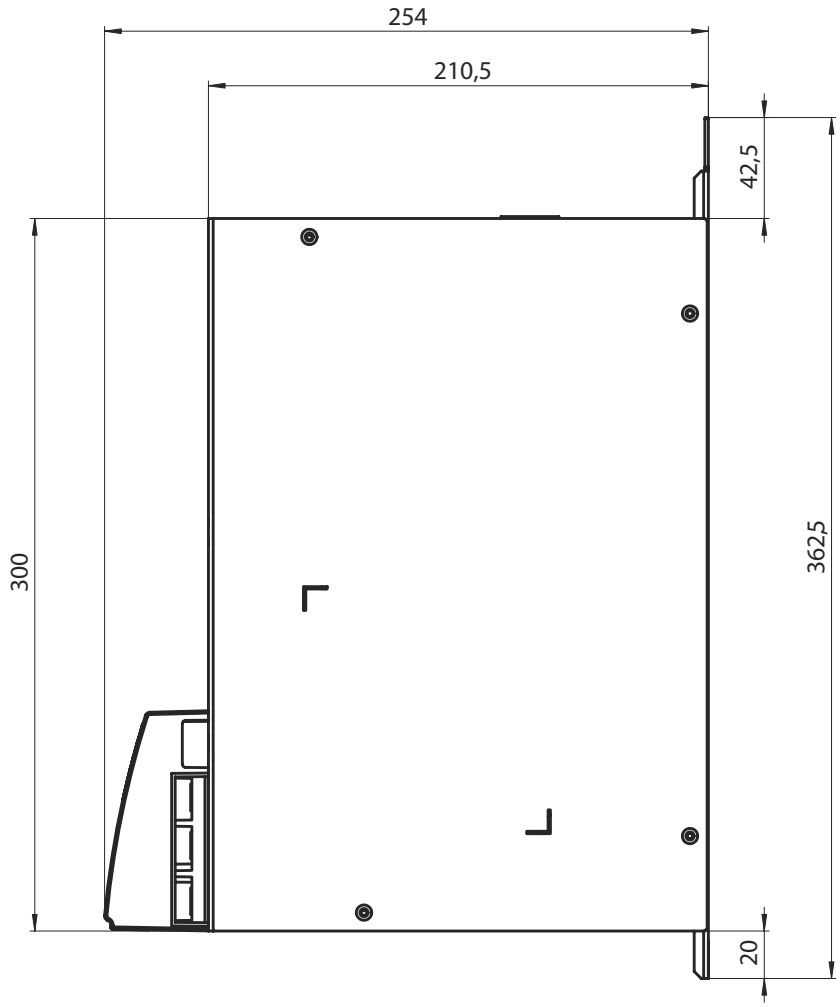

Figure 23: Dimensions 24 V switched-mode power supply module

4.8 Technical data XFP11A communication module option

The XFP11A communication module is a Profibus slave module for direct integration into MOVIAXIS® axis modules. The XFP11A Profibus card is used for directly connecting axis modules to Profibus-capable control systems. Only one XFP11A Profibus card can be installed per axis module.

XFP11A option	
Part number	824 932 6
Power consumption	P = 2.5 W
PROFIBUS protocol options	PROFIBUS DP and DP-V1 to IEC 61158
Automatic baud rate detection	9.6 kBaud ... 12 MBaud
Connection technology	• Via 9-pin sub D plug • Pin assignment to IEC 61158
Bus termination	Not integrated, implement using suitable PROFIBUS plug with terminating resistors that can be switched on.
Station address	0 ... 125, adjustable via DIP switches
Name of the GSD file	• SEW_6006.GSD (PROFIBUS DP) • SEWA6003.GSD (PROFIBUS DP-V1)
DP ident. number	$6006_{hex} = 24582_{dec}$
Application-specific parameter-setting data (Set-Prm application data)	• Length: 9 bytes • Hex parameter settings 00,00,00,06,81,00,00,01,**01** = DP diagnostics-alarm = **OFF** • Hex parameter settings 00,00,00,06,81,00,00,01,**00** = DP diagnostics-alarm = **ON**
Diagnostics data	• Standard diagnostics: 6 bytes
Tools for startup	• PC program MOVITOOLS® MotionStudio

DP Configuration

The servo inverter must be given a specific DP configuration by the DP master to define the type and number of input and output data used for transmission. The configuration telegram comprises the DP configurations for slots 1 to 3. The DP configurations column shows which configuration data is sent to the servo inverter when the PROFIBUS DP connection is being established.

Slot 1

Parameter data configuration	Meaning / Notes	DP Configuration
Empty	Reserved	0x00

Slot 2

Parameter data configuration	Meaning / Notes	DP Configuration
Empty	No parameter channel configured	0x00
Param (4words)	MOVILINK® parameter channel configured	0xC0, 0x87, 0x87

Slot 3

Parameter data configuration	Meaning / Notes	DP Configuration
1 PD	Process data exchange via 1 process data word	0xC0, 0xC0, 0xC0
2 PD	Process data exchange via 2 process data words	0xC0, 0xC1, 0xC1
3 PD	Process data exchange via 3 process data words	0xC0, 0xC2, 0xC2
4 PD	Process data exchange via 4 process data words	0xC0, 0xC3, 0xC3
5 PD	Process data exchange via 5 process data words	0xC0, 0xC4, 0xC4
6 PD	Process data exchange via 6 process data words	0xC0, 0xC5, 0xC5
7 PD	Process data exchange via 7 process data words	0xC0, 0xC6, 0xC6
8 PD	Process data exchange via 8 process data words	0xC0, 0xC7, 0xC7
9 PD	Process data exchange via 9 process data words	0xC0, 0xC8, 0xC8
1 0PD	Process data exchange via 10 process data words	0xC0, 0xC9, 0xC9
11 PD	Process data exchange via 11 process data words	0xC0, 0xCA, 0xCA
12 PD	Process data exchange via 12 process data words	0xC0, 0xC7, 0xC7
13 PD	Process data exchange via 13 process data words	0xC0, 0xCC, 0xCC
14 PD	Process data exchange via 14 process data words	0xC0, 0xCD, 0xCD
15 PD	Process data exchange via 15 process data words	0xC0, 0xCE, 0xCE
16 PD	Process data exchange via 16 process data words	0xC0, 0xCF, 0xCF
32 PD	Process data exchange via 32 process data words	0xC0, 0xDF, 0xDF

4.9 Technical data K-Net communication module option

Description

The XFA (K-Net) communication module is a slave module for connection to a serial bus system for high-speed data transfer. No more than one XFA (K-Net) communication module may be installed per MOVIAXIS® MXA axis module.

Terminal assignment

	Terminal	Assignment	Brief description		
	X31:		K-Net connection (RJ-45 socket)		
	X32:		K-Net connection (RJ-45 socket)		

You can select either connector X31 or X32 as input or output.

Technical data

K-Net	
Power consumption	2 W
Electrical isolation	No
Bus bandwidth	max. 50 Mbit/s
Connection technology	2xRJ-45
Max. cable length per section	50 m
Transmission medium	CAT7 cable

Interfaces	K-Net: Front
K-Net properties	Serial bus
	No electrical isolation
	Bus bandwidth with max. 50 MBit/s
	Connection technology with two RJ-45 sockets
	Transmission medium CAT7 cable
Card properties	Installation in MOVIAXIS® MX servo inverter with housing widths as of 60 mm

The power and current data refer to DC 24 V. The losses of the internal switched-mode power supply modules have been taken into account.

4.10 Technical data input / output module XIO11A / XIA11A

Binary hybrid module XIO11A

The input / output modules XIO11A / XIA11A are digital and digital / analog hybrid option modules. Both digital and analog signals can be read in or output by the servo inverter with these option modules.

General information	
Supply voltage	DC 24 V ± 25 %, 4 A[1] (EN 61131-1)
Supply of IOs	from the front
Addressing	via 16-digit address switch (positions 1 and 3 only)
Connection contacts	COMBICON 5.08 One core per terminal: 0.20...2.5 mm^2 (AWG24...13) Two cores per terminal: 0.25...1 mm^2 (AWG23...17)
Power consumption inverter	0.6 W
Binary inputs	
Number of inputs	8
Type of input	Type 1 according to EN 61131-2
Filter	500 Hz
Voltage range for "1"	15 V ≤ UH ≤ 30 V
Voltage range for "0"	-3 V ≤ UL ≤ 5 V
Processing time	1 ms
Electrical isolation	Yes
Binary outputs	
Number of outputs	8
Type of output	Binary outputs according to EN 61131-2
Rated voltage	DC 24 V
Processing time	1 ms
Rated current	0.5 A
Power loss	0.1 W with rated current ($R_{on\ max}$: 400 mΩ)
Inductive load capacity	100 mJ at max. 1 Hz
Protection device	Short circuit and overload protection
Electrical isolation	Yes

1) Maximum current of 4 A must be secured accordingly externally.

Analog / binary hybrid module XIA11A

General information	
Supply voltage	24V DC ± 25%, 2 A (EN 61131-1)
Supply of IOs	from the front
Addressing	via 16-digit address switch (positions 1 and 3 only)
Connection contacts	COMBICON 5.08 One core per terminal: 0.20...2.5 mm^2 (AWG24...13) Two cores per terminal: 0.25...1 mm^2 (AWG23...17)
Power consumption inverter	0.7 W
Analog inputs	
Number of inputs	2
Input range	±10 V
Type of input	differential
Conversion cycle	1 ms
Resolution	12 bit
Electrical isolation	No
Encoder resistance	min. 1 kΩ
Maximum permitted permanent overload	+30 V against GND
Input impedance	> 20 kΩ (EN 61131)
Accuracy (at 25 °C)	± 0.2 %
Measuring error temperature coefficient	100 ppm SKE[1)]/ °C
Maximum operating frequency of input filter	250 Hz
Analog outputs	
Number of outputs	2
Output range	±10 V
Conversion cycle	1 ms
Resolution	12 bit
Electrical isolation	No
Output load	min. 1 kΩ
Accuracy (at 25 °C)	± 0.1 %
Measuring error temperature coefficient	100 ppm SKE[1)]/ °C
Minimum rise time (0 - 10 V)	100 µs
Binary inputs	
Number of inputs	4
Type of input	Type 1 according to EN 61131-2
Filter	500 Hz
Voltage range for "1"	15 V ≤ UH ≤ 30 V
Voltage range for "0"	-3 V ≤ UL ≤ 5 V
Processing time	1 ms
Electrical isolation	Yes

Table continued on next page.

Binary outputs	
Number of outputs	4
Type of output	Binary outputs according to EN 61131-2
Rated voltage	DC 24 V
Processing time	1 ms
Rated current	0.5 A
Power loss	0.1 W with rated current ($R_{on\ max}$: 400 mΩ)
Inductive load capacity	100 mJ at max. 1 Hz
Protection device	Short circuit and overload protection
Electrical isolation	Yes

1) SKE = Maximum scale value

4.11 Technical data braking resistor option

General information

The BW... braking resistor series is adapted to the technical characteristics of MOVIAXIS® multi-axis servo inverters.

Wire and grid resistors

- Perforated sheet cover (IP20) open to mounting surface.
- The short-time load capacity of the wire and grid resistors is greater than in the flat-type braking resistors (→ power diagrams).

The wire and grid resistors have to be protected against overload using a bimetallic relay. Set the trip current to the value I_F, see the following tables. Do not use electronic or electromagnetic fuses because these can be triggered even in case of short-term excess currents that are still within the tolerance range.

The resistor surfaces will heat up under a load of P_N. Make sure to select an installation site that will accommodate these high temperatures. As a rule, braking resistors are therefore mounted on the control cabinet roof.

The performance data listed in the following tables indicate the load capacity of the braking resistors depending on their cyclic duration factor. The cyclic duration factor cdf of the braking resistor is indicated in % and refers to a cycle duration of ≤ 120 s.

UL and cUL listing

Type BW... braking resistors are UL and cUL approved in conjunction with the MOVIAXIS® multi-axis servo inverter. SEW-EURODRIVE will provide a certificate upon request.

Technical data

Braking resistor type	1)	BW027-006	BW027-012	BW012-015	BW012-025	BW012-050	BW012-100
Part number		822 422 6	822 423 4	821 679 7	821 680 0	821 681 9	821 682 7
Supply module		Size 1	Size 1	BG2	BG2	BG2	BG2
Load capacity at 100 % cdf[2]	kW	0.6	1.2	1.5	2.5	5.0	10
Resistance value R_{BW}	Ω	27 ±10 %		12 ±10 %			
Trip current (of F16) I_F	A_{RMS}	4.7	6.7	11.2	14.4	20.4	28.9
Design		wire-wound resistor			Steel-grid resistor		
Connections	mm^2	Ceramic terminals 2.5 (AWG13)					
Permitted electric loading of the terminals at 100 % cdf[3]	A	DC 20					
Permitted electric loading of the terminals at 40 % cdf[3]	A	DC 25					
Enclosure		IP20 (when installed)					
Ambient temperature ϑ_U	°C	–20 ... +45					
Type of cooling		KS = Self-cooling					

1) Unit

2) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration $T_D \leq 120$ s.

The following braking resistors are only intended for use with a DC link discharge module.

Braking resistor type	1)	BW006-025-01[2]	BW006-050-01[2]	BW004-050-01[2]
Part number		1 820 011 7	1 820 012 5	1 820 013 3
Supply module		BG3	BG3	BG3
Load capacity at 100 % cdf[3]	kW	2.5	5.0	5.0
Resistance value R_{BW}	Ω	5.8 ±10 %		3.6 ±10 %
Trip current (of F16) I_F	A_{RMS}	20.8	29.4	37.3
Design		Steel-grid resistor		
Connections		M8 stud		
Permitted electric loading of the terminal stud at 100 % cdf[3]**2**	A	DC 115		
Permitted electric loading of the terminal stud at 40 % cdf[3]	A	DC 143		
Enclosure		IP20 (when installed)		
Ambient temperature ϑ_U	°C	–20 ... +45		
Type of cooling		KS = Self-cooling		

1) Unit

2) Braking resistors show a tapping of 1 Ω

3) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration $T_D \leq 120$ s.

Dimension drawing braking resistors BW...

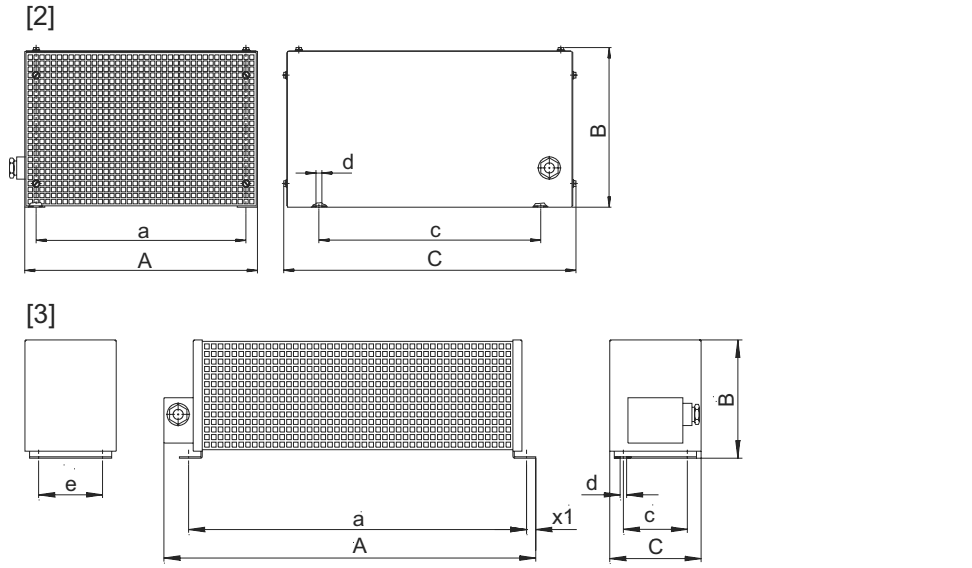

*Figure 24: Dimension drawing BW braking resistors in **[2]** grid resistor / **[3]** wire resistor*

Flat-design resistors: The connecting lead is 500 mm long. The scope of delivery includes four M4 threaded bushes each of type 1 and 2.

