ACOPOSmicro

User's manual

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Translation of the original documentation

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1 General information

1.1 Manual history

Information:

B&R makes every effort to keep documents as current as possible. The most current versions can be downloaded from the B&R website (www.br-automation.com).

Version	Date	Comment
1.27	December 2021	• Register description power supply module: Short circuit detection configurable • Warning for drive modules: Possible damage to module in the event of short circuit! • Editorial changes.
1.26	March 2021	• Power supply module information updated. • Pinout for 80CMxx001.21-01 cables corrected. • Diameter for 80CMxx013.21-01 cables corrected. • Flex cycles for X20CA3E61.xxxx cables corrected. • Possibility to extend the braking resistor cabling. • Chapter "Safety technology" in V1.22, see History of chapter ACOPOSmicro safety technology. • Editorial changes.
1.25	December 2019	• Added mappMotion system requirements for stepper motor modules.
1.24	October 2019	• Section "EMC-compatible connection with shield plate" is supplemented with further infomation.
1.23	July 2019	• Section "EMC-compatible connection with shield plate" is supplemented by the sub-section "Important notes about securing cables". • Accessories - Signal connectors added. • Editorial changes.
1.22	July 2018	• New hybrid cables and cable extensions for inverter modules. • Technical data extension with respect to changing the enable response time of a trigger switching delay. • New section " EMC-compatible connection with shield plate". • Updated and added technical data, accessories and register description of the modules. • Specified the maximum installation elevation of the module in detail. • Editorial changes.
1.21	September 2017	• Updated and added technical data, accessories and register description of the modules. • Renamed "Appendix A abbreviations" to "Abbreviations and terminology". • Editorial changes.
1.20	December 2016	• Updated section "Inverter modules" to include new modules: 80VD100PD.C033-01, 80VD100PD.C088-01, 80VD100PD.C144-01, 80VD100PD.C03X-01, 80VD100PD.C08x-01. • Updated technical data for power inverters to include the new possible switching frequency of 40 kHz and minimum revision specifications. • Added order key for interface and inverter modules to manual. • Reorganized and updated technical data, accessories and register descriptions. • Chapter "Safety technology" in V1.21, see History of chapter "Safety technology". • Editorial changes.
1.11	January 2016	• Updated chapter "Transport and storage". • Updated references in technical data. • Updated register descriptions for stepper motor modules (e.g. SSI encoders, HIPERFACE encoders, etc.).

1.2 Safety guidelines

Information:

The safety notices, connection descriptions (nameplate and documentation) and limit values listed in the technical data are to be read carefully before installation and commissioning and must be observed.

These safety notices must be kept and included with the device if it is passed on to anyone else (e.g. sold, rented, etc.).

The user is responsible for observing all applicable international and national electrical standards.

1.2.1 Organization of notices

Safety notices

Contain **only** information that warns of dangerous functions or situations.

Signal word	Description
Danger!	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Caution!	Failure to observe these safety guidelines and notices can result in minor injury or damage to property.
Notice!	Failure to observe these safety guidelines and notices can result in damage to property.

General notices

Contain **useful** information for users and instructions for avoiding malfunctions.

Signal word	Description
Information:	Useful information, application tips and instructions for avoiding malfunctions.

1.2.2 General information

B&R drive systems and motors have been designed, developed and manufactured for conventional use in industrial environments. They have not been designed, developed and manufactured for use that involves fatal risks or hazards that could result in death, injury, serious physical harm or other loss without the assurance of exceptionally stringent safety precautions.

In particular, these risks include the use of these devices to monitor nuclear reactions in nuclear power plants, in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

Dual use

Servo drives, inverter modules and frequency inverters from B&R are not dual-use goods per appendix I of Council Regulation (EC) No. 428/2009 | 3A225, amended by Commission Delegated Regulation (EU) No. 2015/2420.

> **Danger!**
>
> **Drive systems and motors can have exposed parts that carry voltage (e.g. terminals) as well as hot surfaces. Additional hazards include moving machine parts. The removal of required covers, inappropriate use of the devices or their improper installation or operation can result in severe personal injury or damage to property.**

All tasks such as the transport, installation, commissioning and servicing of devices are only permitted to be carried out by qualified personnel. Qualified personnel are those familiar with the transport, mounting, installation, commissioning and operation of devices who also have the appropriate qualifications to perform these tasks (e.g. IEC 60364). National accident prevention regulations must be observed.

The safety guidelines, information about connection conditions (nameplate and documentation) and limit values specified in the technical data must be read carefully before installation and commissioning and must be strictly observed.

> **Danger!**
>
> **The improper handling of drive systems and motors can cause severe personal injury or damage to property!**

1.2.3 Intended use

Motor drives and motors are components designed to be installed in electrical systems or machines. They are not permitted to be used unless the machine meets directive 2006/42/EC (machinery directive) as well as directive 2004/108/EC (EMC directive).

> **Danger!**
>
> **Before applying power, it is necessary to check if the B&R drive system being used is suitable for the respective power system. The specifications and limitations in the user documentation for the respective device series must be observed completely!**

When used in residential areas, commercial areas or small businesses, additional measures must be implemented by the user.

For technical data as well as connection and ambient conditions, see the nameplate or this user's manual. Specifications regarding connection and ambient conditions must be observed!

> **Danger!**
>
> **Electronic devices are generally not failsafe.**
>
> **If the drive system fails, the user is responsible for ensuring that any connected motors are brought to a secure state.**

1.2.4 Protection against electrostatic discharge

Electrical assemblies that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

1.2.4.1 Packaging

Electrical assemblies with housing do not require special ESD packaging but must be handled properly

1.2.4.2 Regulations for proper ESD handling

- Do not touch the connector contacts of connected cables.
- Do not touch the contact tips on circuit boards.

1.2.5 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical stress, temperature, humidity, aggressive atmosphere).

Drive systems contain components sensitive to electrostatic charges that can be damaged by inappropriate handling. It is therefore necessary to provide the required protective measures against electrostatic discharge when installing or removing these drive systems.

1.2.5.1 Forming DC bus capacitors

Electrolytic capacitors are installed in B&R servo drives, inverter modules, stepper motor modules and power supplies. In these cases, the oxide layer that acts as a dielectric can become weakened by electrochemical processes when stored for a lengthy period with the power is switched off. In the worst case, this can cause a short circuit and subsequent destruction of the capacitor and irreparable damage to B&R modules.

When stored for periods over 1 year, the electrolytic capacitors may be destroyed during commissioning if not preconditioned. If preconditioning takes place using a forming process defined for B&R modules, then proper operation can be guaranteed. Forming is performed by applying a defined voltage over a defined period of time. This reforms the oxide layer to ensure the functionality of the electrolytic capacitors.

> **Caution!**
>
> **DC bus capacitors can become damaged or destroyed when switching on at the nominal voltage after being stored for periods over 1 year.**
>
> **Forming B&R modules stored over a long period of time before commissioning avoids damage to the capacitors.**

1.2.5.1.1 Forming specifications for DC bus capacitors

Procedure for modules stored for a long period of time

If modules are not supplied with nominal voltage for a longer period of time, the DC bus capacitors must be formed as follows.

The nominal voltage is the voltage permitted at the mains connections on the respective module.

Power is only supplied to the module; the output stage or controller is NOT permitted to be switched on during this!

Storage time up to 1 year: → No action required

Storage time 1 to 2 years: → Supply the module with nominal voltage 1 hour before commissioning.

Storage time 2 to 3 years: Supply the module with an adjustable power supply and increase the voltage in steps. Observe the following sequence:

1. Supply with 25% of the nominal voltage for 30 minutes.
2. Supply with 50% of the nominal voltage for 30 minutes.
3. Supply with 75% of the nominal voltage for 30 minutes.
4. Supply with 100% of the nominal voltage for 30 minutes.

Total forming time: >2 hours
The module is now ready for operation.

Storage time 3 or more years: Supply the module with an adjustable power supply and increase the voltage in steps. Observe the following sequence:

1. Supply with 25% of the nominal voltage for 2 hours.
2. Supply with 50% of the nominal voltage for 2 hours.
3. Supply with 75% of the nominal voltage for 2 hours.
4. Supply with 100% of the nominal voltage for 2 hours.

Total forming time: >8 hours
The module is now ready for operation.

Information:

B&R recommends forming at nominal voltage for 1 hour once a year.

B&R modules that have been stored for more than 5 years without forming should no longer be put into operation.
The storage period is valid from the time of delivery by B&R.

1.2.6 Handling and installation

Warning!

B&R drive systems and motors may be very heavy.

During handling and installation of B&R drive systems or motors, there is therefore the danger of personal injury or damage to property (through shearing, impacts, cutting or crushing). If required, use suitable protective equipment (e.g. safety glasses, protective gloves, safety shoes, etc.)!