Type	Main dimensions [mm]			Fastening parts [mm]				Weight [kg]
BW..	A	B	C	a	c/e	x1	d	
BW027-006	486	120	92	430	64	10	6.5	2.2
BW027-012	486	120	185	426	150	10	6.5	4.3
BW012-015	600	120	92	544	64	10	6.5	4.0
BW012-025	295	260	490	270	380	–	10.5	8.0
BW012-050	395	260	490	370	380	–	10.5	11.0
BW012-100	595	270	490	570	380	–	10.5	18.0
BW006-025-01	295	260	490	270	380	–	10.5	9.5
BW006-050-01	395	260	490	370	380	–	10.5	13.0
BW004-050-01	395	260	490	370	380	–	10.5	13.0

4.12 Technical data line filter option

Line filters suppress emitted interferences on the line side of servo inverters.

Technical data

Line filter type	[1]	NF018-503	NF048-503	NF085-503	NF150-503
Part number		827 413 4	827 117 8	827 415 0	827 417 7
Supply module		Size 1	BG2	BG3	BG3
Rated voltage V_N	V_{AC}	3×500 +10 %, 50/60 Hz			
Rated current I_N	A_{AC}	18	48	85	150
Power loss at I_N P_V	W	12	22	35	90
Earth-leakage current at V_N	mA	< 25	< 40	< 30	< 30
Ambient temperature ϑ_U	°C	–25 ... +40			
Degree of protection		IP20 (EN 60529)			
Connections L1-L3/L1'-L3'	mm^2	4 (AWG12)	10 (AWG8)	35 (AWG2)	95 (AWG4/0)
PE		M5 stud	M5/M6 stud	M8	M10
NF...type line filter[2]		cRUus			

1) Unit

2) **NF... line filters have cRUus approval independent of the MOVIAXIS® multi-axis servo inverter. SEW-EURODRIVE will provide a certificate upon request**.

Dimension drawing NF line filter

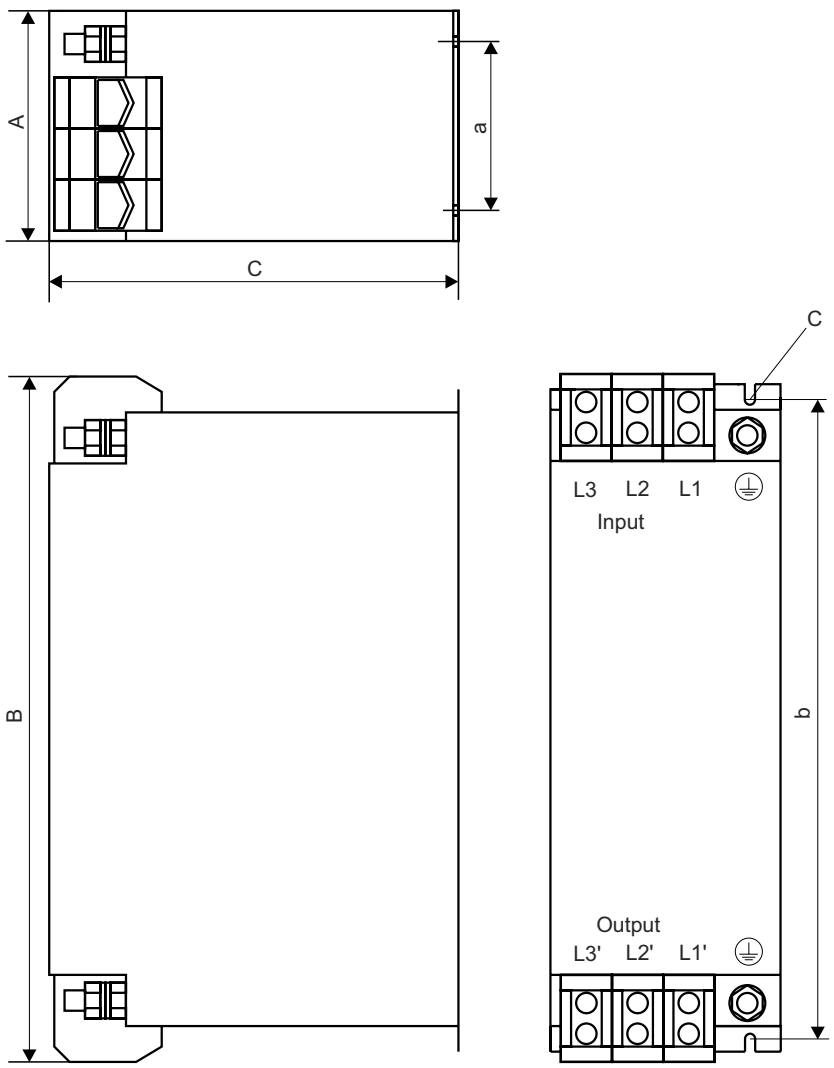

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Figure 25: Dimension drawing for NF line filter

Any mounting position

Line filter type	Main dimensions [mm]			Mounting dimensions [mm]		Hole dimension [mm]	PE connection	Weight
	A	B	C	a	b	c		kg
NF018-503	50	255	80	20	240	5.5	M5	1.1
NF048-503	60	315	100	30	295		M6	2.1
NF085-503	90	320	140	60	255	6.5	M8	3.5
NF150-503	100	330	155	65			M10	5.6

4.13 Technical data line choke option

Line chokes are used to

- increase overvoltage protection,
- limit the charging current when several supply modules are connected together in parallel on the input end with shared mains contactors (rated current of line choke = total of supply module rated currents).

Technical data

Line choke type		[1)]	ND020-013	ND045-013	ND085-013	ND150-013
Part number			826 012 5	826 013 3	826 014 1	825 548 2
Supply module			Size 1	BG2	BG3	BG3
Rated voltage	V_N	V_{AC}	3 × 500 +10 %, 50/60 Hz			
Rated current	I_N	A_{AC}	20	45	85	150
Power loss at I_N P_V		W	10	15	25	62
Inductance	L_N	mH	0.1	--	--	--
Ambient temperature	ϑ_U	°C	–25 ... +40			
Degree of protection			IP00 (EN 60529)			
Connections L1-L3/L1'-L3'		mm^2	4 (AWG12) Terminal strips	10 (AWG8) Terminal strips	35 (AWG2) Terminal strips	M10 stud PE: M8 stud
PE						

1) Unit

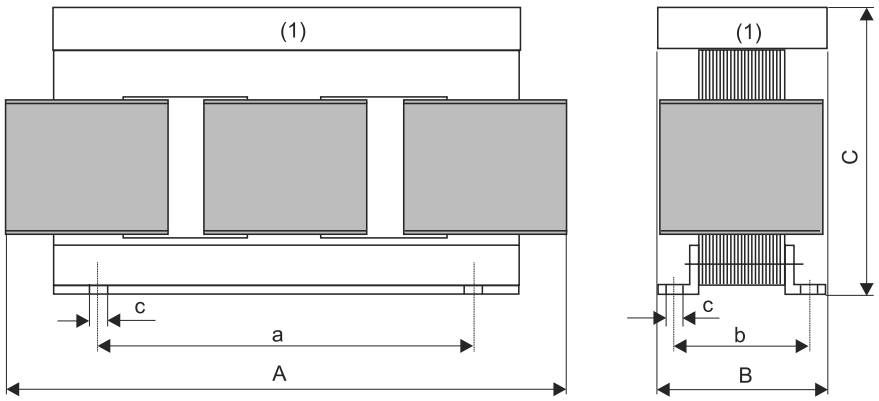

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Figure 26: Dimension drawing for ND... line choke

(1) Space for terminal strips (touch-safe)
Any mounting position

All dimensions in mm:

Line choke type	Main dimensions			Mounting dimensions		Hole dimension	Weight
	A	B	C	a	b	c	kg
ND020-013	85	60	120	50	31	5-10	0.5
ND045-013	125	95	170	84	55-75	6	2.5
ND085-013	185	115	235	136	56	7	8
ND150-013	255	140	230	170	77	8	17

4.14 Mains cables, motor and motor brake lines, braking resistor lines, fuses

Special regulations

Comply with the **regulations issued by specific countries and for specific machines** regarding fusing and the selection of line cross sections. If required, also adhere to the notes on **UL compliant installation**.

Prescribed motor cable length

The maximum motor cable length is

- 50 m shielded,
- 100 m unshielded.

An exception from this rule is the 2 A axis module. Its maximum motor cable length is

- 25 m shielded,
- 50 m unshielded.

Motor brake cable

The motor brake cable has an influence on the tolerance requirement for the 24 V brake supply. The tolerance values regarding brake supply listed in these operating instructions refer to a maximum cable length of 25 m and a minimum cross section of 0.75 mm² (0.03 Ω/m at 100 °C).

Line cross section and fusing

SEW-EURODRIVE recommends the following line cross sections and fusing, assuming the use of single-core copper cables with PVC insulation laid in cable ducts, an ambient temperature of 40 °C and rated system currents of 100 % of the rated unit current:

MOVIAXIS® MXP supply modules:

MOVIAXIS® MXP	**Size 1**	**Size 2**	**Size 3**	
Rated output power [kW]	10	25	50	75
Power supply connection				
Rated mains current AC [A]	15	36	72	110
Fuses F11/F12/F13 I_N	Design according to rated mains current			
Mains conductor L1/L2/L3	1.5 - 6 mm² (AWG16-10))	10 - 16 mm² (AWG8-6))	16 - 50 mm² (AWG6-1/0))	35 - 50 mm² (AWG2-1/0))
PE conductor	1 × 10 mm² (AWG8)	1 × 16 mm²(AWG6)	1 × 50 mm² (AWG1/0)	1 × 50 mm² (AWG1/0)
Cross section and contacts mains connection	COMBICON PC6 pluggable, max. 6 (AWG10)	M6 screw bolts max. 16 mm² (AWG6)	Screw bolt M8 max. 50 mm² (AWG1/0)	
Braking resistor connection				
Brake line +R/-R	Design according to rated current of braking resistor			
Cross section and contacts on unit	COMBICON PC4 pluggable, max. 4 (AWG12)	M6 screw bolts max. 16 mm² (AWG6)		
Cross section and contacts on braking resistor	→ Technical data of braking resistors			

MOVIAXIS® MXA axis modules:

MOVIAXIS® MXA	Size 1			Size 2	
Continuous output current AC [A] PWM = 4 kHz	2	4	8	12	16
Rated output mains current AC [A] PWM = 8 kHz	2	4	8	12	16
Motor line U/V/W	1.5 - 4 mm^2 (AWG16-12)				
Cross section and contacts	COMBICON PC4 pluggable, max. 4 mm^2 (AWG12)				

MOVIAXIS® MXA	Size 3		Size 4	Size 5	Size 6
Continuous output current AC [A] PWM = 4 kHz	32	43	64	85	133
Rated output mains current AC [A] PWM = 8 kHz	24	32	48 24, 32 (special design)	64	100 64 (special design)
Motor line U/V/W	4 - 6 mm^2 (AWG12-10)	6 mm^2 (AWG10)	10 - 16 mm^2 (AWG8-6)	16 mm^2 (AWG6)	25 - 50 mm^2 (AWG4-1/0)
Cross section and contacts	COMBICON PC6 pluggable, max. 6 (AWG10)		M6 screw bolts max. 16 mm^2 (AWG6)		Screw bolt M8 max. 50 mm^2 (AWG1/0)

MOVIAXIS® MXZ DC link discharge module:

MOVIAXIS® MXZ	Size 1
Braking resistor connection	
Brake line +R/-R	Design according to rated current of braking resistor
Cross section and contacts on unit	M6 screw bolts max. 16 mm^2 (AWG6)
Cross section and contacts on braking resistor	→ Technical data of braking resistors

Voltage drop

The line cross section of the motor lead should be selected so the **voltage drop is as small as possible**. An excessively large voltage drop means that the full motor torque is not achieved.

The expected voltage drop can be determined with reference to the following tables (the voltage drop can be calculated in proportion to the length if the cables are shorter or longer). This information applies in case of core lines made of copper with PVC insulation at 40 °C ambient temperature and installation type E according to EN "60204-1 1998-11 table 5.

Line Cross section	Load with I [A] =															
	4	**6**	**8**	**10**	**13**	**16**	**20**	**25**	**30**	**40**	**50**	**63**	**80**	**100**	**125**	**150**
Copper	Voltage drop ΔU [V] with length = 100 m (330 ft) and ϑ = 70 °C															
1.5 mm²	5.3	8	10.6	13.3	17.3	21.3	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
2.5 mm²	3.2	4.8	6.4	8.1	10.4	12.8	16	1)	1)	1)	1)	1)	1)	1)	1)	1)
4 mm²	1.9	2.8	3.8	4.7	6.5	8.0	10	12.5	1)	1)	1)	1)	1)	1)	1)	1)
6 mm²					4.4	5.3	6.4	8.3	9.9	1)	1)	1)	1)	1)	1)	1)
10 mm²						3.2	4.0	5.0	6.0	8.2	10.2	1)	1)	1)	1)	1)
16 mm²								3.3	3.9	5.2	6.5	7.9	10.0	1)	1)	1)
25 mm²									2.5	3.3	4.1	5.1	6.4	8.0	1)	1)
35 mm²											2.9	3.6	4.6	5.7	7.2	8.6
50 mm²														4.0	5.0	6.0

1) Not recommended design range, excessive voltage drop.

Line Cross section	Load with I [A] =															
	4	**6**	**8**	**10**	**13**	**16**	**20**	**25**	**30**	**40**	**50**	**63**	**80**	**100**	**125**	**150**
Copper	Voltage drop ΔU [V] with length = 100 m (330 ft) and ϑ = 70 °C															
AWG16	7.0	10.5	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
AWG14	4.2	6.3	8.4	10.5	13.6	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
AWG12	2.6	3.9	5.2	6.4	8.4	10.3	12.9	1)	1)	1)	1)	1)	1)	1)	1)	1)
AWG10					5.6	6.9	8.7	10.8	13.0	1)	1)	1)	1)	1)	1)	1)
AWG8						4.5	5.6	7.0	8.4	11.2	1)	1)	1)	1)	1)	1)
AWG6								4.3	5.1	6.9	8.6	10.8	13.7	1)	1)	1)
AWG4									3.2	4.3	5.4	6.8	8.7	10.8	13.5	1)
AWG3									2.6	3.4	4.3	5.1	6.9	8.6	10.7	12.8
AWG2											3.4	4.2	5.4	6.8	8.5	10.2
AWG1												3.4	4.3	5.4	6.8	8.1
AWG1/0												2.6	3.4	4.3	5.4	6.8
AWG2/0													2.7	3.4	4.3	5.1

1) More than 3 % voltage drop in relation to V_{mains} = 460V_{AC}. (not recommended)

4.15 Prefabricated cables

Prefabricated cables

SEW-EURODRIVE offers cable sets and prefabricated cables for simple and fault-free connection of various system components to MOVIAXIS®. The cables are prefabricated in 1 m steps to the required length. It is necessary to differentiate between whether the cables are intended for fixed routing or for cable carrier applications.

- Motor cables and extension cables for connecting CM motors.
- Motor cables and extension cables for connecting DS and CMD motors.
- Motor cables and extension cables for connecting CMP motors.
- VR forced cooling fan cable and extension cable.
- Encoder cable and extension cable (Hiperface, incremental encoder), resolver cable and extension cable in plug and terminal box design for motors.

We recommend using the prefabricated cables from SEW-EURODRIVE.

Thread of plugs

Sub D plugs come equipped with the usual UNC threads.

Notes on the wiring diagrams

All connectors are shown with view onto the pins!

Power cable for DFS

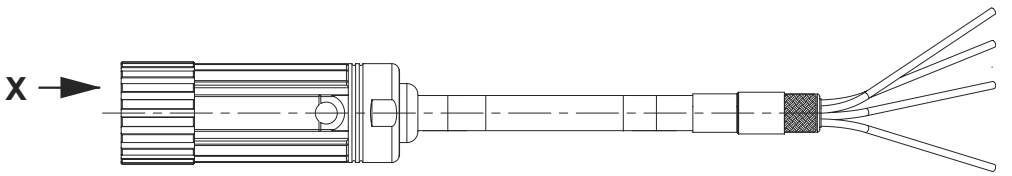
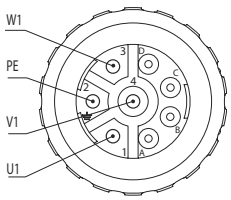


Figure 27: DFS motor cable

Pin assignment of the motor cable

Plug connector	Contact	Core identification	Assigned	Extra
BSTA 078  **View X**	1	Black with white lettering U, V, W	U	Bag of loose parts
	4		V	
	3		W	
	2	Green/yellow	PE	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM 11	**4×1.5 mm² (AWG 16)**	0590 454 4	Fixed installation
SM 11	**4×1.5 mm² (AWG 16)**	0590 477 3	Cable carrier installation

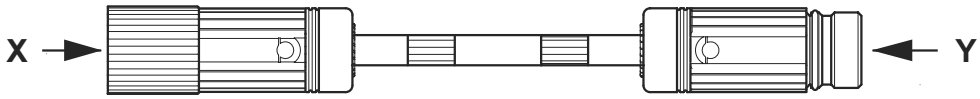


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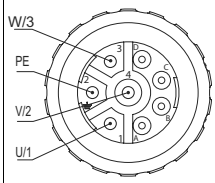
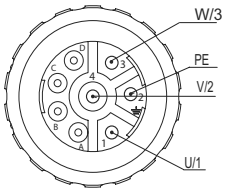
Figure 28: Motor extension cable

Pin assignment of motor extension cable

Plug connector	Contact	Core identification	Assigned	Contact	Plug connector
BSTA 078  **View X**	1	Black with white lettering U, V, W	U	1	**BKUA 199**  **View Y**
	4		V	4	
	3		W	3	
	2	Green/yellow	PE	2	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM11	**4×1.5 mm² (AWG 16)**	0590 361 0	Cable carrier installation

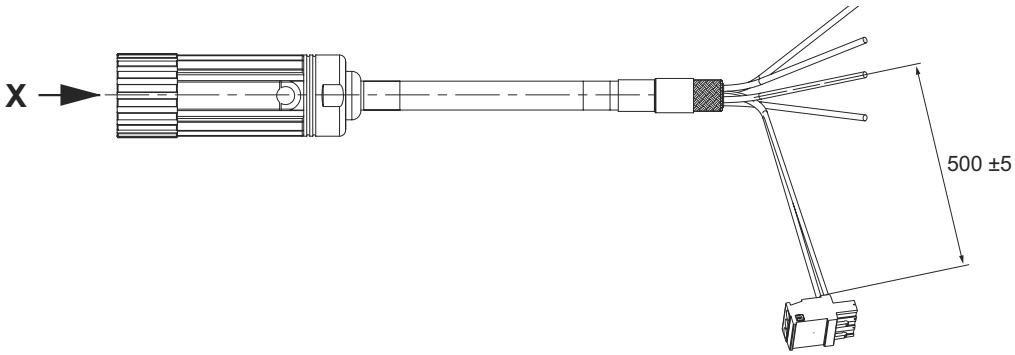
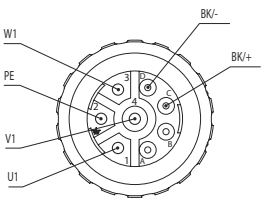


Figure 29: DFS brake motor cable

Pin assignment of brake motor cable

Plug connector	Contact	Core identification	Assigned	Extra
BSTA 078  **View X**	1	Black with white lettering U, V, W	U	Bag of loose parts
	4		V	
	3		W	
	2	Green/yellow	PE	
	A	–	n.c.	
	B	–	n.c.	
	C	Black with white lettering 1, 2, 3	2	
	D		1	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SB 11	**4×1.5 mm² (AWG 16)** **3×1 mm² (AWG 17)**	1332 485 3	Fixed installation
SB 11	**4×1.5 mm² (AWG 16)** **3×1 mm² (AWG 17)**	1332 486 1	Cable carrier installation

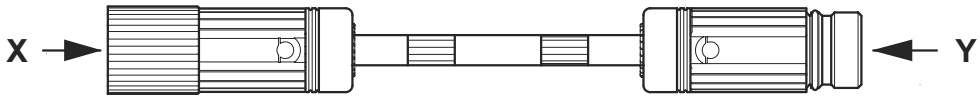


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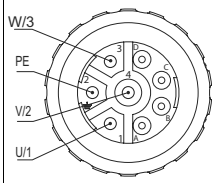
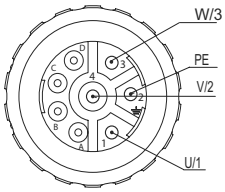
Figure 30: Brake motor extension cable

Pin assignment of brake motor extension cable

Plug connector	Contact	Core identification	Assigned	Contact	Plug connector
BSTA 078  **View X**	1	Black with white lettering U, V, W	U	1	**BKUA 199**  **View Y**
	4		V	4	
	3		W	3	
	2	Green/yellow	PE	2	
	A		n.c.	A	
	B		n.c.	B	
	C	Black with white lettering 1, 2, 3	2	C	
	D		1	E	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SB11	**4×1.5 mm² (AWG 16)**	0593 650 0	Cable carrier installation

Power cable for CFM

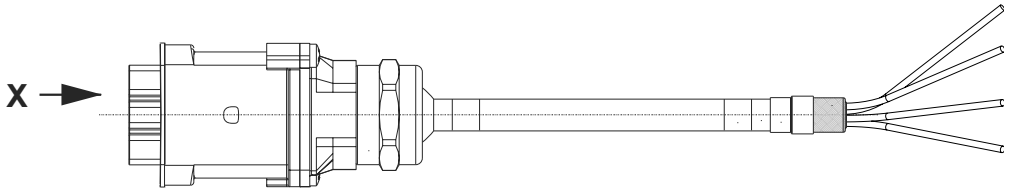


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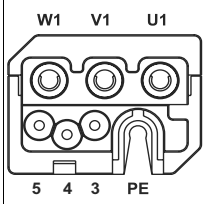
Figure 31: CFM motor cable

Pin assignment of the motor cable

Plug connector	Contact	Core identification	Assigned	Contact type	Extra
C148U connector with socket contacts	U1	Black with white lettering U, V, W	U	Cut-off, length ca. 250 mm	Bag of loose parts
	V1		V		
	W1		W		
 **View X**	PE	Green/yellow	(protective earth)	with Phoenix plug connector GMVSTBW 2.5/3 ST	

Motor cable types

The cables are equipped with a plug for motor connection and conductor end sleeves for inverter connection.

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM 51 / SM 61	**4×1.5 mm² (AWG 16)**	199 179 5	Fixed installation
SM 52 / SM 62	**4×2.5 mm² (AWG 12)**	199 181 7	
SM 54 / SM 64	**4×4 mm² (AWG 10)**	199 183 3	
SM 56 / SM 66	**4×6 mm² (AWG 10)**	199,185 X	
SM 59 / SM 69	**4×10 mm² (AWG 8)**	199 187 6	
SM 51 / SM 61	**4×1.5 mm² (AWG 16)**	199 180 9	Cable carrier installation
SM 52 / SM 62	**4×2.5 mm² (AWG 12)**	199 182 5	
SM 54 / SM 64	**4×4 mm² (AWG 10)**	199 184 1	
SM 56 / SM 66	**4×6 mm² (AWG 10)**	199 186 8	
SM 59 / SM 69	**4×10 mm² (AWG 8)**	199 188 4	

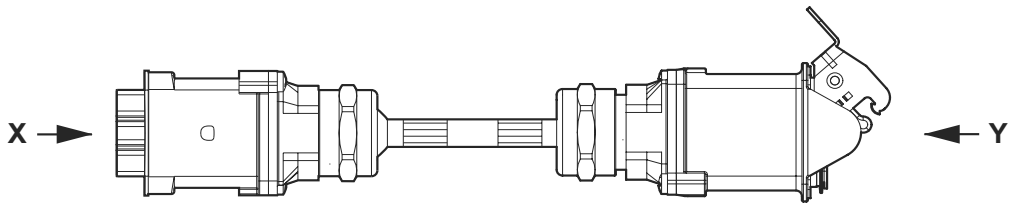
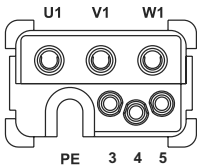
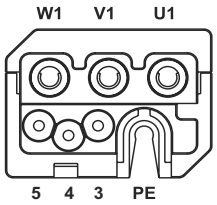


Figure 32: Motor extension cable

Pin assignment of motor extension cable

Plug connector	Contact	Core identification	Contact	Plug connector
C148U adapter with pin contacts	U1	Black with white lettering U, V, W	U1	**C148U connector with socket contacts**
	V1		V1	
	W1		W1	
	PE	Green/yellow	PE	
	3	Black with white lettering 1, 2, 3	3	
	4		4	
	5		5	

The motor extension cable has the same pin assignment as all other contacts.

Types of motor extension cables

The cables are equipped with a plug and adapter for extending the CFM motor cable.

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM 51 / SM 61	**4×1.5 mm² (AWG 16)**	199 549 9	Fixed installation
SM 52 / SM 62	**4×2.5 mm² (AWG 12)**	199 551 0	
SM 54 / SM 64	**4×4 mm² (AWG 10)**	199 553 7	
SM 56 / SM 66	**4×6 mm² (AWG 10)**	199 555 3	
SM 59 / SM 69	**4×10 mm² (AWG 8)**	199,557 X	
SM 51 / SM 61	**4×1.5 mm² (AWG 16)**	199 550 2	Cable carrier installation
SM 52 / SM 62	**4×2.5 mm² (AWG 12)**	199 552 9	
SM 54 / SM 64	**4×4 mm² (AWG 10)**	199 554 5	
SM 56 / SM 66	**4×6 mm² (AWG 10)**	199 556 1	
SM 59 / SM 69	**4×10 mm² (AWG 8)**	199 558 8	

Alternative plug connectors

Plug connectors for power supply with socket contacts (complete):

Type	Cross sections	Part no.
SM51 / SM61	4 x 1.5 mm²	199 135 3
SM52 / SM62	4 x 2.5 mm²	199 136 1
SM54 / SM64	4 x 4 mm²	199,137 X
SM56 / SM66	4 x 6 mm²	199 138 8
SM59 / SM69	4 x 10 mm²	199 139 6

Brake motor cables

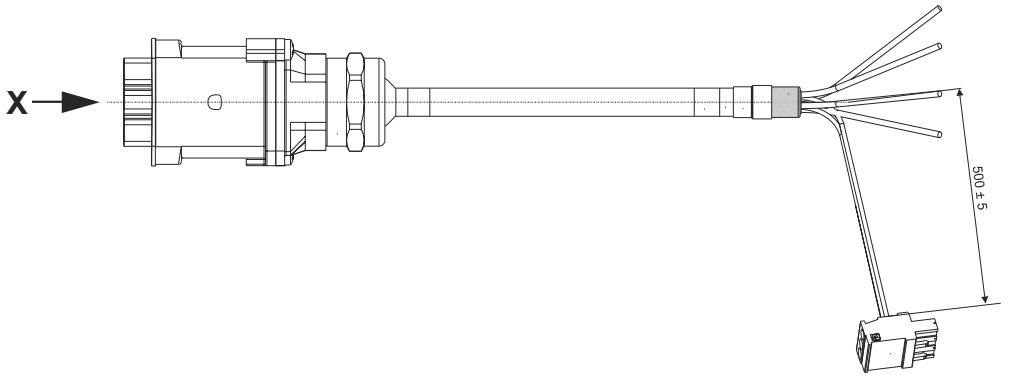


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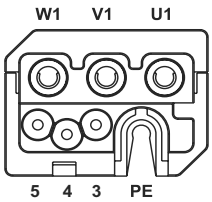
Figure 33: CFM brake motor cable

Pin assignment of brake motor cable

The brake motor cable is fabricated for the BME, BMP, BMH, BMK and BMV brake rectifiers. For the BSG control unit, the customers have to assemble the cable themselves.

Plug connector	Contact	Core identification	Assigned	Contact type	Extra
C148U connector with socket contacts	U1	Black with white lettering U, V, W	U	Cut-off, length ca. 250 mm	Bag of loose parts
	V1		V		
	W1		W		
 **View X**	PE	Green/yellow	(protective earth)		
	3	Black with white lettering 1, 2, 3	1	with Phoenix plug connector GMVSTBW 2.5/3ST	
	4		2		
	5		3		

Types of brake motor cables

Plug connector type, complete	Number of cores and line cross section	Part number	Installation type
SB 51 / SB 61	**4x1.5 mm^2 (AWG 16) + 3x1.0 mm^2 (AWG 17)**	199 189 2	Fixed installation
SB 52 / SB 62	**4x2.5 mm^2 (AWG 12)+ 3x1.0 mm^2 (AWG 17)**	199 191 4	
SB 54 / SB 64	**4x4 mm^2 (AWG 10)+ 3x1.0 mm^2 (AWG 17)**	199 193 0	
SB 56 / SB 66	**4×6 mm^2 (AWG 10) + 3x1.5 mm^2 (AWG 17)**	199 195 7	
SB 59 / SB 69	**4x10 mm^2 (AWG 10) + 3x1.5 mm^2 (AWG 17)**	199 197 3	

Plug connector type, complete	Number of cores and line cross section	Part number	Installation type
SB 51 / SB 61	**4x1.5 mm² (AWG 16) + 3x1.0 mm² (AWG 17)**	199 190 6	Cable carrier installation
SB 52 / SB 62	**4x2.5 mm² (AWG 12)+ 3x1.0 mm² (AWG 17)**	199 192 2	
SB 54 / SB 64	**4x4 mm² (AWG 10)+ 3x1.0 mm² (AWG 17)**	199 194 9	
SB 56 / SB 66	**4x6 mm² (AWG 10)+ 3x1.5 mm² (AWG 16)**	199 196 5	
SB 59 / SB 69	**4x10 mm² (AWG 10) + 3x1.5 mm² (AWG 17)**	199 198 1	

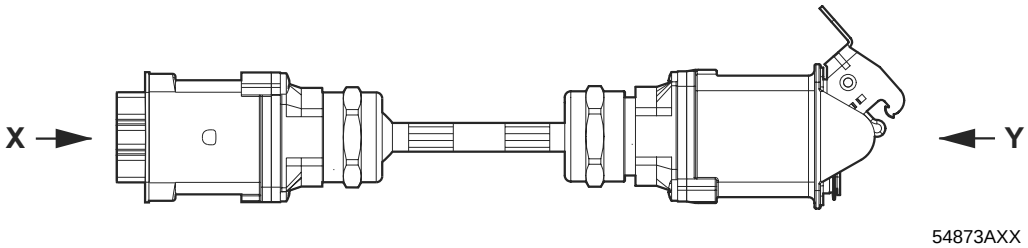
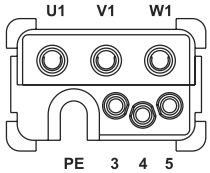
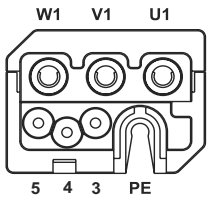


Figure 34: Brake motor extension cable

Pin assignment of brake motor extension cable

Plug connector	Contact	Core identification	Contact	Plug connector
C148U adapter with pin contacts	U1	Black with white lettering U, V, W	U1	**C148U connector with socket contacts**
	V1		V1	
	W1		W1	
	PE	Green/yellow	PE	
	3	Black with white lettering 1, 2, 3	3	
	4		4	
	5		5	

The brake motor extension cable has the same pin assignment as all other contacts.