Installation must be performed according to this documentation using suitable equipment and tools.

Devices are only permitted to be installed by qualified personnel when the power is switched off. The control cabinet must first be disconnected from the power supply and secured against being switched on again.

General safety guidelines and national accident prevention regulations (e.g. VBG 4) for working with high voltage systems must be observed.

Electrical installation must be carried out according to applicable guidelines (e.g. wire cross sections, fuse protection, protective ground connections, see also "Dimensioning" on page 211).

1.2.7 Operation

1.2.7.1 Protection against contact with electrical parts

Danger!

To operate drive systems, it is necessary for certain parts to carry dangerous voltages over 42 VDC. Touching one of these components can result in a life-threatening electric shock. There is a risk of death, serious injury or damage to property.

Before turning on a drive system, it is important to ensure that the housing is properly connected to ground (PE rail). The ground connection must also be made if the drive is only connected for testing purposes or only operated for a short time!

Before switching on, live parts must be safely covered. All covers and control cabinet doors must be kept closed during operation.

Control and power connections can still carry voltage even if the motor is not turning. Touching these connections while the device is switched on is prohibited.

Before performing any work on drive systems, they must first be disconnected from the power system and prevented from being switched on again.

Danger!

Risk of electric shock!

Remove the power supply, wait 5 minutes and make sure that the voltage on terminal X1 has dropped to below 42 VDC before beginning maintenance work.

The following warning label is attached to the drive systems:

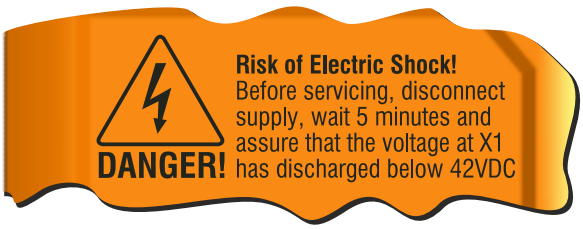


Figure 1: Warning label on the drive system

ACOPOSmicro units are provided with these adhesive labels in different languages (see page 204).

The connections on the drive system for signal voltages in the voltage range 5 to 30 V are safely isolated circuits. The signal voltage connections and interfaces are therefore only permitted to be connected to devices or electrical components that have sufficient isolation in accordance with IEC 60364-4-41 or EN 61800-5-1 and that correspond to SELV / PELV.

Never remove the electrical connections of drive systems while voltage is applied. In some cases, electric arcs may occur that can cause personal injury and/or damage to contacts.

1.2.7.2 Protection against hazardous movements

Danger!

Improper control of motors can result in unintended hazardous movements! Such incorrect behavior can have various causes:

- **Incorrect installation or faults when handling components**
- **Improper or incomplete wiring**
- **Defective devices (drive system, motor, position encoder, cables, brake)**
- **Incorrect control (e.g. caused by software error)**

Some of the errors listed above can be detected and prevented by the drive system's internal monitoring. Nevertheless, it is still possible for the motor shaft to move any time after the device is switched on! For this reason, higher-level safety precautions must be put in place to ensure that personnel and machines are protected.

The moving parts on machines must be shielded in such a way as to prevent unintentional access by personnel. This type of protection can be achieved by using stable mechanical protective equipment such as protective covers, protective fences, protective gates or photoelectric sensors.

Removing, bypassing or circumventing these protective measures and entering the area where movement takes place is prohibited.

A sufficient number of emergency stop buttons must be installed in direct proximity to the machine and be easily accessible at all times. This emergency stop equipment must be checked before the machine is put into operation.

On free running motors, the key (if present) must be removed or measures taken to prevent its ejection.

The holding brake built into motors cannot prevent hoisting equipment from dropping suspended loads.

1.2.7.3 Protection against burns

The surfaces of drive systems and motors can reach very high temperatures during operation.

As a result, the included adhesive labels must be affixed to drive systems and motors to indicate this danger (see page 204):



Figure 2: Adhesive label for "Hot surface" (3 pcs. are included with the delivery of the ACOPOSmicro)

1.2.8 Specifications for functional safety

For the characteristic values for functional safety, see section "Safety technology [V1.22]" on page 375.

Characteristic values are calculated based on a proof test interval of maximum 20 years. Since a proof test cannot be carried out for B&R drive systems, the proof test interval is the same as the system's mission time.

In accordance with the EN ISO 13849, EN 62061 and IEC 61508 standards, the safety functions described in section "Safety technology [V1.22]" cannot be used beyond the specified mission time.

> **Danger!**
>
> **The user must ensure that all B&R drive systems that execute a safety function are replaced by new B&R drive systems or removed from operation before their mission time expires.**

2 System characteristics

2.1 The ACOPOSmicro drive system

ACOPOSmicro provides drive modules for up to 2 axes for low-power applications. The ACOPOSmicro is designed to control both stepper motors and servo motors.

- Extremely versatile
- Integrated I/O
- Compact design
- Low power dissipation
- Uniform design for inverter and stepper motor modules

ACOPOSmicro with heat spreader Without encoder interfaces	ACOPOSmicro with heat sink Including: Encoder interfaces
	

2.1.1 Flexibility

Ever-changing fields of application and the necessity to integrate different types of drives in one machine often create enormous challenges for application developers. Creating projects with B&R Automation Studio makes it possible to handle a wide range of drive concepts using the same tools. This means that flexible drive architectures can be implemented by either combining these concepts together or maintaining their independence from one another.

It is possible to plan for different machine variants as early as the project development phase and to account for separate configurations that use various drive types. This makes it easy to switch from a stepper motor to a power inverter variant (and vice versa) without problems. As a result, machine manufacturers are able to enjoy unprecedented flexibility.

2.1.2 Integrated I/O

In addition to trigger inputs, this system also includes a 24 VDC output. It can be used, for example, to control external brakes in addition to being available for other tasks. If required, additional functionality can be added via optional modules without taking up extra space.

This makes it possible to meet even extraordinary customer-specific requirements. The optional support of many different encoder systems illustrates this product line's high degree of flexibility.

2.1.3 Most compact dimensions

The two-channel variant of this system clearly highlights this module's extremely compact design. The ACOPOSmicro requires an area of less than 50 cm² per axis.

This not only saves space in the control cabinet for applications with multiple axes, but also provides advantages in wiring since the bus and supply voltage connection is only required for every second motor.

2.1.4 Safe pulse disabling

ACOPOSmicro modules are equipped with safety function "Safe Torque Off" (STO) to ensure safe standstill and to avoid unexpected startup.
Depending on the external wiring, safety classifications up to SIL 2 / PL d / Cat. 3 can be achieved. Safe pulse disabling interrupts the power being sent to the drive. Electrical torque can then no longer be generated, so the drive coasts to a stop.
The requirements for preventing unexpected startup per EN 1037 as well as the requirements concerning category 0 stop functions per EN 60204-1 are met. The requirements concerning the STO safety function per EN 61800-5-2 are also met.

2.1.5 Coding and marking

The possibility of using keyed connection terminals is extremely useful, especially for the two-channel variant. In particular, this prevents serious errors that can occur by connecting the wrong drive axis during commissioning. Being able to easily label the ACOPOSmicro also helps to avoid errors.

2.1.6 Variable nominal voltage ranges

To achieve higher torque values at high speeds, the first voltage variant was designed for a nominal voltage of 80 VDC. The ability to withstand overvoltage up to 95 VDC also allows for increases in the DC bus voltage such as those that occur during braking procedures. But the drive can also be used for almost any application in the extra-low voltage range. This means that the ACOPOSmicro product family can be operated up to a voltage of 18 VDC.

2.1.7 Modular cooling design

The majority of the heat generated in the device is emitted to the heat spreader integrated in the ACOPOSmicro. This heat can then be dissipated in various ways, such as through a conventional heat sink on the cooling medium of an external cold plate (water or oil-cooled) or passed on to the machine parts.

2.1.8 ACOPOSmicro stepper motor modules

Whereas earlier stepper motors were mainly reserved for simpler tasks, today they are used to meet even complex CNC demands. The particular strength of these motors is their high level of torque in the low to middle speed range that can be implemented with even very small motor designs. Within the torque limits, this technology is a truly cost-effective solution.

Ease of handling

With this system, it goes without saying that no switches are needed to select the motor current. All module settings are software-based. The default values of all parameters can be quickly and easily adapted to the project and overwritten at runtime. Being able to break current values down to approximately one percent of the nominal current makes it possible to select exactly the current that is needed. The module's main feature is that holding current, nominal current and maximum current (boost current) can each be defined separately. This keeps thermal loss in the stepper motor to a minimum, and the maximum torque is available exactly when it is needed. All of this leads to drastic energy savings and reduced power dissipation in the motor, further extending the service life of all components.