Types of brake motor extension cables

Plug connector type, complete	Number of cores and line cross section	Part number	Installation type
SK 51 / SK 61	**4x1.5 mm² (AWG 16) + 3x1.0 mm² (AWG 17)**	199,199 X	Fixed installation
SK 52 / SK 62	**4x2.5 mm² (AWG 12)+ 3x1.0 mm² (AWG 17)**	199 201 5	
SK 54 / SK 64	**4x4 mm² (AWG 10)+ 3x1.0 mm² (AWG 17)**	199 203 1	
SK 56 / SK 66	**4x6 mm² (AWG 10)+ 3x1.5 mm² (AWG 17)**	199 205 8	
SK 59 / SK 69	**4x10 mm² (AWG 10) + 3x1.5 mm² (AWG 17)**	199 207 4	

Plug connector type, complete	Number of cores and line cross section	Part number	Installation type
SK 51 / SK 61	**4x1.5 mm² (AWG 16) + 3x1.0 mm² (AWG 17)**	199 200 7	Cable carrier installation
SK 52 / SK 62	**4x2.5 mm² (AWG 12)+ 3x1.0 mm² (AWG 17)**	199 202 3	
SK 54 / SK 64	**4x4 mm² (AWG 10)+ 3x1.0 mm² (AWG 17)**	199,204 X	
SK 56 / SK 66	**4x6 mm² (AWG 10)+ 3x1.5 mm² (AWG 16)**	199 206 6	
SK 59 / SK 69	**4×10 mm² (AWG 10) + 3x1.5 mm² (AWG 17)**	199 208 2	

Alternative plug connectors

Plug connectors for power supply with socket contacts (complete).

Type	Cross sections	Part no.
SB51 / SB61	**4x1.5 mm² (AWG 16) + 3x1.0 mm² (AWG 17)**	199 142 6
SB52 / SB62	**4x2.5 mm² (AWG 12)+ 3x1.0 mm² (AWG 17)**	199 143 4
SB54 / SB64	**4x4 mm² (AWG 10)+ 3x1.0 mm² (AWG 17)**	199 144 2
SB56 / SB66	**4x6 mm² (AWG 10)+ 3x1.5 mm² (AWG 16)**	199 145 0
SB59 / SB69	**4x10 mm² (AWG 10) + 3x1.5 mm² (AWG 17)**	199 146 9

CMP / CMD power cables

Motor cables

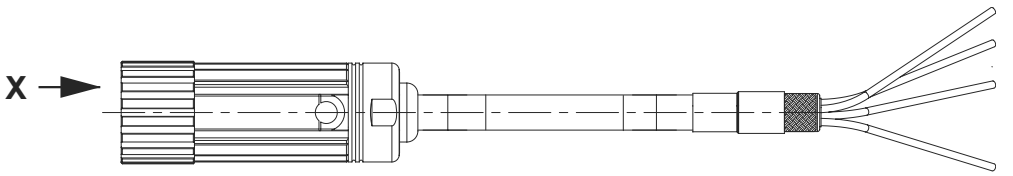


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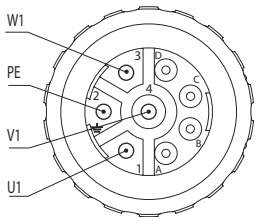
Figure 35: CMP motor cable

Pin assignment of motor cables

Plug connector	Contact	Cable core color	Assigned	Extra
BSTA 078  **View X**	1	(BK) Black	U	Bag of loose parts
	2	(GN/YE) Green / yellow	PE	
	3	(BK) Black	W	
	4	(BK) Black	V	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM 11	4×1.5 mm^2	0590 4544	Fixed installation
SM 11	4×1.5 mm^2	0590 6245	Cable carrier installation
SM12	4×2.5 mm^2	0590 4552	Fixed installation
SM12	4×2.5 mm^2	0590 6253	Cable carrier installation
SM14	4×4 mm^2	0590 4560	Fixed installation
SM14	4×4 mm^2	0590 4803	Cable carrier installation

Motor extension cables

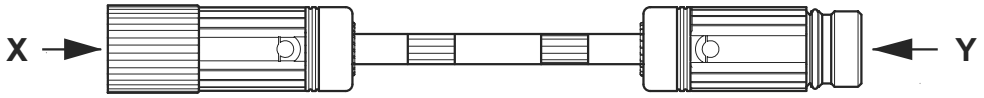


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Figure 36: Motor extension cable

Pin assignment of motor extension cable

Plug connector	Contact	Cable core color	Assigned	Contact	Plug connector
BSTA 078	1	(BK/WH) Black with white lettering U, V, W	U	1	**BKUA 199**
	4		V	4	
	3		W	3	
	2	(GR/YE) Green / yellow	PE	2	
View X					**View Y**

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM11	4×1.5 mm^2	1333 2547	Cable carrier installation
SM12	4×2.5 mm^2	1333 2465	Cable carrier installation
SM14	4×4 mm^2	1333 2473	Cable carrier installation

Brake motor cables (CMP only)

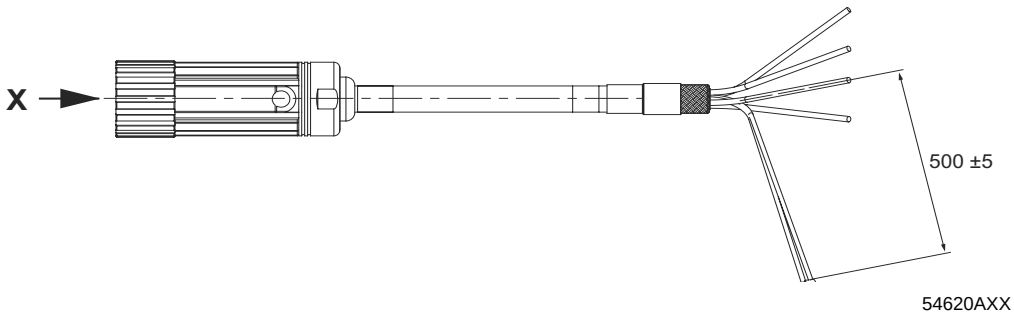
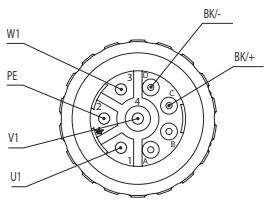


Figure 37: CMP brake motor cable

Pin assignment of brake motor cables (CMP only)

Plug connector	Contact	Cable core color	Assigned	Extra
BSTA 078  **View X**	1	(BK/WH) Black with white lettering U, V, W	U	Bag of loose parts
	4		V	
	3		W	
	2	(GN/YE) Green / yellow	PE	
	A	–	n. c.	
	B	–	n. c.	
	C	(BK/WH) Black with white lettering 1, 2, 3	2	
	D		1	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SB 11	$4 \times 1.5\ mm^2 + 2 \times 1\ mm^2$	1332 4853	Fixed installation
SB 11	$4 \times 1.5\ mm^2 + 2 \times 1\ mm^2$	1333 1221	Cable carrier installation
SB12	$4 \times 2.5\ mm^2 + 2 \times 1\ mm^2$	1333 2139	Fixed installation
SB12	$4 \times 2.5\ mm^2 + 2 \times 1\ mm^2$	1333 2155	Cable carrier installation
SB14	$4 \times 4\ mm^2 + 2 \times 1\ mm^2$	1333 2147	Fixed installation
SB14	$4 \times 4\ mm^2 + 2 \times 1\ mm^2$	1333 2163	Cable carrier installation

Brake motor extension cables (CMP only)

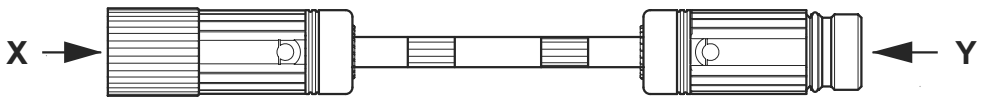


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Figure 38: CMP brake motor extension cables

Pin assignment of brake motor extension cables (CMP only)

Plug connector	Contact	Cable core color	Assigned	Contact	Plug connector
BSTA 078	1	(BK/WH) Black with white letter-ing U, V, W	U	1	**BKUA 199**
	4		V	4	
	3		W	3	
	2	(GN/YE) Green / yellow	PE	2	
	A	–	n. c.	A	
	B	–	n. c.	B	
	C	(BK/WH) Black with white lettering 1, 2, 3	2	C	
	D		1	D	
View X					**View Y**

Plug connector type	Number of cores and line cross section	Part number	Installation type
SB11	$4 \times 1.5\ mm^2 + 2 \times 1\ mm^2$	1333 2481	Cable carrier installation
SM12	$4 \times 2.5\ mm^2 + 2 \times 1\ mm^2$	1333 2503	Cable carrier installation
SM14	$4 \times 4\ mm^2 + 2 \times 1\ mm^2$	1333 2511	Cable carrier installation

Feedback cable

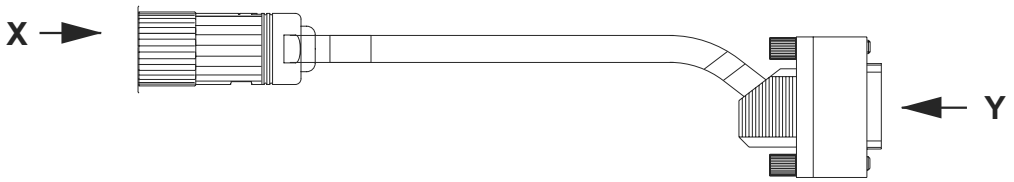
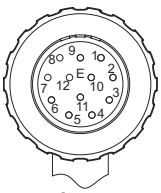
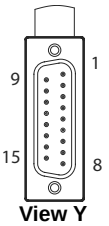


Figure 39: Resolver cable plug connector MOVIAXIS® MX

Resolver cable

Type	Installation	Part number
DS/CM/CMP/CMD	Fixed installation	1332 742 9
DS/CM/CMP/CMD	Cable carrier installation	1332 743 7

Pin assignment of resolver cable RH.M / RH.L

Motor connection end				Connection MOVIAXIS® MX		
Plug connector	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
ASTA021FR **198 921 9** 12-pin with socket contacts  **View X**	1	R1 (reference +)	Pink (PK)	R1 (reference +)	5	Sub-D 15-pin  **View Y**
	2	R2 (reference -)	Gray (GY)	R2 (reference -)	13	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	10	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	9	
	7	n.c.	-	n.c.	3	
	8	n.c.	-	n.c.	4	
	9	TF/KTY +	Brown (BN) / violet (VT)[1)]	TF/KTY +	14	
	10	TF/KTY -	White (WH) / black (BK)[1)]	TF/KTY -	6	
	11	n.c.	-	n.c.	7	
	12	n.c.	-	n.c.	8	
		–	–	n.c.	11	
		–	–	n.c.	12	
		–	–	n.c.	15	

1) Double assignment to increase cross section

HIPERFACE® cables

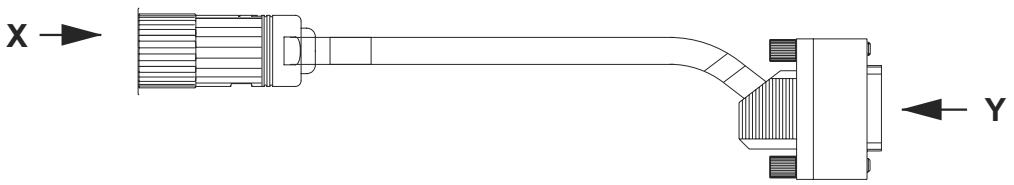


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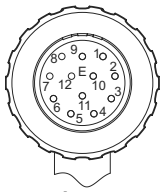
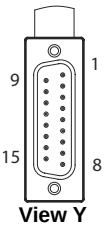
Figure 40: HIPERFACE® plug connector MOVIAXIS® MX

Type	Installation	Part number
DS/CM/CMP/CMD	Fixed installation	1332 453 5
DS/CM/CMP/CMD	Cable carrier installation	1332 455 1

Cable pin assignment for HIPERFACE® encoder AS1H / ES1H / AV1H / EK0H / AK0H

Motor connection end				Connection MOVIAXIS® MX		
Plug connector	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
ASTA021FR **198 921 9** 12-pin with socket contacts  **View X**	1	Unassigned	Unassigned	Unassigned	3	sub-D 15-pin  **View Y**
	2	Unassigned	Unassigned	Unassigned	5	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	1	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	9	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	2	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	10	
	7	DATA -	Violet (VT)	DATA -	12	
	8	DATA +	Black (BK)	DATA +	4	
	9	TF/KTY +	Brown (BN)	TF/KTY +	14	
	10	TF/KTY -	White (WH)	TF/KTY -	6	
	11	ΓΝΔ	Gray/pink (GY/PK)[1)]	ΓΝΔ	8	
	12	U_S	Red/blue (RD/BU)[1)]	U_S	15	
		–	–	Unassigned	7	
		–	–	Unassigned	11	
		–	–	Unassigned	13	

1) Double assignment to increase cross section

Resolver cable terminal box for DS/CM motors

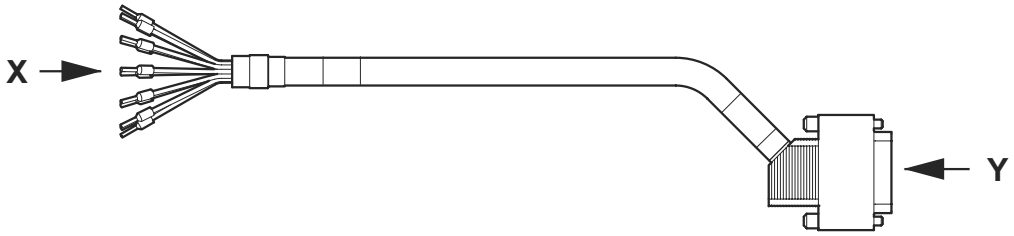
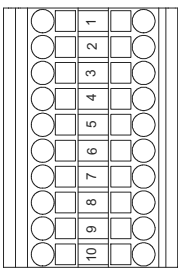
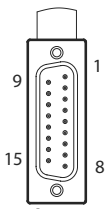


Figure 41: Cable from resolver to terminal box DFS with MOVIAXIS® MXA

Type	Installation	Part number
DS	Fixed installation	1332 744 5
DS	Cable carrier installation	1332 745 3
CM	Fixed installation	1332 762 3
CM	Cable carrier installation	1332 763 1

Pin assignment of resolver cable RH.M / RH.L

Motor connection end				Connection MOVIAXIS® MX		
Terminal strip	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
 View X	1	R1 (REF +)	Pink (PK)	R1 (reference +)	5	Sub-D 15-pin  View Y
	2	R2 (REF -)	Gray (GY)	R2 (reference -)	13	
	3	S1 (COS +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (COS -)	Blue (BU)	S3 (cosine -)	10	
	5	S2 (SIN +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (SIN -)	Green (GN)	S4 (sine -)	9	
	7	Unassigned	-	Unassigned	3	
	8	Unassigned	-	Unassigned	4	
	9	TF / TH / KTY +	Brown (BN) / violet (VT)	TF / TH / KTY +	14	
	10	TF / TH / KTY -	White (WH) / black (BK)	TF / TH / KTY -	6	
	11	-	-	Unassigned	7	
	12	-	-	Unassigned	8	
	13	-	-	Unassigned	11	
	14	-	-	Unassigned	12	
	15	-	-	Unassigned	15	

HIPERFACE® encoder cable terminal box for DS motors

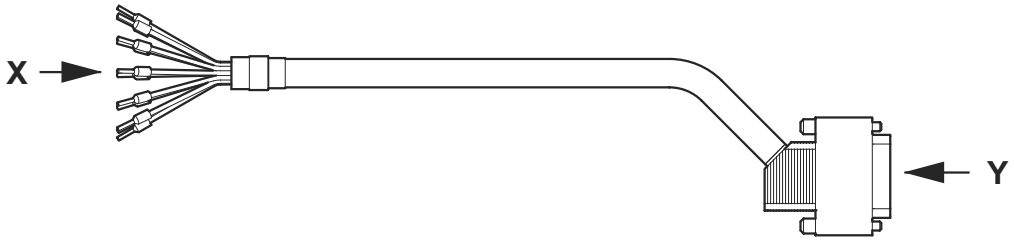


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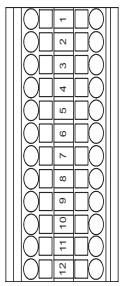
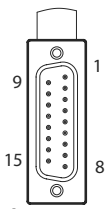
Figure 42: HIPERFACE® encoder cable with terminal box connection on motor end for DS motors

Type	Installation	Part number
DS	Fixed installation	1332 765 8
DS	Cable carrier installation	1332 766 6

Cable pin assignment for HIPERFACE® encoder AS1H / ES1H / AV1H

Motor connection end					Connection MOVIAXIS® MX	
Terminal strip	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
 View X	6	DATA +	Black (BK)	DATA +	4	Sub-D 15-pin  View Y
	5	DATA -	Violet (VT)	DATA -	12	
	1	S1 (COS +)	Red (RD)	S1 (COS +)	1	
	2	S3 (COS -)	Blue (BU)	S3 (COS -)	9	
	3	S2 (SIN +)	Yellow (YE)	S2 (SIN +)	2	
	4	S4 (SIN -)	Green (GN)	S4 (SIN -)	10	
	7	GND	Gray pink (GYPK) / pink (PK)	GND	8	
	8	Us	Red blue (RDBU)	Us	15	
	9	TF / TH / KTY +	Brown (BN)	TF / TH / KTY +	14	
	10	TF / TH / KTY -	White (WH)	TF / TH / KTY -	6	

HIPERFACE® encoder cable terminal box for CM motors

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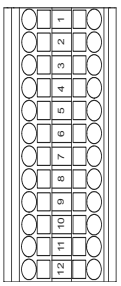
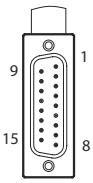
Figure 43: HIPERFACE® encoder cable with terminal box connection on motor end for CM motors

Type	Installation	Part number
CM	Fixed installation	1332 457 8
CM	Cable carrier installation	1332 454 3

Pin assignment for HIPERFACE® encoder cable AS1H / ES1H

Motor connection end					Connection MOVIAXIS® MX	
Terminal strip	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
 View X	6	DATA +	Black (BK)	DATA +	4	Sub-D 15-pin  View Y
	5	DATA -	Violet (VT)	DATA -	12	
	1	S1 (COS +)	Red (RD)	S1 (COS +)	1	
	2	S3 (COS -)	Blue (BU)	S3 (COS -)	9	
	3	S2 (SIN +)	Yellow (YE)	S2 (SIN +)	2	
	4	S4 (SIN -)	Green (GN)	S4 (SIN -)	10	
	7	GND	Gray pink (GYPK) / pink (PK)	GND	8	
	8	Us	Red blue (RDBU)	Us	15	
	9	TF / TH / KTY +	Brown (BN)	TF / TH / KTY +	14	
	10	TF / TH / KTY -	White (WH)	TF / TH / KTY -	6	

5 Motor Selection

5.1 Motor selection DS / CM synchronous servomotors

Motor assignment

Structure and legend of data tables and combination overviews for DS/CM synchronous servomotors

n_N	Motor	M_0	I_0	M_{DYN}	I_{max}:	M_{0VR}	I_{0VR}	J_{mot}	J_{bmot}	M_{B1}	M_{B2}	W_{max1}	W_{max2}
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[10^{-4} kgm^2]		[Nm]		[kJ]	
2000	**CFM71S**	5	2.2	16,5	8.8	7.3	3.2	4.89	6.65	10	5	18	22
	CFM71M	6.5	3	21,5	12	9.4	4.2	6.27	8.03	14	7	15	20
	CFM71L	9.5	4.2	31,4	16.8	13.8	6.1	9.02	10.8	14	10	15	18

n_N	Rated speed
M_0	Torque at standstill
I_0	Standstill current
M_{DYN}	Dynamic limit torque of the servomotor
I_{max}	Maximum permitted motor current
M_{0VR}	Standstill torque with forced cooling fan
I_{0VR}	Standstill current with forced cooling fan
J_{mot}	Mass moment of inertia of the motor
J_{bmot}	Mass moment of inertia of the brake motor
M_{B1}	Standard braking torque
M_{B2}	Reduced braking torque
W_{max1}	Maximum possible braking work with standard braking torque during a maintenance interval.
W_{max2}	Maximum possible braking work with reduced braking torque during a maintenance interval.

n_N	Motor	L_1	R_1	V_{p0}	m_{mot}	m_{bmot}
[min^{-1}]		[mH]	[mΩ]	[V/1000 min^{-1}]	[kg]	
2000	**CFM71S**	52	7090	151	9.5	11.8
	CFM71M	36	4440	148	10.8	13.0
	CFM71L	24	2500	152	13.0	15.3

L_1	Inductance of the winding
R_1	Ohmic resistance of the winding
V_{p0}	Internal voltage at 1000 min^{-1}
m_{mot}	Weight of the motor
m_{bmot}	Weight of the brake motor

Motor assignment DS/CM synchronous servomotors with 400 V system voltage

n_N	Motor	M_0	I_0	M_{DYN}	I_{max}:	M_{0VR}	I_{0VR}	J_{mot}	J_{bmot}	M_{B1}	M_{B2}	W_{max1}	W_{max2}
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[10^{-4} kgm^2]		[Nm]		[kJ]	
2000	**CFM71S**	5	2.2	16.5	8.8	7.3	3.2	4.89	6.65	10	5	18	22
	CFM71M	6.5	3	21.5	12	9.4	4.2	6.27	8.03	14	7	15	20
	CFM71L	9.5	4.2	31.4	16.8	13.8	6.1	9.02	10.8	14	10	15	18
	CFM90S	11	4.9	39.6	19.6	16	7.1	17.4	21.2	28	14	17	24
	CFM90M	14.5	6.9	52.2	28	21	10	22.3	26.1	40	20	10.5	19.5
	CFM90L	21	9.9	75.6	40	30.5	14.4	32.1	35.9	40	28	10.5	17
	CFM112S	23.5	10	82.3	40	34	14.5	68.4	84	55	28	32	48
	CFM112M	31	13.5	108.5	54	45	19.6	88.2	104	90	40	18	44
	CFM112L	45	20	157.5	80	65	29	128	143	90	55	18	32
	CFM112H	68	30.5	238.0	122	95	42.5	190	209	90	55	18	32
3000	**DFS56M**	1	1.65	3.8	6.6	–	–	0.48	0.83	2.5	–	–	–
	DFS56L	2	2.4	7.6	9.6	–	–	0.83	1.18	2.5	–	–	–
	DFS56H	4	2.8	15.2	11.2	–	–	1.53	1.88	5	–	–	–
	CFM71S	5	3.3	16.5	13.2	7.3	4.8	4.89	6.65	10	5	14	20
	CFM71M	6.5	4.3	21.5	17.2	9.4	6.2	6.27	8.03	14	7	11	18
	CFM71L	9.5	6.2	31.4	25	13.8	9	9.02	10.8	14	10	11	14
	CFM90S	11	7.3	39.6	29	16	10.6	17.4	21.2	28	14	10	20
	CFM90M	14.5	10.1	52.2	40	21	14.6	22.3	26.1	40	20	4.5	15
	CFM90L	21	14.4	75.6	58	30.5	21	32.1	35.9	40	28	4.5	10
	CFM112S	23.5	15	82.3	60	34	22	68.4	84	55	28	18	36
	CFM112M	31	20.5	108.5	82	45	30	88.2	104	90	40	7	32
	CFM112L	45	30	157.5	120	65	44	128	143	90	55	7	18
	CFM112H	68	43	238.0	172	95	60	190	209	90	55	7	18
4500	**DFS56M**	1	1.65	3.8	6.6	–	–	0.48	0.83	2.5	–	–	–
	DFS56L	2	2.4	7.6	9.6	–	–	0.83	1.18	2.5	–	–	–
	DFS56H	4	4	15.2	16	–	–	1.53	1.88	5	–	–	–
	CFM71S	5	4.9	16.5	19.6	7.3	7.2	4.89	6.65	10	5	10	16
	CFM71M	6.5	6.6	21.5	26	9.4	9.6	6.27	8.03	14	7	6	14
	CFM71L	9.5	9.6	31.4	38	13.8	14	9.02	10.8	14	10	6	10
	CFM90S	11	11.1	39.6	44	16	16.2	17.4	21.2	28	14	5	15
	CFM90M	14.5	14.7	52.2	59	21	21.5	22.3	26.1	40	20	3	9
	CFM90L	21	21.6	75.6	86	30.5	31.5	32.1	35.9	40	28	3	5
	CFM112S	23.5	22.5	82.3	90	34	32.5	68.4	84	55	25	11	22
	CFM112M	31	30	108.5	120	45	44	88.2	104	90	40	4	18
	CFM112L	45	46	157.5	184	65	67	128	143	90	55	4	11
	CFM112H	68	66	238.0	264	95	92	190	209	90	55	4	11
6000	**DFS56M**	1	1.65	3.8	6.6	–	–	0.48	0.83	2.5	-	-	-
	DFS56L	2	2.75	7.6	11	–	–	0.83	1.18	2.5	-	-	-
	DFS56H	4	5.3	15.2	21	–	–	1.53	1.88	5	-	-	-
	CFM71S	5	6.5	16.5	26	7.3	9.5	4.89	6.65	-	-	-	-
	CFM71M	6.5	8.6	21.5	34	9.4	12.5	6.27	8.03	-	-	-	-
	CFM71L	9.5	12.5	31.4	50	13.8	18.2	9.02	10.8	-	-	-	-
	CFM90S	11	14.5	39.6	58	16	21	17.4	21.2	-	-	-	-
	CFM90M	14.5	19.8	52.2	79	21	29	22.3	26.1	-	-	-	-
	CFM90L	21	29.5	75.6	118	30.5	43	32.1	35.9	-	-	-	-

Motor assignment DS/CM synchronous servomotors with 400 V system voltage

n_N	Motor	L_1	R_1	V_{p0}	m_{mot}	m_{bmot}
[min^{-1}]		[mH]	[mΩ]	[V/1000 min^{-1}]	[kg]	
2000	**CFM71S**	52	7090	151	9.5	11.8
	CFM71M	36	4440	148	10.8	13.0
	CFM71L	24	2500	152	13.0	15.3
	CFM90S	18	1910	147	15.7	19.6
	CFM90M	12.1	1180	141	17.8	21.6
	CFM90L	8.4	692	146	21.9	26.5
	CFM112S	10	731	155	26.2	31.8
	CFM112M	7.5	453	153	30.5	36.0
	CFM112L	4.6	240	151	39.3	44.9
	CFM112H	2.6	115	147	54.2	59.8
3000	**DFS56M**	9.7	5700	40	2.8	2.9
	DFS56L	8.8	3700	56	3.5	3.6
	DFS56H	12.7	4500	97	4.8	5.3
	CFM71S	23	3150	101	9.5	11.8
	CFM71M	16	2000	100	10.8	13.0
	CFM71L	11	1120	102	13.0	15.3
	CFM90S	8.1	838	98	15.7	19.6
	CFM90M	5.7	533	96	17.8	21.6
	CFM90L	3.9	324	99	21.9	26.5
	CFM112S	4.6	325	103	26.2	31.8
	CFM112M	3.1	193	99	30.5	36.0
	CFM112L	2	103	101	39.3	44.9
	CFM112H	1.3	57	104	54.2	59.8
4500	**DFS56M**	9.7	5700	40	2.8	2.9
	DFS56L	8.8	3700	56	3.5	3.6
	DFS56H	6.2	2200	67.5	4.8	5.3
	CFM71S	10	1380	66	9.5	11.8
	CFM71M	6.9	828	64	10.8	13.0
	CFM71L	4.9	446	65	13.0	15.3
	CFM90S	3.45	358	64	15.7	19.6
	CFM90M	2.65	249	65	17.8	21.6
	CFM90L	1.73	148	66	21.9	26.5
	CFM112S	2	149	69	26.2	31.8
	CFM112M	1.5	92	68	30.5	36.0
	CFM112L	0.85	44	66	39.3	44.9
	CFM112H	0.54	24	67	54.2	59.8
6000	**DFS56M**	9.70	5700	40	2.8	2.9
	DFS56L	6.80	2800	49	3.5	3.6
	DFS56H	3.50	1200	50.5	4.8	5.3
	CFM71S	5.75	780	50	9.5	-
	CFM71M	3.93	493	49	10.8	-
	CFM71L	2.68	277	50	13.0	-
	CFM90S	2.03	212	49	15.7	-
	CFM90M	1.48	136	48	17.8	-
	CFM90L	0.93	77	48	21.9	-

Motor selection DS/CM synchronous servomotors

Rated speed n_N = 2000 min^{-1}

Motor			Assignment MOVIAXIS® MXA size									
			1			2		3		4	5	6
Type	I_N	[A]	2	4	8	12	16	24	32	48	64	100
	I_{max}:	[A]	5	10	20	30	40	60	80	120	160	250
CM71S	I_{max}:	% I_N	250	220								
	M_{max}	Nm	10.9	16.5								
CM71M	I_{max}:	% I_N		250	150							
	M_{max}	Nm		19.2	21.5							
CM71L	I_{max}:	% I_N		250	210							
	M_{max}	Nm		21.6	31.4							
CM90S	I_{max}:	% I_N		250	245							
	M_{max}	Nm		22.1	39.4							
CM90M	I_{max}:	% I_N			250	229						
	M_{max}	Nm			40.3	51.8						
CM90L	I_{max}:	% I_N			250	250	247					
	M_{max}	Nm			41.8	60.6	75.1					
CM112S	I_{max}:	% I_N			250	250	250					
	M_{max}	Nm			46.3	66.3	81.9					
CM112M	I_{max}:	% I_N				250	250	225				
	M_{max}	Nm				67.4	86.6	108.0				
CM112L	I_{max}:	% I_N					250	250	250			
	M_{max}	Nm					88.7	126.9	156.8			
CM112H	I_{max}:	% I_N						250	250	250	191	
	M_{max}	Nm						132.0	171.4	234.4	237.0	

Rated speed n_N = 3000 min^{-1}

Motor			Assignment MOVIAXIS® MXA size									
			1			2		3		4	5	6
Type	I_N	[A]	2	4	8	12	16	24	32	48	64	100
	I_{max}:	[A]	5	10	20	30	40	60	80	120	160	250
DFS56M	I_{max}:	% I_N	250	165								
	M_{max}	Nm	2.9	3.8								
DFS56L	I_{max}:	% I_N	250	240								
	M_{max}	Nm	4.1	7.6								
DFS56H	I_{max}:	% I_N	250	250	140							
	M_{max}	Nm	7.1	13.7	15.2							
CM71S	I_{max}:	% I_N		250	165							
	M_{max}	Nm		13.8	16.5							
CM71M	I_{max}:	% I_N		250	215							
	M_{max}	Nm		14.5	21.5							
CM71L	I_{max}:	% I_N			250	208						
	M_{max}	Nm			27.4	31.5						
CM90S	I_{max}:	% I_N			250	242						
	M_{max}	Nm			29.1	39.2						
CM90M	I_{max}:	% I_N			250	250	250	169				
	M_{max}	Nm			28.3	41.1	51.6	52.0				
CM90L	I_{max}:	% I_N				250	250	242				
	M_{max}	Nm				43.1	56.2	75.6				
CM112S	I_{max}:	% I_N				250	250	250				
	M_{max}	Nm				46.3	60.1	81.9				
CM112M	I_{max}:	% I_N					250	250	250	171		
	M_{max}	Nm					59.7	85.7	106.3	108.0		
CM112L	I_{max}:	% I_N						250	250	250		
	M_{max}	Nm						88.7	115.0	156.8		
CM112H	I_{max}:	% I_N								250	250	172
	M_{max}	Nm								180.7	225.7	237.0