Maximum resolution

Depending on the stepper motor being used, the ACOPOSmicro can break a motor revolution down into 102,400 partial steps. This is possible due to the 256 microsteps supported by the system. The basic step angle is automatically divided into the maximum possible microsteps based on speed. In addition to increased positioning precision, this also enables much smoother operation. The common problem of accumulating resonant frequencies is significantly minimized by the ability to fine-tune the current change. The high frequency of the current controller also plays a role in this. Optional encoder feedback can help stepper motors achieve highly accurate positioning under a wide range of load torques.

2.1.9 ACOPOSmicro inverter modules

Effective every step of the way

Reduced energy, service and maintenance costs thanks to a longer service life and fewer components per axis – all of this is made possible through the use of ACOPOSmicro inverter modules and LinMot® linear motors instead of pneumatic cylinders.

In particular, the large amount of energy required to generate compressed air due to significant energy loss (e.g. motor and compressor loss, pressure loss through reduction valves and leaks) has a negative impact on the total cost of ownership of a machine and increases the demand for electric linear axes.

Linear motors provide more precise positioning, thus improving the accuracy of repeated machine movements. Higher clock speeds – up to a factor of 2 – increase the production capacity of a plant and reduce overall production costs. Packaging machines, handling devices and pick-and-place applications are just a few examples where linear motors are replacing pneumatic cylinders, linear axes driven by servo motors, cam gears and multi-jointed applications.

In short, the integration of electrically driven linear axes into B&R's automation technology catalog opens up entirely new dimensions of flexible machine designs.