Rated speed n_N = 4500 min^{-1}

Motor			Assignment MOVIAXIS® MXA size									
			1			2		3		4	5	6
Type	I_N	[A]	2	4	8	12	16	24	32	48	64	100
	I_{max}:	[A]	5	10	20	30	40	60	80	120	160	250
DFS56M	I_{max}:	% I_N	250	165								
	M_{max}	Nm	2.9	3.8								
DFS56L	I_{max}:	% I_N	250	240								
	M_{max}	Nm	4.1	7.6								
DFS56H	I_{max}:	% I_N		250	200							
	M_{max}	Nm		9.8	15.2							
CM71S	I_{max}:	% I_N		250	245							
	M_{max}	Nm		9.9	16.5							
CM71M	I_{max}:	% I_N			250	221						
	M_{max}	Nm			17.9	21.5						
CM71L	I_{max}:	% I_N			250	250	241					
	M_{max}	Nm			19.2	26.8	31.5					
CM90S	I_{max}:	% I_N				250	250	185				
	M_{max}	Nm				28.7	36.5	39.5				
CM90M	I_{max}:	% I_N				250	250	246				
	M_{max}	Nm				29.2	38.1	52.1				
CM90L	I_{max}:	% I_N						250	250	179		
	M_{max}	Nm						56.4	71.5	75.2		
CM112S	I_{max}:	% I_N						250	250	188		
	M_{max}	Nm						60.1	75.5	81.9		
CM112M	I_{max}:	% I_N						250	250	250		
	M_{max}	Nm						61.1	79.3	108.0		
CM112L	I_{max}:	% I_N								250	250	184
	M_{max}	Nm								112.9	142.3	156.8
CM112H	I_{max}:	% I_N									250	250
	M_{max}	Nm									160.0	228.5

Rated speed n_N = 6000 min^{-1}

Motor			Assignment MOVIAXIS® MXA size									
			1			2		3		4	5	6
Type	I_N	[A]	2	4	8	12	16	24	32	48	64	100
	I_{max}:	[A]	5	10	20	30	40	60	80	120	160	250
DFS56M	I_{max}:	% I_N	250	165								
	M_{max}	Nm	2.9	3.8								
DFS56L	I_{max}:	% I_N		250	138							
	M_{max}	Nm		7.0	7.6							
DFS56H	I_{max}:	% I_N		250	250	175						
	M_{max}	Nm		7.5	14.4	15.1						
CM71S	I_{max}:	% I_N			250	217						
	M_{max}	Nm			14.0	16.5						
CM71M	I_{max}:	% I_N			250	250	216					
	M_{max}	Nm			14.5	19.8	21.5					
CM71L	I_{max}:	% I_N				250	250	208				
	M_{max}	Nm				21.8	27.3	31.4				
CM90S	I_{max}:	% I_N				250	250	242				
	M_{max}	Nm				22.4	29.2	39.4				
CM90M	I_{max}:	% I_N					250	250	247			
	M_{max}	Nm					28.9	41.8	51.9			
CM90L	I_{max}:	% I_N						250	250	246		
	M_{max}	Nm						42.1	55.0	75.2		

5.2 Motor selection for CMP synchronous servomotors

Structure of the data tables

n_N	Motor	M_0	I_0	M_{max}	I_{max}	M_{0VR}	I_{0VR}	J_{mot}	J_{bmot}	M_{B1}	M_{B2}	L_1	R_1	U_{p0} kalt
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[kgcm^2]		[Nm]		[mH]	Ω	[V]
3000	CMP40S	0.5	1.2	1.9	6.1	-	-	0.1	0.13	0.95	--	23	11.94	27.5
	CMP40M	0.8	0.95	3.8	6.0	-	-	0.15	0.18	0.95	--	45.5	19.92	56

n_N	Rated speed
M_0	Torque at zero speed (thermal continuous torque at low speeds)
I_0	Standstill current
M_{max}	Maximum limit torque of the servomotors
I_{max}	Maximum prmitted motor current
M_{0VR}	Torque at zero speed with forced cooling fan
I_{0VR}	Standstill current with forced cooling fan
J_{mot}	Mass moment of inertia of the motor
J_{bmot}	Mass moment of inertia of the brake motor
M_{B1}	Standard braking torque
M_{B2}	Reduced braking torque
L_1	Inductance of the winding
R_1	Ohmic resistance of the winding
U_{p0} kalt	Rotor voltage at 1000 min^{-1}.

Motor data of CMP servomotors with 400 V system voltage

n_N	Motor	M_0	I_0	M_{max}	I_{max}	M_{0VR}	I_{0VR}	J_{mot}	J_{bmot}	M_{B1}	M_{B2}	L_1	R_1	U_{p0} kalt
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[kgcm^2]		[Nm]		[mH]	Ω	[V]
3000	CMP40S	0.5	1.2	1.9	6.1	-	-	0.1	0.13	0.95	--	23	11.94	27.5
	CMP40M	0.8	0.95	3.8	6.0	-	-	0.15	0.18	0.95	--	45.5	19.92	56
	CMP50S	1.3	0.96	5.2	5.1	1.7	1.25	0.42	0.48	3.1	4.3	71	22.49	86
	CMP50M	2.4	1.68	10.3	9.6	3.5	2.45	0.67	0.73	4.3	3.1	38.5	9.98	90
	CMP50L	3.3	2.2	15.4	13.6	4.8	3.2	0.92	0.99	4.3	3.1	30.5	7.41	98
	CMP63S	2.9	2.15	11.1	12.9	4	3	1.15	1.49	7	9.3	36.5	6.79	90
	CMP63M	5.3	3.6	21.4	21.6	7.5	5.1	1.92	2.26	9.3	7	22	3.57	100
	CMP63L	7.1	4.95	30.4	29.7	10.3	7.2	2.69	3.03	9.3	7	14.2	2.07	100
4500	CMP40S	0.5	1.2	1.9	6.1	-	-	0.1	0.13	0.85	--	23	11.94	27.5
	CMP40M	0.8	0.95	3.8	6.0	-	-	0.15	0.18	0.95	--	45.5	19.92	56
	CMP50S	1.3	1.32	5.2	7.0	1.7	1.7	0.42	0.48	3.1	4.3	37	11.6	62
	CMP50M	2.4	2.3	10.3	13.1	3.5	3.35	0.67	0.73	4.3	3.1	20.5	5.29	66
	CMP50L	3.3	3.15	15.4	19.5	4.8	4.6	0.92	0.99	4.3	3.1	14.6	3.56	68
	CMP63S	2.9	3.05	11.1	18.3	4	4.2	1.15	1.49	7	9.3	18.3	3.34	64
	CMP63M	5.3	5.4	21.4	32.4	7.5	7.6	1.92	2.26	9.3	7	9.8	1.49	67
	CMP63L	7.1	6.9	30.4	41.4	10.3	10	2.69	3.03	9.3	7	7.2	1.07	71
6000	CMP40S	0.5	1.2	1.9	6.1	-	-	0.1	0.13	0.95	--	23	11.94	27.5
	CMP40M	0.8	1.1	3.8	6.9	-	-	0.15	0.18	0.95	--	34	14.95	48.5
	CMP50S	1.3	1.7	5.2	9.0	1.7	2.2	0.42	0.48	3.1	4.3	22.5	7.11	48.5
	CMP50M	2.4	3	10.3	17.1	3.5	4.4	0.67	0.73	4.3	3.1	12	3.21	50.5
	CMP50L	3.3	4.2	15.4	26	4.8	6.1	0.92	0.99	4.3	3.1	8.2	1.91	51
	CMP63S	2.9	3.9	11.1	23.4	4	5.4	1.15	1.49	--	--	11.2	2.1	50
	CMP63M	5.3	6.9	21.4	41.4	7.5	9.8	1.92	2.26	--	--	5.9	0.92	52
	CMP63L	7.1	9.3	30.4	55.8	10.3	13.5	2.69	3.03	--	--	4	0.62	53

Inverter assignment to MOVIAXIS® MX

Overview of combinations for CMP servomotors, system voltage 400 V, peak torque in Nm.

n_N [min^{-1}]	Motor		MOVIAXIS® MX									
			Size 1			BG2		BG3		BG4	BG5	BG6
		I_N [A]	2	4	8	12	16	24	32	48	64	100
		I_{max}[A]	5	10	20	30	40	60	80	120	160	250
3000	CMP40S	I_{max} [%xI_N]	250	153								
		M_{max} [Nm]	1.7	1.9								
	CMP40M	I_{max} [%xI_N]	250	150								
		M_{max} [Nm]	3.4	3.8								
	CMP50S	I_{max} [%xI_N]	250	128								
		M_{max} [Nm]	5.1	5.2								
	CMP50M	I_{max} [%xI_N]	250	240								
		M_{max} [Nm]	6.5	10.3								
	CMP50L	I_{max} [%xI_N]	250	250	170							
		M_{max} [Nm]	7.2	12.7	15.4							
	CMP63S	I_{max} [%xI_N]	250	250	161							
		M_{max} [Nm]	6.2	9.9	11.1							
	CMP63M	I_{max} [%xI_N]		250	250	180						
		M_{max} [Nm]		13.2	20.6	21.4						
	CMP63L	I_{max} [%xI_N]		250	250	248						
		M_{max} [Nm]		13.8	24	30.8						
4500	CMP40S	I_{max} [%xI_N]	250	153								
		M_{max} [Nm]	1.7	1.9								
	CMP40M	I_{max} [%xI_N]	250	150								
		M_{max} [Nm]	3.4	3.8								
	CMP50S	I_{max} [%xI_N]	250	175								
		M_{max} [Nm]	4.2	5.2								
	CMP50M	I_{max} [%xI_N]	250	250	164							
		M_{max} [Nm]	5	8.7	10.3							
	CMP50L	I_{max} [%xI_N]		250	244							
		M_{max} [Nm]		9.6	15.4							
	CMP63S	I_{max} [%xI_N]		250	229							
		M_{max} [Nm]		8	11.1							
	CMP63M	I_{max} [%xI_N]			250	250	203					
		M_{max} [Nm]			15.8	19.4	20.3					
	CMP63L	I_{max} [%xI_N]			250	250	250	173				
		M_{max} [Nm]			17.9	23.3	26.8	27.2				

n_N [min^{-1}]	Motor		MOVIAXIS® MX									
			Size 1			BG2		BG3		BG4	BG5	BG6
		I_N [A]	2	4	8	12	16	24	32	48	64	100
		I_{max}[A]	5	10	20	30	40	60	80	120	160	250
6000	CMP40S	I_{max} [%xI_N]	250	153								
		M_{max} [Nm]	1.7	1.9								
	CMP40M	I_{max} [%xI_N]	250	173								
		M_{max} [Nm]	2.9	3.4								
	CMP50S	I_{max} [%xI_N]	250	225								
		M_{max} [Nm]	3.5	5.1								
	CMP50M	I_{max} [%xI_N]		250	241							
		M_{max} [Nm]		7	9.7							
	CMP50L	I_{max} [%xI_N]		250	250	217						
		M_{max} [Nm]		7.4	12.1	13.8						
	CMP63S	I_{max} [%xI_N]		250	250	195						
		M_{max} [Nm]		6.9	11.1	12						
	CMP63M	I_{max} [%xI_N]			250	250	250	173				
		M_{max} [Nm]			13.9	18.5	21.6	21.9				
	CMP63L	I_{max} [%xI_N]			250	250	250	233				
		M_{max} [Nm]			14.6	20.2	24.6	29.3				

5.3 Motor selection for CMD synchronous servomotors

Structure of the data tables

n_N	Motor	M_0	I_0	M_{max}	I_{max}:	J_{mot}	L_1	R_1	V_{p0}	n_{max}
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[$kgcm^2$]	[mH]	Ω	[V]	[min^{-1}]
3000	CMD70S	0.7	1.04	3	6	0.261	32.3	17.44	43	6000
	CMD70M	1.1	1.36	5	8	0.45	25.2	10.89	56	8000

n_N	Rated speed
M_0	Torque at zero speed (thermal continuous torque at low speeds)
I_0	Standstill current
M_{max}	Dynamic limit torque of the servomotor
I_{max}:	Maximum permitted motor current
J_{mot}	Mass moment of inertia of the motor
L_1	Inductance of the winding
R_1	Ohmic resistance of the winding
V_{p0}	Internal voltage at 1000 min^{-1}
n_{max}	Maximum speed

Motor data of CMD servomotors with 400 V system voltage

n_N	Motor	M_0	I_0	M_{max}	I_{max}:	J_{mot}	L_1	R_1	V_{p0}	n_{max}
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[$kgcm^2$]	[mH]	Ω	[V]	[min^{-1}]
1200	CMD93S	2,4	1,55	10	8	1,23	43	10,64	93	2750
	CMD93M	4,2	2,5	22	16	2,31	19,1	3,63	110	2750
	CMD93L	6	3,5	33	23	3,38	18	3,14	106	2750
	CMD138S	6,7	3,9	17	13	6,4	25	1,97	117	2500
	CMD138M	12,1	5,5	39	26	11,4	20,6	1,29	148	2000
	CMD138L	16,5	8	62	40	16,5	11,8	0,66	138	2000
2000	CMD138S	6,7	7,4	17	25	6,4	7	0,6	62	3000
	CMD138M	12,1	11,4	39	53	11,4	4,8	0,3	71	2000
	CMD138L	16,5	15,1	62	76	16,5	3,3	0,2	73	2000
3000	CMD70S	0,7	1,04	3	6	0,261	32,3	17,44	43	6000
	CMD70M	1,1	1,36	5	8	0,45	25,2	10,89	56	5000
	CMD70L	1,9	1,96	11	18	0,83	17	5,85	64	5000
	CMD93S	2,4	2,32	10	12	1,23	19,2	4,6	62	4000
	CMD93M	4,2	3,6	22	23	2,31	9,3	2,27	77	4000
	CMD93L	6	6	33	40	3,38	6	1,02	61	4000
4500	CMD55S	0,25	0,7	1,2	4	0,087	28,4	28,65	26	8000
	CMD55M	0,45	0,95	2,3	6	0,148	21,6	18,44	33	8000
	CMD55L	0,9	1,5	6	12	0,267	14,8	10,18	39	8000

Inverter assignment to MOVIAXIS® MX

Overview of combinations for CMD servomotors, system voltage 400 V, peak torque in Nm.

n_N [min^{-1}]	Motor		MOVIAXIS® MX									
			Size 1			BG2		BG3		BG4	BG5	BG6
		I_N [A]	2	4	8	12	16	24	32	48	64	100
		I_{max}[A]	5	10	20	30	40	60	80	120	160	250
1200	CMD93S	I_{max} [%xI_N]	250	204								
		M_{max} [Nm]	7	9.6								
	CMD93M	I_{max} [%xI_N]	250	250	202							
		M_{max} [Nm]	8.6	15.9	22.4							
	CMD93L	I_{max} [%xI_N]		250	250	191						
		M_{max} [Nm]		16.8	29.9	32.7						
	CMD138S	I_{max} [%xI_N]		250	165							
		M_{max} [Nm]		14.7	17.4							
	CMD138M	I_{max} [%xI_N]			250	217						
		M_{max} [Nm]			34.6	39.2						
	CMD138L	I_{max} [%xI_N]			250	250	250	167				
		M_{max} [Nm]			38.9	52.8	62.3	62.5				
2000	CMD138S	I_{max} [%xI_N]			250	208						
		M_{max} [Nm]			15.3	17.4						
	CMD138M	I_{max} [%xI_N]				250	250	221				
		M_{max} [Nm]				28.1	33.8	38.9				
	CMD138L	I_{max} [%xI_N]				250	250	250	237			
		M_{max} [Nm]				31.7	40.8	54.9	62.5			
3000	CMD70S	I_{max} [%xI_N]	250	145								
		M_{max} [Nm]	2.6	2.8								
	CMD70M	I_{max} [%xI_N]	250	196								
		M_{max} [Nm]	3.8	5.2								
	CMD70L	I_{max} [%xI_N]	250	250	221							
		M_{max} [Nm]	4.7	8.8	11.2							
	CMD93S	I_{max} [%xI_N]	250	250	152							
		M_{max} [Nm]	5	8.5	9.6							
	CMD93M	I_{max} [%xI_N]		250	250	193						
		M_{max} [Nm]		11.8	20.3	22.4						
	CMD93L	I_{max} [%xI_N]			250	250	248					
		M_{max} [Nm]			19.2	26.9	32.7					
4500	CMD55S	I_{max} [%xI_N]	204									
		M_{max} [Nm]	1.1									
	CMD55M	I_{max} [%xI_N]	250	152								
		M_{max} [Nm]	2.1	2.3								
	CMD55L	I_{max} [%xI_N]	250	250	152							
		M_{max} [Nm]	3	5.2	5.9							

5.4 Motor selection CT / CV asynchronous servomotors

Motor assignment

Structure and legend of data tables and combination overviews for CT/CV asynchronous servo motors

n_N [1/min]	Motor	M_N [Nm]	I_N [A]	I_{q_n} [A]	I_{d_n} [A]	k_T [Nm/A]	V_N [V]	J_{Mot} [10^{-4} kgm^2]	J_{BMot} [10^{-4} kgm^2]
1200	CT71D4	3	1.4	1.21	0.69	2.48	360	4.6	5.5
	CT80N4	5	2.1	1.65	1.30	3.0	350	8.7	9.6
	CT90L4	10	3.65	3.13	1.89	3.2	345	34	39.5

n_N	Rated speed
M_N	Rated torque
I_N	Rated current
I_{q_n}	Torque generating rated current
I_{d_n}	Magnetizing rated current
k_T	Torque constant
V_N	Rated voltage
J_{mot}	Mass moment of inertia of the motor.
J_{bmot}	Mass moment of inertia of the brake motor

Motor		Assignment MOVIAXIS® MXA size									
			1		2		3		4	5	6
Type	I_N [A]	2	4	8	12	16	24	32	48	64	100
	I_{max} [A]	5	10	20	30	40	60	80	120	160	250
CT71D4	M_{max} [Nm]	4.90	7.70								
	M_{max} [%]	188.46	296.15								
	$M_{100\%}$ [Nm]	1.20	3.80								
	I_d [% I_N]	47.60	23.80								
	I_{Mmax} [% I_N]	219.00	110.00								
	n_{base} [min^{-1}]	2566.00	2093.00								

M_{max}	Maximum torque
$M_{100\%}$	Torque at 100 % rated drive current
I_d	Magnetization current
I_{Mmax}	Required drive current to reach M_{max}
n_{trans}	Transition speed with M_{max} not available above this value due to field weakening.

Data CT/CV asynchronous servo motors with 400V system voltage

n_N [1/min]	Motor	M_N [Nm]	I_N [A]	I_{q_n} [A]	I_{d_n} [A]	k_T [Nm/A]	V_N [V]	J_{Mot} [10^{-4} kgm^2]	J_{BMot} [10^{-4} kgm^2]
	CT71D4	3	1.4	1.21	0.69	2.48	360	4.6	5.5
	CT80N4	5	2.1	1.65	1.30	3.0	350	8.7	9.6
	CT90L4	10	3.65	3.13	1.89	3.2	345	34	39.5
	CV100M4	15	4.7	4.15	2.25	3.61	345	53	59
	CV100L4	26	8.5	7.9	3.21	3.29	320	65	71
	CV132S4	37	11.5	10.4	4.83	3.56	340	146	158
1200	CV132M4	50	15.5	14.2	6.18	3.52	340	280	324
	CV132ML4	61	18.2	16.7	7.43	3.66	345	330	374
	CV160M4	73	22.5	20.3	9.73	3.60	335	400	440
	CV160L4	95	30	26.7	14.2	3.56	330	925	1030
	CV180M4	110	36	30.2	19.7	3.65	330	1120	1226
	CV180L4	125	39.5	33.8	20.5	3.7	345	1290	1396
	CV200L4	200	58	53.2	23.7	3.76	330	2340	2475
	CT71D4	3	1.9	1.67	0.95	2.48	355	4.6	5.5
	CT80N4	5	2.9	2.28	1.79	3.03	350	8.7	9.6
	CT90L4	10	5	4.32	2.61	3.2	345	34	39.5
	CV100M4	15	6.5	5.73	3.10	3.61	345	53	59
	CV100L4	26	11.7	10.86	4.41	3.29	320	65	71
	CV132S4	37	15.8	14.35	6.67	3.56	340	146	158
1700	CV132M4	48	21	19.2	8.7	3.52	335	280	324
	CV132ML4	58	26.5	23.8	11.2	3.66	320	330	374
	CV160M4	71	30.5	27.2	13.4	3.6	340	400	440
	CV160L4	89	39.5	34.5	19.53	3.56	335	925	1030
	CV180M4	105	48	39.7	27.2	3.65	335	1120	1226
	CV180L4	115	56	46.6	30.7	3.7	325	1290	1396
	CV200L4	190	79	71.2	33.4	3.76	325	2340	2475
	CT71D4	3	2.4	2.1	1.20	1.43	345	4.6	5.5
	CT80N4	5	3.65	2.87	2.26	1.74	340	8.7	9.6
	CT90L4	10	6.4	5.44	3.29	1.84	335	34	39.5
	CV100M4	15	8.2	7.23	3.91	2.07	335	53	59
	CV100L4	25	14.3	13.2	5.56	1.9	310	65	71
	CV132S4	37	19.9	18.1	8.41	2.05	335	146	158
2100	CV132M4	48	26	23.7	10.75	2.03	330	280	324
	CV132ML4	58	30.5	27.5	12.9	2.1	340	330	374
	CV160M4	70	38	33.9	16.9	2.07	330	400	440
	CV160L4	88	49.5	43	24.6	2.05	330	925	1030
	CV180M4	100	59	47.7	34.2	2.1	325	1120	1226
	CV180L4	115	64	53.7	35.4	2.14	345	1290	1396
	CV200L4	175	91	80.1	41.2	2.16	325	2340	2475
	CT71D4	3	3.35	2.9	1.65	1.04	350	4.6	5.5
	CT80N4	4.5	4.75	3.6	3.11	1.26	345	8.7	9.6
	CT90L4	9.5	8.4	7.12	4.54	1.33	345	34	39.5
	CV100M4	15	11.3	9.95	5.39	1.51	345	53	59
	CV100L4	21	17	15.2	7.65	1.38	310	65	71
	CV132S4	35	26.5	23.6	11.6	1.49	340	146	158
3000	CV132M4	45	34.5	31.2	15.1	1.44	335	280	324
	CV132ML4	52	41.5	36.9	19.3	1.41	320	330	374
	CV160M4	64	48.5	42.6	23.3	1.50	340	400	440
	CV160L4	85	67	57.2	33.9	1.49	340	925	1030
	CV180M4	93	77	61.1	47.2	1.52	335	1120	1226
	CV180L4	110	94	77	53.1	1.43	325	1290	1396
	CV200L4	145	110	94.1	57.8	1.54	330	2340	2475

Motor selection CT/CV asynchronous servomotors

Rated speed n_N = 1200 min^{-1}

Motor		Assignment MOVIAXIS® MXA size									
		1			2		3		4	5	6
Type	I_N [A]	2	4	8	12	16	24	32	48	64	100
	I_{max} [A]	5	10	20	30	40	60	80	120	160	250
CT71D4	M_{max} [Nm]										
	M_{max} [%]										
	$M_{100\%}$ [Nm]										
	I_d [% I_N]										
	I_{Mmax} [% I_N]										
	n_{base} [min^{-1}]										
CT80N4	M_{max} [Nm]	14.60	15.60								
	M_{max} [%]	280.77	300.00								
	$M_{100\%}$ [Nm]	4.60	11.50								
	I_d [% I_N]	64.90	32.50								
	I_{Mmax} [% I_N]	>250	133.00								
	n_{base} [min^{-1}]	595.00	550.00								
CT90L4	M_{max} [Nm]		30.50								
	M_{max} [%]		299.02								
	$M_{100\%}$ [Nm]		11.30								
	I_d [% I_N]		47.30								
	I_{Mmax} [% I_N]		243.00								
	n_{base} [min^{-1}]		685.00								
CV100M4	M_{max} [Nm]		35.20	45.00							
	M_{max} [%]		234.67	300.00							
	$M_{100\%}$ [Nm]		11.90	27.70							
	I_d [% I_N]		56.20	28.10							
	I_{Mmax} [% I_N]		>250	158.,00							
	n_{base} [min^{-1}]		806,00	678.00							
CV100L4	M_{max} [Nm]			65.00	75.00						
	M_{max} [%]			317.07	365.85						
	$M_{100\%}$ [Nm]			24.10	38.00						
	I_d [% I_N]			40.10	26.80						
	I_{Mmax} [% I_N]			>250	192.00						
	n_{base} [min^{-1}]			762.00	666.00						
CV132S4	M_{max} [Nm]			69.00	105.00	110.00					
	M_{max} [%]			336.59	512.20	536.59					
	$M_{100\%}$ [Nm]			22.70	39.10	54.30					
	I_d [% I_N]			60.40	40.30	30.20					
	I_{Mmax} [% I_N]			>250	>250	196.00					
	n_{base} [min^{-1}]			973.00	826.00	826.00					
CV132M4	M_{max} [Nm]				103.40	139.00	150.00				
	M_{max} [%]				206.39	277.45	299.40				
	$M_{100\%}$ [Nm]				36.20	52.00	81.70				
	I_d [% I_N]				51.50	38.60	25.70				
	I_{Mmax} [% I_N]				>250	>250	179.00				
	n_{base} [min^{-1}]				947.00	832.00	806.00				
CV132ML4	M_{max} [Nm]					143.90	183.00	183.00			
	M_{max} [%]					235.90	300.00	300.00			
	$M_{100\%}$ [Nm]					51.90	83.60	114.00			
	I_d [% I_N]					46.40	31.00	23.20			
	I_{Mmax} [% I_N]					>250	211.00	158.00			
	n_{base} [min^{-1}]					851.00	774.00	774.00			

Motor		Assignment MOVIAXIS® MXA size									
		1			2		3		4	5	6
Type	I_N [A]	2	4	8	12	16	24	32	48	64	100
	I_{max} [A]	5	10	20	30	40	60	80	120	160	250
CV160M4	M_{max} [Nm]					139.50	213.00	219.00			
	M_{max} [%]					191.36	292.18	300.41			
	$M_{100\%}$ [Nm]					45.70	78.90	109.60			
	I_d [% I_N]					60.80	40.50	30.40			
	I_{Mmax} [% I_N]					>250	>250	193.00			
	n_{base} [min^{-1}]					960.00	826.00	845.00			
CV160L4	M_{max} [Nm]						207.40	280.00	294.00		
	M_{max} [%]						211.42	285.42	299.69		
	$M_{100\%}$ [Nm]						68.90	102.10	163.20		
	I_d [% I_N]						59.00	44.30	29.50		
	I_{Mmax} [% I_N]						>250	>250	175.00		
	n_{base} [min^{-1}]						992.00	909.00	954.00		
CV180M4	M_{max} [Nm]							282.60	360.00	360.00	
	M_{max} [%]							288.07	366.97	366.97	
	$M_{100\%}$ [Nm]							91.90	159.60	222.00	
	I_d [% I_N]							61.50	41.00	30.80	
	I_{Mmax} [% I_N]							>250	210.00	157.30	
	n_{base} [min^{-1}]							1018.00	1043.00	1075.00	
CV180L4	M_{max} [Nm]							286.40	360.00	360.00	
	M_{max} [%]							236.69	297.52	297.52	
	$M_{100\%}$ [Nm]							91.00	160.70	224.50	
	I_d [% I_N]							64.00	42.70	32.00	
	I_{Mmax} [% I_N]							>250	207.00	155.00	
	n_{base} [min^{-1}]							934.00	998.00	1050.00	
CV200L4[1)]	M_{max} [Nm]								442.20	567.00	567.00
	M_{max} [%]								226.77	290.77	290.77
	$M_{100\%}$ [Nm]								156.90	223.50	365.20
	I_d [% I_N]								49.30	37.00	23.70
	I_{Mmax} [% I_N]								>250	239.00	153.00
	n_{base} [min^{-1}]								966.00	947.00	1088.00

1) An effective motor utilization is not possible with the available servo inverter sizes.

Rated speed n_N = 1700 min^{-1}

Motor		Assignment MOVIAXIS® MXA size									
		1			2		3		4	5	6
Type	I_N [A]	2	4	8	12	16	24	32	48	64	100
	I_{max} [A]	5	10	20	30	40	60	80	120	160	250
CT71D4	M_{max} [Nm]	7.70									
	M_{max} [%]	296.15									
	$M_{100\%}$ [Nm]	3.20									
	I_d [% I_N]	47.60									
	I_{Mmax} [% I_N]	219.00									
	n_{base} [min^{-1}]	889.00									
CT80N4	M_{max} [Nm]		15.60								
	M_{max} [%]		300.00								
	$M_{100\%}$ [Nm]		7.90								
	I_d [% I_N]		44.70								
	I_{Mmax} [% I_N]		183.00								
	n_{base} [min^{-1}]		992.00								
CT90L4	M_{max} [Nm]		22.40	30.50							
	M_{max} [%]		219.61	299.02							
	$M_{100\%}$ [Nm]		7.00	17.50							
	I_d [% I_N]		65.30	32.70							
	I_{Mmax} [% I_N]		>250	168.00							
	n_{base} [min^{-1}]		1312.00	1165.00							
CV100M4	M_{max} [Nm]			45.00	45.00						
	M_{max} [%]			300.00	300.00						
	$M_{100\%}$ [Nm]			19.30	30.30						
	I_d [% I_N]			38.70	25.80						
	I_{Mmax} [% I_N]			218.00	146.00						
	n_{base} [min^{-1}]			1158.00	1158.00						
CV100L4	M_{max} [Nm]			46.70	71.00	75.00					
	M_{max} [%]			227.80	346.34	365.85					
	$M_{100\%}$ [Nm]			16.00	26.70	36.80					
	I_d [% I_N]			55.10	36.80	27.60					
	I_{Mmax} [% I_N]			>250	>250	198.00					
	n_{base} [min^{-1}]			1395.00	1152.00	1114.00					
CV132S4	M_{max} [Nm]				75.40	102.00	110.00				
	M_{max} [%]				367.80	497.56	299.73				
	$M_{100\%}$ [Nm]				25.70	37.50	59.50				
	I_d [% I_N]				55.50	41.70	27.80				
	I_{Mmax} [% I_N]				>250	>250	180.00				
	n_{base} [min^{-1}]				1402.00	1280.00	1318.00				
CV132M4	M_{max} [Nm]					97.70	148.50	150.00			
	M_{max} [%]					195.01	296.41	299.40			
	$M_{100\%}$ [Nm]					33.60	56.00	77.00			
	I_d [% I_N]					54.40	36.20	27.20			
	I_{Mmax} [% I_N]					>250	>250	189.00			
	n_{base} [min^{-1}]					1446.00	1254.00	1299.00			
CV132ML4	M_{max} [Nm]						143.70	183.00	183.00		
	M_{max} [%]						235.57	300.00	300.00		
	$M_{100\%}$ [Nm]						51.80	73.10	113.80		
	I_d [% I_N]						46.40	34.90	23.20		
	I_{Mmax} [% I_N]						>250	237.00	158.00		
	n_{base} [min^{-1}]						1395.00	1312.00	1344.00		