2.1.10 Operating and connection elements

ACOPOSmicro stepper motor modules

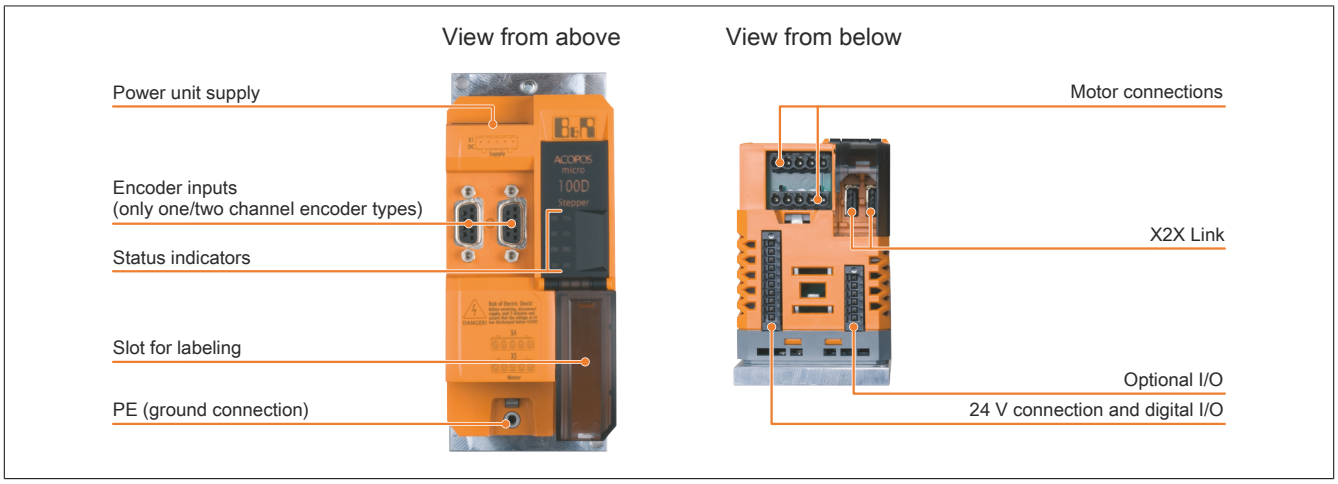


Figure 3: ACOPOSmicro stepper motor modules - Operating and connection elements

ACOPOSmicro inverter modules

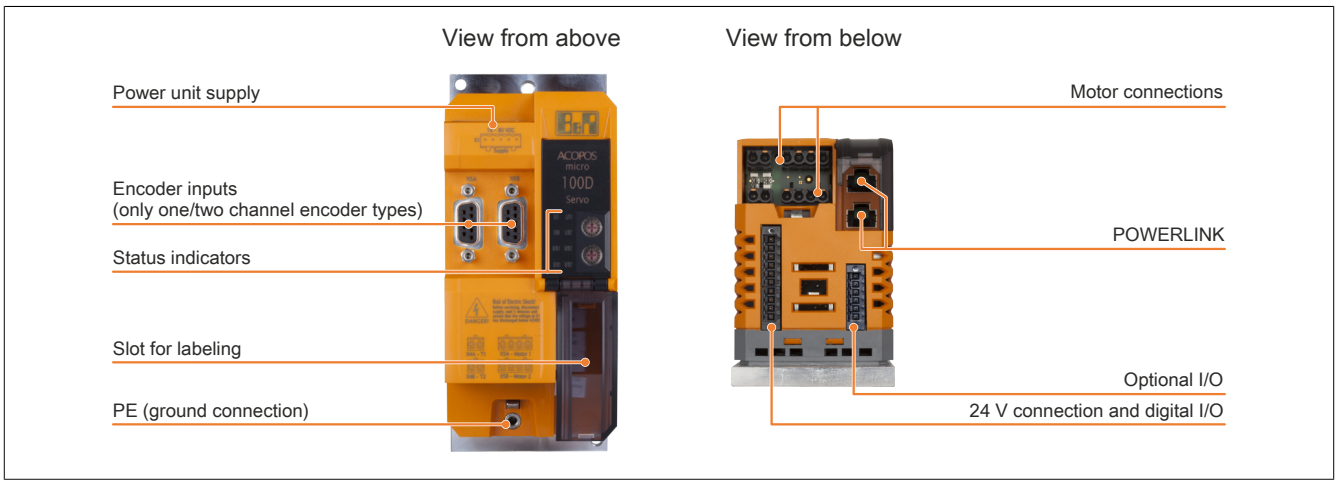


Figure 4: ACOPOSmicro inverter modules - Operating and connection elements

2.1.11 Dimensions

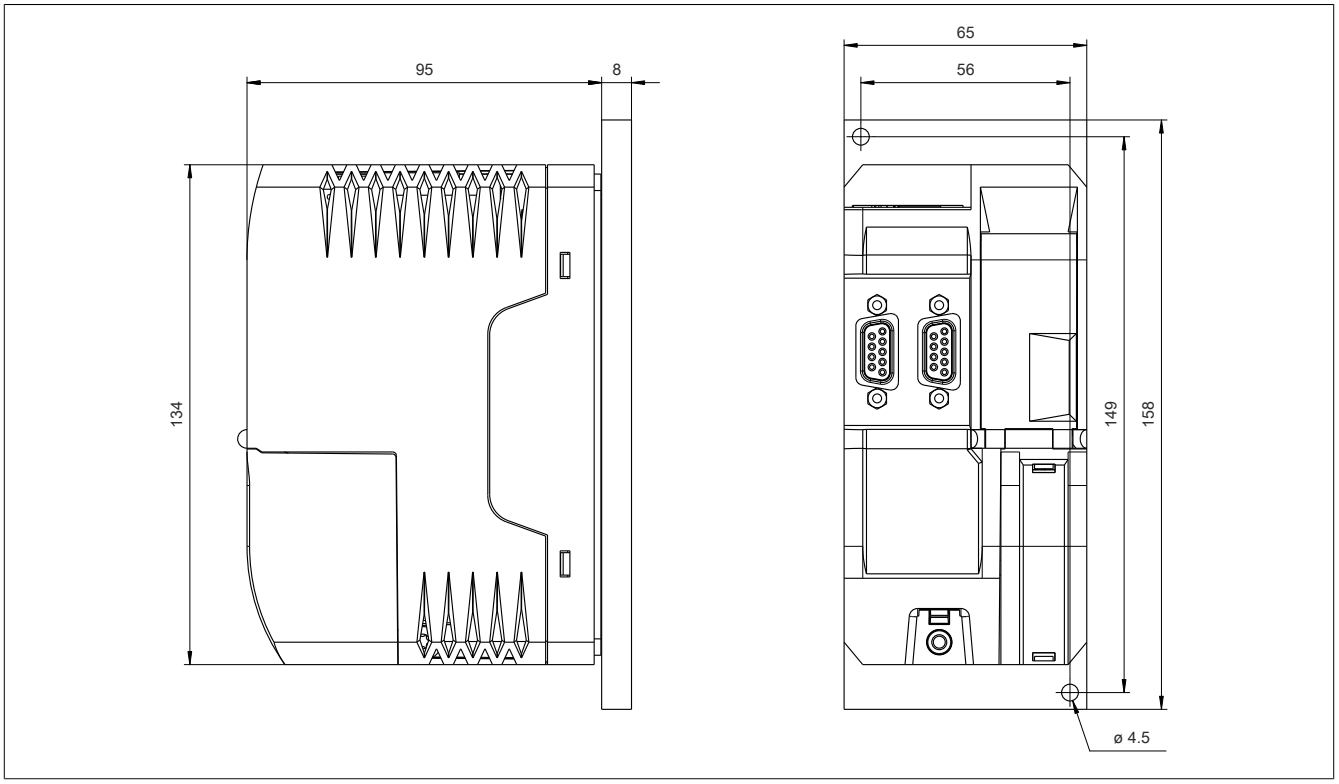


Figure 5: ACOPOSmicro with cold plate - Dimensions

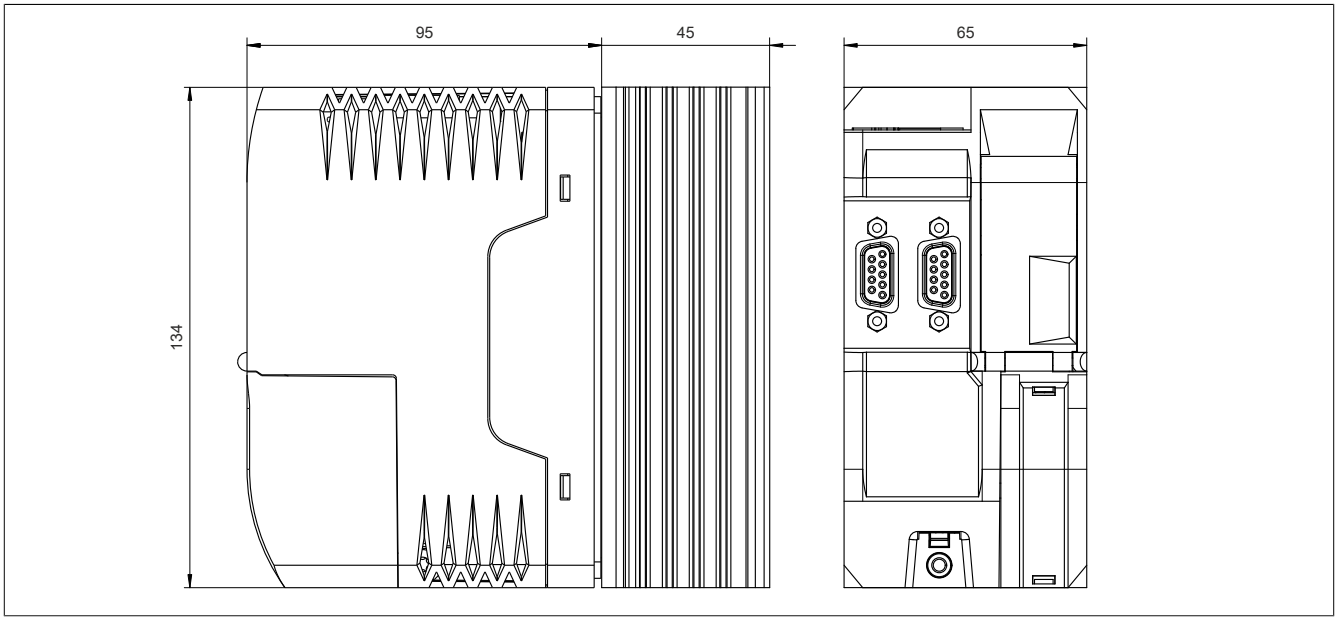
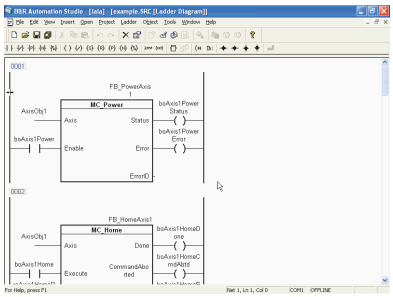


Figure 6: ACOPOSmicro with heat sink - Dimensions

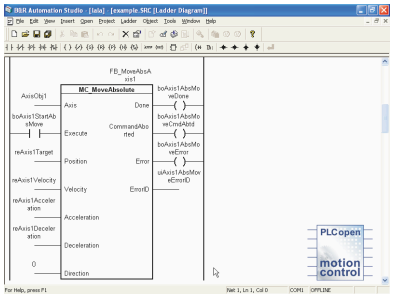
2.1.12 Software

2.1.12.1 PLCopen motion control function blocks



Motion control is one of the central topics in automation technology. This is due in part to the fact that this area bears a relatively high share of the costs of an entire automation solution; as a result, the potential for savings are high as well.

PLCopen motion control function blocks comply with the IEC 61131-3 standard and help users reduce costs by offering vendor-independence and reducing overall development times. They provide additional support in that they can be used with a wide variety of programming languages, including Ladder Diagram (LD), Structured Text (ST) and the high-level language C.



The functionality provided by these function blocks can be broken down into single- and multi-axis movements. Single-axis movements include traditional absolute and relative movements, as well as the possibility of overlapping movements. Multi-axis movements provide support for gear, cam, up/down synchronization and differential gear (i.e. changing the phase angle) functions.

2.1.12.2 Higher productivity with Smart Process Technology

Smart Process Technology meets customer needs for cost-effective solutions and high production speeds. This freely configurable technology library is uniformly integrated into existing motion control products.

The use of indirect process parameters makes it possible to eliminate sensors, which are often not fast enough to keep up with high production speeds. Synchronous processing and short response times make it possible to achieve excellent productivity and precision. In addition, powerful and intelligent decentralized units allow seamless quality control. In the field, this significantly reduces cycle times while simultaneously improving component quality.

Improved product quality, increased machine productivity, reduced maintenance and downtime and seamless quality control during production – every last one of these requirements of advanced motion control products is satisfied completely.

2.1.12.3 ACOPOSmicro - Perfect for CNC applications as well

B&R's integrated soft CNC system combines all software components necessary for machine automation on a powerful 64-bit platform. It provides sufficient computing power for complex processing machines. Its integrated system architecture, used together with ACOPOSmicro inverter modules, opens up many opportunities with regard to response speed, data throughput and precision, all while providing a way to reduce overall costs.

- Uniformly integrated ACOPOSmicro technology for controlling servo motors
- Powerful with minimal latency
- Ultimate freedom for automation concepts with unlimited PLC and CNC system flexibility
- 8 independent CNC channels
- Individual graphic interface

- Virtually unlimited system memory for programs, diagnostics and process data
- Internet or intranet connection for inspection and remote maintenance

Leading manufacturers of water jet, laser and flame cutting machines are already utilizing these technological advantages.

2.1.12.4 Quick, comfortable commissioning

All B&R products are programmed and configured in the same way using a Windows-based tool, B&R Automation Studio. Complex drive solutions can be created after a short orientation period. Adding hardware components and program sections, as well as their configuration, is done in dialog boxes; this reduces project development times considerably.

Axis movements can be checked without programming using NC Test. All types of movements, ranging from point-to-point to gear functions, can be carried out interactively. The reaction of the axis can be seen online in the monitor window. The trace function records relevant drive data for clear evaluation.

2.1.12.5 Tools for straightforward and efficient diagnostics

The drive is monitored in real time using the oscilloscope function. Many trigger options generate informative data for analyzing the movement during operation. A visual display allows the user to make fine adjustments and optimize movements down to the microsecond. The integration of powerful tools, such as the cam editor, reduces programming for complex coupled movements to simple drag-and-drop procedures. The results and effects on speed, acceleration and jolt can be graphically analyzed right away.

2.2 Topologies

2.2.1 Compact solution for small and mid-sized machines

In this topology, the ACOPOSmicro is connected directly to a B&R controller system. This is the most compact solution for remote distributed I/O systems. ACOPOSmicro devices, X67 systems, compact I/O systems, X20 systems and simple operating panels can all be operated on the same line.