Motor		Assignment MOVIAXIS® MXA size									
		1			2		3		4	5	6
Type	I_N [A]	2	4	8	12	16	24	32	48	64	100
	I_{max} [A]	5	10	20	30	40	60	80	120	160	250
CV160M4	M_{max} [Nm]						152.50	206.00	219.00		
	M_{max} [%]						209.19	282.58	300.41		
	$M_{100\%}$ [Nm]						51.90	75.70	120.10		
	I_d [% I_N]						55.70	41.80	27.90		
	I_{Mmax} [% I_N]						>250	>250	177.00		
	n_{base} [min^{-1}]						1357.00	1248.00	1293.00		
CV160L4	M_{max} [Nm]							200.10	294.00	294.00	
	M_{max} [%]							203.98	299.69	299.69	
	$M_{100\%}$ [Nm]							65.40	113.10	157.20	
	I_d [% I_N]							61.00	40.70	30.50	
	I_{Mmax} [% I_N]							>250	241.00	181.00	
	n_{base} [min^{-1}]							1434.00	1338.00	1420.00	
CV180M4	M_{max} [Nm]								308.90	360.00	
	M_{max} [%]								314.88	366.97	
	$M_{100\%}$ [Nm]								104.60	153.10	
	I_d [% I_N]								56.60	42.40	
	I_{Mmax} [% I_N]								>250	217.00	
	n_{base} [min^{-1}]								1434.00	1517.00	
CV180L4	M_{max} [Nm]									360.00	360.00
	M_{max} [%]									251.75	251.75
	$M_{100\%}$ [Nm]									138.60	234.90
	I_d [% I_N]									48.00	30.70
	I_{Mmax} [% I_N]									233.00	149.00
	n_{base} [min^{-1}]									1485.00	1728.00
CV200L4[1)]	M_{max} [Nm]									417.60	567.00
	M_{max} [%]									214.15	290.77
	$M_{100\%}$ [Nm]									145.80	251.60
	I_d [% I_N]									52.10	33.40
	I_{Mmax} [% I_N]									>250	215.00
	n_{base} [min^{-1}]									1427.00	1504.00

1) An effective motor utilization is not possible with the available servo inverter sizes.

Rated speed n_N = 2100 min^{-1}

Motor		Assignment MOVIAXIS® MXA size									
		1			2		3		4	5	6
Type	I_N [A]	2	4	8	12	16	24	32	48	64	100
	I_{max} [A]	5	10	20	30	40	60	80	120	160	250
CT71D4	M_{max} [Nm]	6.90	7.70								
	M_{max} [%]	265.38	296.15								
	$M_{100\%}$ [Nm]	2.30	5.50								
	I_d [% I_N]	60.00	30.00								
	I_{Mmax} [% I_N]	>250	138.00								
	n_{base} [min^{-1}]	1427.00	1318.00								
CT80N4	M_{max} [Nm]		15.60								
	M_{max} [%]		300.00								
	$M_{100\%}$ [Nm]		5.70								
	I_d [% I_N]		56.40								
	I_{Mmax} [% I_N]		231.00								
	n_{base} [min^{-1}]		1421.00								
CT90L4	M_{max} [Nm]			30.50	30.50						
	M_{max} [%]			299.02	299.02						
	$M_{100\%}$ [Nm]			13.40	21.20						
	I_d [% I_N]			41.20	27.40						
	I_{Mmax} [% I_N]			212.00	141.00						
	n_{base} [min^{-1}]			1632.00	1645.00						
CV100M4	M_{max} [Nm]			40.70	45.00						
	M_{max} [%]			271.33	300.00						
	$M_{100\%}$ [Nm]			14.50	23.50						
	I_d [% I_N]			48.90	32.60						
	I_{Mmax} [% I_N]			>250	184.00						
	n_{base} [min^{-1}]			1587.00	1626.00						
CV100L4	M_{max} [Nm]				56.00	75.00	75.00				
	M_{max} [%]				273.17	365.85	365.85				
	$M_{100\%}$ [Nm]				20.20	28.50	44.40				
	I_d [% I_N]				46.30	34.70	23.20				
	I_{Mmax} [% I_N]				>250	>250	224.00				
	n_{base} [min^{-1}]				1741.00	1536.00	1536.00				
CV132S4	M_{max} [Nm]					80.00	110.00	110.00			
	M_{max} [%]					217.98	299.73	299.73			
	$M_{100\%}$ [Nm]					27.80	46.00	63.20			
	I_d [% I_N]					52.50	35.00	26.30			
	I_{Mmax} [% I_N]					>250	227.00	170.00			
	n_{base} [min^{-1}]					1805.00	1728.00	1786.00			
CV132M4	M_{max} [Nm]						119.60	150.00	150.00		
	M_{max} [%]						238.72	299.40	299.40		
	$M_{100\%}$ [Nm]						43.50	61.10	94.80		
	I_d [% I_N]						44.70	33.60	22.40		
	I_{Mmax} [% I_N]						>250	234.00	156.00		
	n_{base} [min^{-1}]						1747.00	1664.00	1696.00		
CV132ML4	M_{max} [Nm]						123.50	166.00	183.00		
	M_{max} [%]						202.46	272.13	300.00		
	$M_{100\%}$ [Nm]						42.60	61.70	97.40		
	I_d [% I_N]						53.80	40.30	26.90		
	I_{Mmax} [% I_N]						>250	>250	183.00		
	n_{base} [min^{-1}]						1715.00	1581.00	1606.00		

Motor		Assignment MOVIAXIS® MXA size									
		1			2		3		4	5	6
Type	I_N [A]	2	4	8	12	16	24	32	48	64	100
	I_{max} [A]	5	10	20	30	40	60	80	120	160	250
CV160M4	M_{max} [Nm]							161.70	219.00	219.00	
	M_{max} [%]							221.81	300.41	300.41	
	$M_{100\%}$ [Nm]							56.20	92.90	127.60	
	I_d [% I_N]							52.90	35.30	26.50	
	I_{Mmax} [% I_N]							>250	224.00	168.00	
	n_{base} [min^{-1}]							1741.00	1690.00	1734.00	
CV160L4	M_{max} [Nm]								240.30	294.00	
	M_{max} [%]								244.95	299.69	
	$M_{100\%}$ [Nm]								84.30	120.80	
	I_d [% I_N]								51.30	38.50	
	I_{Mmax} [% I_N]								>250	228.00	
	n_{base} [min^{-1}]								1786.00	1792.00	
CV180M4	M_{max} [Nm]									327.60	360.00
	M_{max} [%]									270.74	297.52
	$M_{100\%}$ [Nm]									113.30	196.90
	I_d [% I_N]									53.50	34.20
	I_{Mmax} [% I_N]									>250	175.00
	n_{base} [min^{-1}]									1830.00	2106.00
CV180L4	M_{max} [Nm]									334.30	360.00
	M_{max} [%]									233.78	251.75
	$M_{100\%}$ [Nm]									114.20	200.40
	I_d [% I_N]									55.30	35.30
	I_{Mmax} [% I_N]									>250	172.00
	n_{base} [min^{-1}]									1664.00	2022.00
CV200L4[1)]	M_{max} [Nm]										532.00
	M_{max} [%]										272.82
	$M_{100\%}$ [Nm]										196.90
	I_d [% I_N]										41.20
	I_{Mmax} [% I_N]										>250
	n_{base} [min^{-1}]										1728.00

1) An effective motor utilization is not possible with the available servo inverter sizes.

Rated speed n_N = 3000 min^{-1}

Motor		Assignment MOVIAXIS® MXA size									
		1			2		3		4	5	6
Type	I_N [A]	2	4	8	12	16	24	32	48	64	100
	I_{max} [A]	5	10	20	30	40	60	80	120	160	250
CT71D4	M_{max} [Nm]	4.90	7.70								
	M_{max} [%]	188.46	296.15								
	$M_{100\%}$ [Nm]	1.20	3.80								
	I_d [% I_N]	47.60	23.80								
	I_{Mmax} [% I_N]	219.00	110.00								
	n_{base} [min^{-1}]	2566.00	2093.00								
CT80N4	M_{max} [Nm]		12.00	15.60							
	M_{max} [%]		230.77	300.00							
	$M_{100\%}$ [Nm]		3.20	9.30							
	I_d [% I_N]		77.70	38.90							
	I_{Mmax} [% I_N]		> 250	159.00							
	n_{base} [min^{-1}]		2406.00	2202.00							
CT90L4	M_{max} [Nm]			26.00	30.50						
	M_{max} [%]			254.90	299.02						
	$M_{100\%}$ [Nm]			8.80	14.80						
	I_d [% I_N]			56.70	37.80						
	I_{Mmax} [% I_N]			> 250	194.00						
	n_{base} [min^{-1}]			2451.00	2522.00						
CV100M4	M_{max} [Nm]			29.00	44.40	45					
	M_{max} [%]			193.33	296.00	300.00					
	$M_{100\%}$ [Nm]			8.90	16.20	22.70					
	I_d [% I_N]			67.30	44.90	33.70					
	I_{Mmax} [% I_N]			> 250	> 250	189.00					
	n_{base} [min^{-1}]			2528.00	2285.00	2502					
CV100L4	M_{max} [Nm]				40.00	56.90	75.00				
	M_{max} [%]				195.12	277.56	365.85				
	$M_{100\%}$ [Nm]				12.80	19.40	31.40				
	I_d [% I_N]				57.70	43.30	28.80				
	I_{Mmax} [% I_N]				> 250	> 250	206.80				
	n_{base} [min^{-1}]				2746.00	2714.00	2362.00				
CV132S4	M_{max} [Nm]					56.90	87.40	110.00	110.00		
	M_{max} [%]					155.04	238.15	299.73	299.73		
	$M_{100\%}$ [Nm]					16.40	31.20	44.30	69.20		
	I_d [% I_N]					72.30	48.20	36.20	24.10		
	I_{Mmax} [% I_N]					> 250	> 250	234.00	156.00		
	n_{base} [min^{-1}]					2714.00	2541.00	2490.00	2630.00		
CV132M4	M_{max} [Nm]						83.90	113.50	150.00	150.00	
	M_{max} [%]						167.47	226.55	299.40	299.40	
	$M_{100\%}$ [Nm]						27.00	40.80	65.80	89.90	
	I_d [% I_N]						> 250	> 250	219.00	164.00	
	I_{Mmax} [% I_N]						62.70	47.10	31.30	23.50	
	n_{base} [min^{-1}]						2732.00	2592.00	2528.00	2541.00	
CV132ML4	M_{max} [Nm]							109.60	167.00	183.00	
	M_{max} [%]							179.67	273.77	300.00	
	$M_{100\%}$ [Nm]							36.00	62.00	86.10	
	I_d [% I_N]							58.00	38.70	29.00	
	I_{Mmax} [% I_N]							> 250	> 250	197.00	
	n_{base} [min^{-1}]							2714.00	2483.00	2573.00	

Motor		Assignment MOVIAXIS® MXA size									
		1			2		3		4	5	6
Type	I_N [A]	2	4	8	12	16	24	32	48	64	100
	I_{max} [A]	5	10	20	30	40	60	80	120	160	250
CV160M4	M_{max} [Nm]								176.70	219.00	
	M_{max} [%]								242.39	300.41	
	$M_{100\%}$ [Nm]								63.00	89.50	
	I_d [% I_N]								48.50	36.40	
	I_{Mmax} [% I_N]								> 250	231.00	
	n_{base} [min^{-1}]								2426.00	2406.00	
CV160L4	M_{max} [Nm]									232.20	294.00
	M_{max} [%]									236.70	299.69
	$M_{100\%}$ [Nm]									80.60	139.70
	I_d [% I_N]									53.00	33.90
	I_{Mmax} [% I_N]									> 250	201.00
	n_{base} [min^{-1}]									2541.00	2682.00
CV180M4	M_{max} [Nm]									232.70	360.00
	M_{max} [%]									192.31	297.52
	$M_{100\%}$ [Nm]									65.80	134.20
	I_d [% I_N]									73.70	47.10
	I_{Mmax} [% I_N]									> 250	241.00
	n_{base} [min^{-1}]									2701.00	2618.00
CV180L4	M_{max} [Nm]										349.00
	M_{max} [%]										244.06
	$M_{100\%}$ [Nm]										121.00
	I_d [% I_N]										53.10
	I_{Mmax} [% I_N]										> 250
	n_{base} [min^{-1}]										2547.00
CV200L4[1)]	M_{max} [Nm]										
	M_{max} [%]										
	$M_{100\%}$ [Nm]										
	I_d [% I_N]										
	I_{Mmax} [% I_N]										
	n_{base} [min^{-1}]										

1) An effective motor utilization is not possible with the available servo inverter sizes.

5.5 Encoders that can be connected:

Encoder type	Asynchronous servomotors	Synchronous servomotors
Resolver		
RH1M	**x**	**x**
HIPERFACE®		
AS1H	**x**	**x**
AV1H		
ES0H		
AS0H		
ES1H		
ES2H		
EV1H		
Sin / cos encoder		
ES1S	**x**	
ES1S		
ES2S		
EV1S		
EV2S		
TTL sensor		
EH1R	**x**	
EH1T		
ESxR		
ESxT		
EVxR		
EVxT		

Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service **Competence Center**	**Central** Gear units / Motors	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte-gm@sew-eurodrive.de
	Central Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-mitte-e@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at

Belgium			
Assembly **Sales** **Service**	**Brüssel**	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 sewit@sew-eurodrive.it

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

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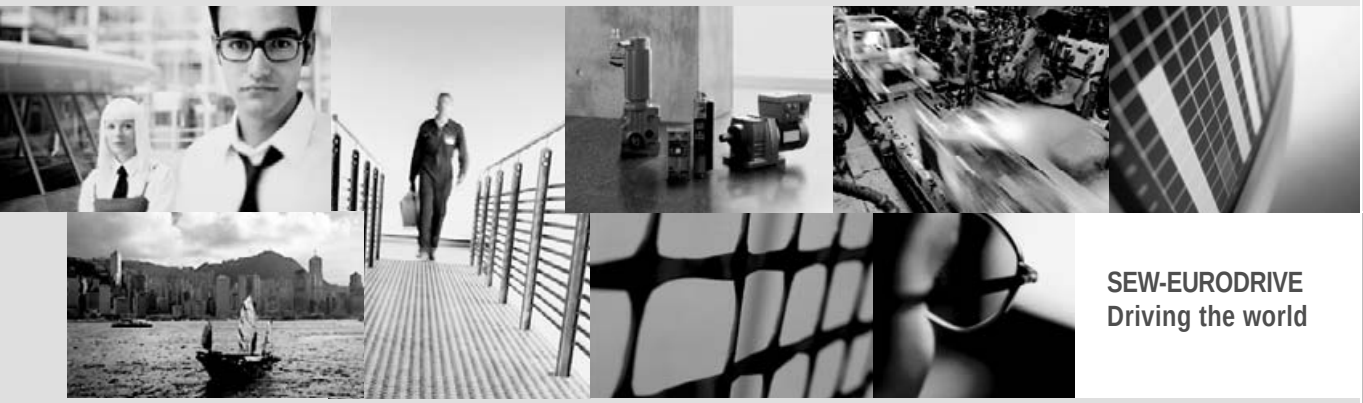

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