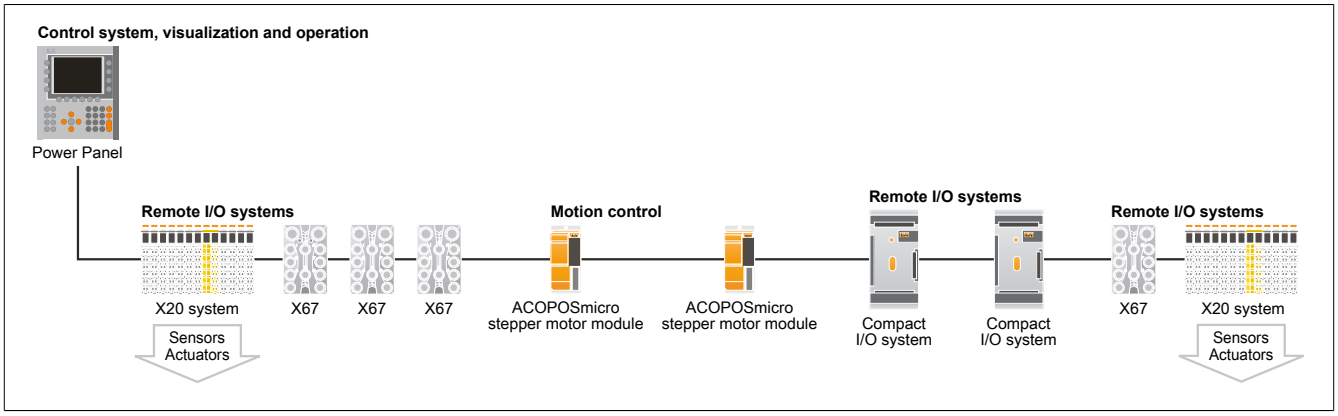


Figure 7: Topology - Compact solution for small and mid-sized machines

Components and technologies	
Control system	Power Panel: Integrated control, operation and HMI
HMI and operation	Power Panel: Integrated control, operation and HMI
Motion control	ACOPOSmicro: Stepper motor modules Stepper motors
Remote I/O systems	X20 system: Slice-based I/O and control system X67 system: Remote I/O with IP67 protection Compact I/O system and valve connections: Economical use of peripheral space

Table 1: Topology - Compact solution for small and mid-sized machines

2.2.2 Customized system combinations

Optimized machine designs require the customized implementation of fieldbus systems. With the flexibility of the X67 system and the openness of B&R's system components, an automation solution can be adapted perfectly to the cost and performance demands of the application.

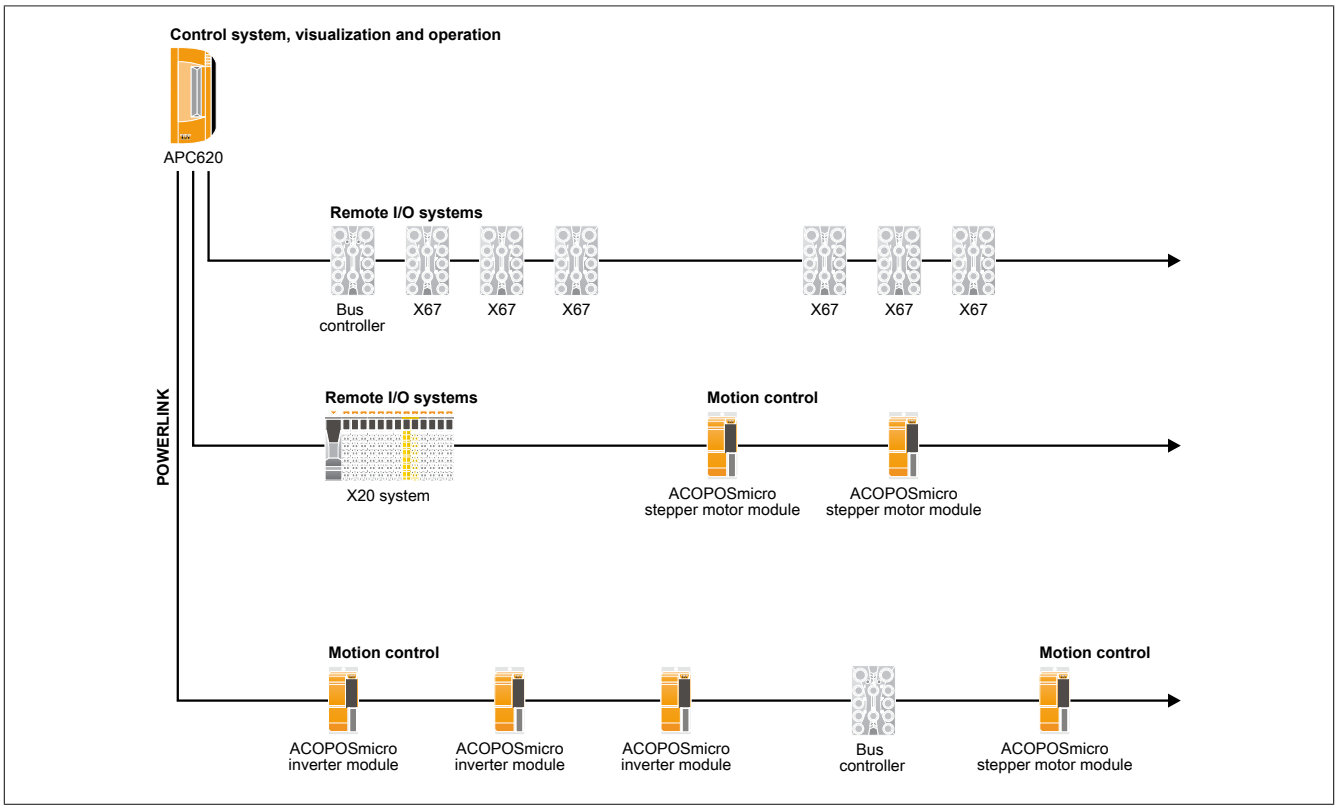


Figure 8: Topology - Customized system combinations

Components and technologies	
Control system	APC620: Automation PC Panel PC: Operation and PC integration
HMI and operation	Panel PC: Operation and PC integration Automation Panel: A new dimension for machine HMI
Motion control	ACOPOSmicro: Stepper motor modules Stepper motors ACOPOSmicro: Inverter modules Servo motors
Remote I/O systems	X20 system: Slice-based I/O and control system X67 system: Remote I/O with IP67 protection Compact I/O system and valve connections: Economical use of peripheral space
Network and fieldbus modules	Various fieldbus modules

2.2.3 APC620 embedded for centralized control, visualization and operation

In this topology, the control program runs on the APC620 embedded. Visual Components is used to integrates all of aspects relating to visualization. A display unit is connected to the PC. The PC is networked over Ethernet TCP/IP, with additional Power Panel-based operator terminals connected via Ethernet. Fieldbus systems (CAN bus, X2X Link) handle the communication to I/O systems used to control axes.

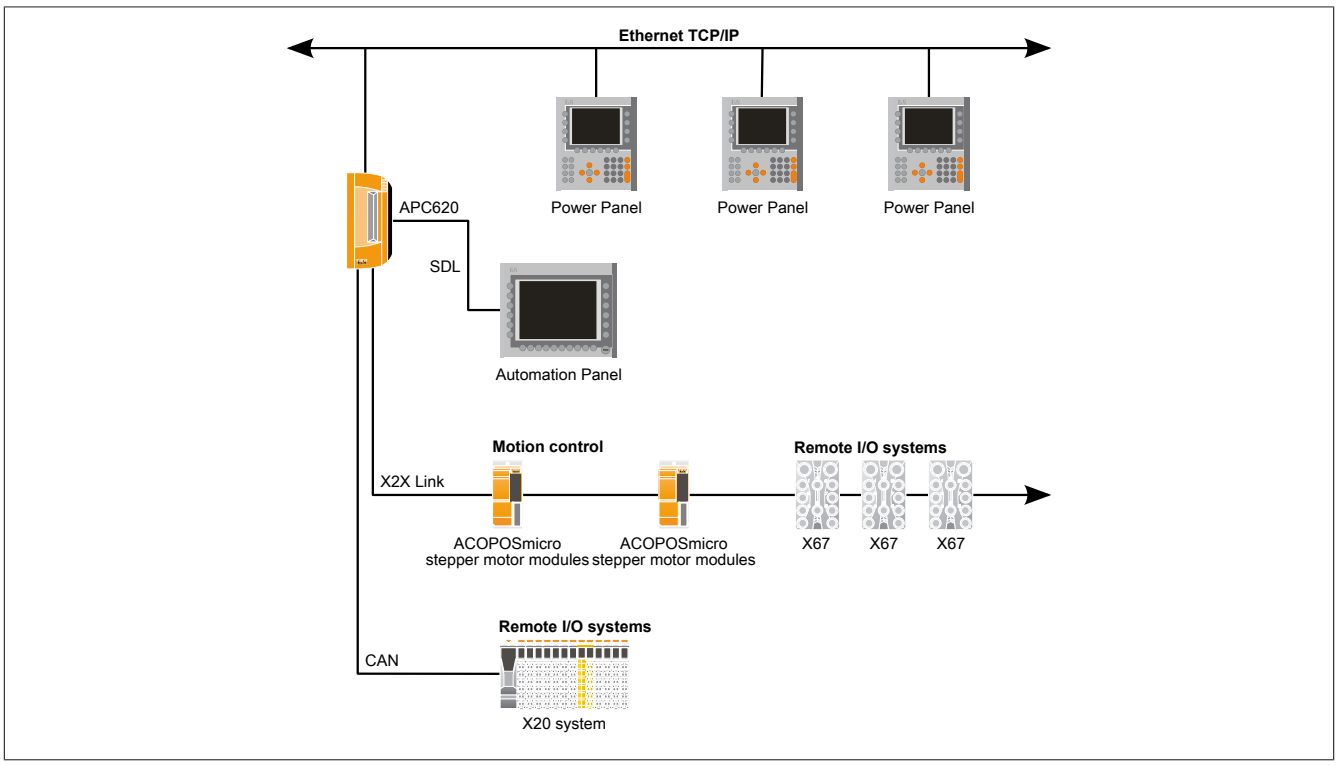


Figure 9: Topology - APC620 embedded for central control, visualization and operation

Components and technologies	
Control system	APC620: Automation PC
HMI and operation	Power Panel: Integrated control, operation and HMI Automation Panel 800: Modular operation and HMI Automation Panel 900: Compact operation and HMI
Motion control	ACOPOSmicro: Stepper motor modules Stepper motors
Remote I/O systems	X20 system: Slice-based I/O and control system X67 system: Remote I/O with IP67 protection

Table 2: Topology - APC620 embedded for central control, visualization and operation

3 Technical data

Order key for interface modules and inverter modules.

80	SD	100	X	D	.	C	1	44	-	01	Example:
80											**Motion control, ACOPOSmicro product line**
	Module type										
	SD										Stepper motor module
	VD										Inverter module
		100									Continuous current • Stepper motor modules: 10 A_{Peak} • Inverter modules: 8 A_{RMS}
			Communication interface								
			X								X2X Link interface
			P								POWERLINK interface
				Number of motor connections							
				S							1 motor connection
				D							2 motor connections
					.						
						Cooling concept					
						C					Cold plate
						W					Heat sink
							Number and type of encoder interfaces				
							0				Standard encoder variant
							1				Other encoder variant
								XX			Without encoder
								0X			1x EnDat 2.2
								00			2x EnDat 2.2
								11			2x HIPERFACE encoder
								2X			1x resolver
								22			2x resolver
								3X			1x SSI absolute encoder
								33			2x SSI absolute encoder
								4X			1x Incremental encoder
								44			2x Incremental encoder
								8X			1x SinCos encoder
								88			2x SinCos encoder
									-		
										Input/Output specifications	
										01	Standard configuration: 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A
										13	In addition to the standard configuration: 4 digital inputs 24 VDC, sink, configurable as incremental encoder, 2 digital outputs 24 VDC, 0.5 A
										14	In addition to the standard configuration: 1 digital input 24 VDC, sink, 1 digital output 24 VDC, 1 A
										21	In addition to the standard configuration: 2 analog inputs ±10 V, 13-bit

Information:

The order key serves as an overview and should make it easier to distinguishing the existing modules. The following overviews show which order key combinations are available as module variants:

Stepper motor modules **"Overview" on page 30****.**

Inverter modules **"Overview" on page 69****.**

3.1 Overview

Stepper motor modules

Order number	Short description	Page
80SD100XD.C011-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x HIPERFACE encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	31
80SD100XD.C033-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x 5 V SSI absolute encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	34
80SD100XD.C044-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x 24 V incremental encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	37
80SD100XD.C04X-13	ACOPOSmicro stepper motor module, X2X Link interface, 1x 24 V incremental encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, 4 digital inputs 24 VDC, sink, configurable as incremental encoder, 2 digital outputs 24 VDC, 0.5 A order terminal blocks separately!	40
80SD100XD.C0XX-01	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	44
80SD100XD.C0XX-21	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, 2 analog inputs ±10 V, 13-bit, order terminal blocks separately!	47
80SD100XD.W044-01	ACOPOSmicro stepper motor module, heat sink, X2X Link interface, 2x 24 V incremental encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	50
80SD100XD.W0XX-01	ACOPOSmicro stepper motor module, heat sink, X2X Link interface, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	53
80SD100XS.C04X-01	ACOPOSmicro stepper motor module, X2X Link interface, 1x 24 V incremental encoder, 24-64 VDC ±25% power supply, 1 motor connection, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	56
80SD100XS.C04X-13	ACOPOSmicro stepper motor module, X2X Link interface, 1x 24 V incremental encoder, 24-64 VDC ±25% power supply, 1 motor connection, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, 4 digital inputs 24 VDC, sink, configurable as incremental encoder, 2 digital outputs 24 VDC, 0.5 A order terminal blocks separately!	59
80SD100XS.C0XX-01	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% power supply, 1 motor connection, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	63

Inverter modules

Order number	Short description	Page
80VD100PD.C000-01	ACOPOSmicro inverter module, POWERLINK interface, 2x EnDat 2.2, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks and encoder buffer battery 80XB120A2.36-00 separately!	70
80VD100PD.C000-14	ACOPOSmicro inverter module, POWERLINK interface, 2x EnDat 2.2, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital input 24 VDC, sink, 2 digital outputs 24 VDC, 1 A, order terminal blocks and encoder buffer battery 80XB120A2.36-00 separately!	73
80VD100PD.C022-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x resolver, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	77
80VD100PD.C022-14	ACOPOSmicro inverter module, POWERLINK interface, 2x resolver, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital input 24 VDC, sink, 2 digital outputs 24 VDC, 1 A, order terminal blocks separately!	80
80VD100PD.C033-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x SSI absolute encoder, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	84
80VD100PD.C088-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x SinCos encoder, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	87
80VD100PD.C144-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x incremental encoder, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	90
80VD100PD.C188-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x LinMot®, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	93
80VD100PS.C00X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x EnDat 2.2, 24-64 VDC ±25% power supply, 1 motor connection, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks and encoder buffer battery 80XB120A2.36-00 separately!	96
80VD100PS.C02X-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 1x resolver, 24-64 VDC ±25% power supply, 1 motor connection, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	99
80VD100PS.C03X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x SSI absolute encoder, 24-64 VDC ±25% power supply, 1 motor connection, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	102
80VD100PS.C08X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x SinCos encoder, 24-64 VDC ±25% power supply, 1 motor connection, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	105

Power supply module

Order number	Short description	Page
80PS080X3.10-01	Power supply module, input 3x 380-480 VAC ±10%, power output 24-80 VDC 16.6 A (max. 1000 W), voltage output 24 VDC 2 A, X2X Link interface, integrated brake chopper, wall mounting. Order terminal blocks separately.	112

Accessories

Order number	Short description	Page
	1.5 mm² hybrid motor cable	
8CH003.1A-1	ACOPOSmicro hybrid motor cable, length 3 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH005.1A-1	ACOPOSmicro hybrid motor cable, length 5 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH007.1A-1	ACOPOSmicro hybrid motor cable, length 7 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH010.1A-1	ACOPOSmicro hybrid motor cable, length 10 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH015.1A-1	ACOPOSmicro hybrid motor cable, length 15 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH020.1A-1	ACOPOSmicro hybrid motor cable, length 20 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH025.1A-1	ACOPOSmicro hybrid motor cable, length 25 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
	Accessories	
8BCM0003.1B470-0	8WS hybrid motor cable extension, length 3 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG+3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	197
8BCM0005.1B470-0	8WS hybrid motor cable extension, length 5 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG+3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	197
8BCM0010.1B470-0	8WS hybrid motor cable extension, length 10 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG+3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	197
8BCM0015.1B470-0	8WS hybrid motor cable extension, length 15 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG+3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	197
8BCM00X5.1B48E-0	8WS/ACOPOSmicro hybrid motor cable, length 0.5 m, ((2x(2x26AWG) + 2x24AWG)C + 3x16AWG)C, female 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	183
	Batteries	
80XB120A2.36-00	1x lithium battery, 1/2 AA 3.6 V	203
	Braking resistor	
80XBR0025.010-11	Braking resistor for power supply module 80PS080X3.10-01 2.5 Ω 100 W	200
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	201
	EnDat 2.2 cables	
8BCF0002.1221B-0	EnDat 2.2 cable, length 2 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0005.1221B-0	EnDat 2.2 cable, length 5 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0007.1221B-0	EnDat 2.2 cable, length 7 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0010.1221B-0	EnDat 2.2 cable, length 10 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0015.1221B-0	EnDat 2.2 cable, length 15 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0020.1221B-0	EnDat 2.2 cable, length 20 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0025.1221B-0	EnDat 2.2 cable, length 25 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
	Hiperface encoder cables	
80CM01005.65-01	HIPERFACE encoder cable, length 1 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
80CM02005.65-01	HIPERFACE encoder cable, length 2 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
80CM03005.65-01	HIPERFACE encoder cable, length 3 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
80CM05005.65-01	HIPERFACE encoder cable, length 5 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
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0TB2105.4021	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm²	126
0TB2105.4022	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm²	126
0TB2105.4031	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm², for LinMot	126
0TB2105.4032	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm², LinMot	126
0TB2105.4121-01	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm²	127
0TB2105.4122-01	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm²	127
0TB2105.4131	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm², LinMot	127
0TB2105.4132	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm², LinMot	127
0TB2105.9021	Accessory terminal block, 5-pin, DC, screw clamp terminal block 2.5 mm²	128
0TB2105.9121-01	Accessory terminal block, 5-pin, DC, cage clamp terminal block 2.5 mm²	128
0TB3102-7010	Accessory terminal block, 2-pin, screw clamp terminal block 6 mm²	129
0TB3104-7021	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled + + - -	129
0TB3104-7022	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled L1 L2 L3 PE	129
0TB710.90	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm²	130
0TB710.91	Accessory terminal block, 10-pin, cage clamp terminal block 1.5 mm²	130
	Thru-bulkhead receptacles	
8BXC004.0000-00	Signal connector, 9-pin, for motor cables with springtec connector, UL/CSA listed	203
8BXC005.0000-00	Signal connector, 12-pin, for resolver cables with springtec connector, UL/CSA listed	203
8BXC009.0000-00	Signal connector, 12-pin, for encoder cables with springtec connector, UL/CSA listed	203
	X2X Link cable	
X20CA0X48.0010	X2X Link attachment cable, open-ended on one side, 1 m	139
X20CA0X48.0020	X2X Link attachment cable, open-ended on one side, 2 m	139
X20CA0X48.0050	X2X Link attachment cable, open-ended on one side, 5 m	139
X20CA0X48.0100	X2X Link attachment cable, open-ended on one side, 10 m	139
X20CA0X48.0200	X2X Link attachment cable, open-ended on one side, 20 m	139
X20CA0X68.0003	X2X Link connection cable, 0.3 m	141
X20CA0X68.0010	X2X Link connection cable, 1 m	141
X20CA0X68.0020	X2X Link connection cable, 2 m	141
X20CA0X68.0050	X2X Link connection cable, 5 m	141
X20CA0X68.0100	X2X Link connection cable, 10 m	141

3.2 Stepper motor modules

Stepper motor modules from the ACOPOSmicro product family are used to control up to two stepper motors. Stepper motors from a wide range of 24 to 64 VDC ±25% nominal voltage and up to 10 A (15 A peak) motor current can be connected.

Due to the individual adjustment of the coil currents, the motor is only operated with the current it actually needs. This makes it easier to select an appropriate motor and prevents unnecessary heating. Because this affects energy consumption and thermal load, the effects are positive on the service life of the complete system. Individually adjustable values for holding, nominal and maximum current (boost current) ensure maximum flexibility. The current for the microsteps is automatically adjusted to the configured current values.

The automatic motor identification system is an enormous help during standstills. The stepper motor modules use the coil characteristics to identify the connected motors. This makes it possible to detect not only wiring errors, but also incorrect motor types being used mistakenly.

- Motor connection: 24 to 64 VDC ±25%, 10 A (15 A peak)
- Holding, nominal and maximum current (boost current) configured independently of each other
- 38.5 kHz PWM frequency
- Integrated motor detection
- 256 microsteps
- Complete integration in Automation Studio and CNC applications
- Function model "Ramp" is based on CANopen communication profile DS402.

3.2.1 Overview

Variants of the ACOPOSmicro stepper motor modules cover a wide range of applications. The following variants are available:

Model number	Motor connections	Encoder	Additional inputs/outputs
80SD100XD.C011-01	2	2x HIPERFACE encoder	-
80SD100XD.C033-01	2	2x SSI absolute encoder	-
80SD100XD.C044-01	2	2x ABR incremental encoder	-
80SD100XD.C04X-13	2	1x ABR incremental encoder	4 digital inputs 24 V 2 digital outputs 24 V, 0.5 A
80SD100XD.C0XX-01	2	-	-
80SD100XD.C0XX-21	2	-	2 analog inputs ±10 V, 13-bit
80SD100XD.W044-01	2	2x ABR incremental encoder	-
80SD100XD.W0XX-01	2	-	-
80SD100XS.C04X-01	1	1x ABR incremental encoder	-
80SD100XS.C04X-13	1	1x ABR incremental encoder	4 digital inputs 24 V 2 digital outputs 24 V, 0.5 A
80SD100XS.C0XX-01	1	-	-

Table 3: Overview of available ACOPOSmicro stepper motor module variants

3.2.2 80SD100XD.C011-01

3.2.2.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XD.C011-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x HIPERFACE encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	
	Required accessories	
	Terminal block sets	
80XSD100XD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021	
80XSD100XD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 4: 80SD100XD.C011-01 - Order data

3.2.2.2 Technical data

Order number	80SD100XD.C011-01
Short description	
Stepper motor module	Connection for 2 stepper motors with HIPERFACE encoder, 2-phase bipolar
General information	
B&R ID code	0xB177
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
24 VDC supply	
Input voltage	24 VDC ± 25%
Voltage monitoring	Yes
Power consumption	
CPU [1)]	Max. 8 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ± 25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.

Table 5: 80SD100XD.C011-01 - Technical data

Order number	80SD100XD.C011-01
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	30 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ± 25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Encoder inputs	
Quantity	2
Type	HIPERFACE
Max. encoder cable length	25 m
Encoder power supply	
Output voltage	Typ. 11.5 V
Load capacity	200 mA
Sine/Cosine inputs	
Signal transmission	Differential signal, asymmetrical
Signal frequency	200 kHz
Differential voltage	0.5 to 1.25 VSS
Common-mode voltage	Max. ±7 V
Terminating resistor	120 Ω
ADC resolution [2)]	16 bits per sine/cosine period
Bit width of position value	Max. 32-bit
Serial interface	
Baud rate	Configurable (max. 38.4 kbaud)
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ± 25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	450 ms (Rev. < K0: 452 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < K0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink

Table 5: 80SD100XD.C011-01 - Technical data

Order number	80SD100XD.C011-01
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [3]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	700 g
Backplane	Always mount on conductive and earthed backplane.

Table 5: 80SD100XD.C011-01 - Technical data

1) Includes the enable input
2) Noise on the encoder signal reduces the resolution that can be used by approx. 5 bits (factor of 32).
3) Without heat spreader

3.2.3 80SD100XD.C033-01

3.2.3.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XD.C033-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x 5 V SSI absolute encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	
	Required accessories	
	Terminal block sets	
80XSD100XD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021	
80XSD100XD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 6: 80SD100XD.C033-01 - Order data

3.2.3.2 Technical data

Order number	80SD100XD.C033-01
Short description	
Stepper motor module	Connection for 2 stepper motors with SSI absolute encoder, 2-phase bipolar
General information	
B&R ID code	0xB178
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ± 25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 8 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ± 25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"

Table 7: 80SD100XD.C033-01 - Technical data

Order number	80SD100XD.C033-01
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	30 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ± 25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 kHz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Encoder inputs	
Quantity	2
Type	SSI absolute encoder
Max. encoder cable length	25 m
Encoder power supply	
Output voltage [3)]	24 V
Load capacity	80 mA
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Synchronous serial interface	
Signal transmission	RS485
Keying	Gray, binary
Word size	Max. 32-bit
Max. signal delay	≤1.25 µs
Differential voltage	Typ. 2.5 V
Data transfer rate	Configurable (max. 1 Mbit/s)
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ± 25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	450 ms (Rev. < K0: 452 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < K0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink

Table 7: 80SD100XD.C033-01 - Technical data

Order number	80SD100XD.C033-01
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [4]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	700 g
Backplane	Always mount on conductive and earthed backplane.

Table 7: 80SD100XD.C033-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Depends on the power supply of the CPU component
4) Without heat spreader

3.2.4 80SD100XD.C044-01

3.2.4.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XD.C044-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x 24 V incremental encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	
	Required accessories	
	Terminal block sets	
80XSD100XD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021	
80XSD100XD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 8: 80SD100XD.C044-01 - Order data

3.2.4.2 Technical data

Order number	80SD100XD.C044-01
Short description	
Stepper motor module	Connection for 2 stepper motors with ABR incremental encoder, 2-phase bipolar
General information	
B&R ID code	0xA781
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 8 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"

Table 9: 80SD100XD.C044-01 - Technical data

Order number	80SD100XD.C044-01
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	30 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Encoder inputs	
Quantity	2
Type	ABR single-ended signals 24 V
Max. encoder cable length	25 m
Encoder power supply	
Output voltage [3]	24 V
Load capacity	40 mA, important: 1 PTC for both encoder channels [4]
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Switching threshold	
Low	<5 V (against COM)
High	>15 V (against COM)
Temperature measurement	
Type	KTY
Values	0 to 110°C
Tolerance	5%
Incremental encoder operation	
Signal form	Square wave pulse
Evaluation	4x
Counter size	16-bit
Input frequency	Max. 50 kHz
Counter frequency	200 kHz
Input current at nominal voltage	Typ. 4 mA
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 9: 80SD100XD.C044-01 - Technical data

Order number	80SD100XD.C044-01
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	450 ms (Rev. < L0: 452 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < L0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [5]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	650 g
Backplane	Always mount on conductive and earthed backplane.

Table 9: 80SD100XD.C044-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Depends on the supply voltage of the CPU component
4) See section "Incremental encoder - Input circuit diagram" in chapter "X6 - Encoder inputs"
5) Without heat spreader

3.2.5 80SD100XD.C04X-13

3.2.5.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XD.C04X-13	ACOPOSmicro stepper motor module, X2X Link interface, 1x 24 V incremental encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, 4 digital inputs 24 VDC, sink, configurable as incremental encoder, 2 digital outputs 24 VDC, 0.5 A order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XSD100XD.C0-13A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-13: 1x 0TB1110.8010, 1x 0TB1106.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021	
80XSD100XD.C0-13B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-13: 1x 0TB1110.8110, 1x 0TB1106.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 10: 80SD100XD.C04X-13 - Order data

3.2.5.2 Technical data

Order number	80SD100XD.C04X-13
Short description	
Stepper motor module	Connection for 2 stepper motors with ABR incremental encoder, 2-phase bipolar
General information	
B&R ID code	0xA78D
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Optional inputs/outputs	No
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1)]	Yes
24 VDC supply	
Input voltage	24 VDC ± 25%
Voltage monitoring	Yes
Power consumption	
CPU [2)]	Max. 7 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ± 25%
Inrush current	Max. 10 A

Table 11: 80SD100XD.C04X-13 - Technical data

Order number	80SD100XD.C04X-13
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	30 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ± 25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Encoder inputs	
Quantity	1
Type	ABR single-ended signals 24 VDC
Max. encoder cable length	25 m
Encoder power supply	
Output voltage [3]	24 V
Load capacity	40 mA [4]
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Switching threshold	
Low	<5 V (against COM)
High	>15 V (against COM)
Temperature measurement	
Type	KTY
Values	0 to 110°C
Tolerance	5%
Incremental encoder operation	
Signal form	Square wave pulse
Evaluation	4x
Counter size	16-bit
Input frequency	Max. 50 kHz
Counter frequency	200 kHz
Input current at nominal voltage	Typ. 4 mA
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ± 25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 11: 80SD100XD.C04X-13 - Technical data

Order number	80SD100XD.C04X-13
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	450 ms (Rev. < K0: 452 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < K0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Digital inputs (option board)	
Quantity	4
Additional functions	Incremental encoder, event counter, period or gate measurement
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 3.1 mA
Input resistance	Approx. 7.8 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 2 µs
Falling edge	[Instant recording] Typ. 3 µs
Electrical isolation	
Input - ACOPOS	No
Input - Input	No
Incremental encoder (option board)	
Counter size	16-bit
Input frequency	Max. 25 kHz
Evaluation	4x
Event counter (option board)	
Quantity	1
Signal form	Square wave pulse
Input frequency	Max. 50 kHz
Counter size	16-bit
Evaluation	Configurable
Gate measurement (option board)	
Quantity	1
Signal form	Square wave pulse
Evaluation	Configurable
Pulse length	≥10 µs
Length of pause between pulses	≥10 µs
Counter frequency	Configurable
Counter size	16-bit
Digital outputs (option board)	
Quantity	2
Nominal voltage	24 VDC
Switching voltage	24 VDC ± 25%
Connection type	1-wire connections
Output circuit	Source
Output protection	Thermal shutdown in the event of overcurrent or short circuit
Design	High-side FET positive switching

Table 11: 80SD100XD.C04X-13 - Technical data

Order number	80SD100XD.C04X-13
Switching delay	
0 → 1	Max. 250 µs
1 → 0	Max. 270 µs
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Braking voltage when switching off inductive loads	47 V
Supply voltage	From the 24 VDC power supply
Max. internal resistance	0.3 Ω
Continuous current per output	0.5 A
Continuous current of all outputs [5]	1.0 A
Switching on after overload cutoff	Typ. 10 ms (depends on the module temperature)
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [6]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	700 g
Backplane	Always mount on conductive and earthed backplane.

Table 11: 80SD100XD.C04X-13 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Depends on the supply voltage of the CPU component
4) See section "Incremental encoder - Input circuit diagram" in chapter "X6 - Encoder inputs"
5) The power required by the CPU is increased by the current consumed by the outputs.
6) Without heat spreader

3.2.6 80SD100XD.C0XX-01

3.2.6.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XD.C0XX-01	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XSD100XD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021	
80XSD100XD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 12: 80SD100XD.C0XX-01 - Order data

3.2.6.2 Technical data

Order number	80SD100XD.C0XX-01
Short description	
Stepper motor module	Connection for two stepper motors without encoder, 2-phase bipolar
General information	
B&R ID code	0xA4A4
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1)]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2)]	Max. 6 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.

Table 13: 80SD100XD.C0XX-01 - Technical data

Order number	80SD100XD.C0XX-01
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	30 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	450 ms (Rev. < L0: 452 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < L0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V

Table 13: 80SD100XD.C0XX-01 - Technical data

Order number	80SD100XD.C0XX-01
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [3]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	655 g
Backplane	Always mount on conductive and earthed backplane.

Table 13: 80SD100XD.C0XX-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Without heat spreader

3.2.7 80SD100XD.C0XX-21

3.2.7.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XD.C0XX-21	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, 2 analog inputs ±10 V, 13-bit, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XSD100XD.C0-21A	Screw clamp set for ACOPOSmicro modules 80SD100XD.xxxx-21: 1x 0TB1110.8010, 1x 0TB1106.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021	
80XSD100XD.C0-21B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-21: 1x 0TB1110.8110, 1x 0TB1106.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 14: 80SD100XD.C0XX-21 - Order data

3.2.7.2 Technical data

Order number	80SD100XD.C0XX-21
Short description	
Stepper motor module	Connection for two stepper motors without encoder, 2-phase bipolar
General information	
B&R ID code	0xA78E
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Optional inputs/outputs	No
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1)]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2)]	Max. 6 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"

Table 15: 80SD100XD.C0XX-21 - Technical data

Order number	80SD100XD.C0XX-21
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	30 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	450 ms (Rev. < K0: 452 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < K0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Analog inputs (option board)	
Quantity	2

Table 15: 80SD100XD.C0XX-21 - Technical data

Order number	80SD100XD.C0XX-21
Input signal	±10 V
Input type	Differential input
Digital converter resolution	13-bit
Conversion time	50 µs for all channels
Output format	
Data type	INT
Voltage	0x8001 - 0x7FFF / 1 LSB = 0x0008 = 2.441 mV
Input impedance in signal range	20 MΩ
Input protection	Protection against wiring with CPU supply voltage
Permissible input signal	Max. ±30 V
Output of digital value during overload	
Overshoot	0x7FFF
Undershoot	0x8001
Conversion method	SAR
Input filter	
Hardware	3rd-order low pass, cutoff frequency 10 kHz
Max. error at 25°C	
Gain	0.08%
Offset	0.015%
Common-mode rejection	
DC	70 dB
50 Hz	70 dB
Common-mode range	±12 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [3]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	650 g
Backplane	Always mount on conductive and earthed backplane.

Table 15: 80SD100XD.C0XX-21 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Without heat spreader

3.2.8 80SD100XD.W044-01

3.2.8.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XD.W044-01	ACOPOSmicro stepper motor module, heat sink, X2X Link interface, 2x 24 V incremental encoder, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XSD100XD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021	
80XSD100XD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 16: 80SD100XD.W044-01 - Order data

3.2.8.2 Technical data

Order number	80SD100XD.W044-01
Short description	
Stepper motor module	Connection for 2 stepper motors with ABR incremental encoder, 2-phase bipolar
General information	
B&R ID code	0xC666
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 8 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"

Table 17: 80SD100XD.W044-01 - Technical data

Order number	80SD100XD.W044-01
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	30 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Encoder inputs	
Quantity	2
Type	ABR single-ended signals 24 V
Max. encoder cable length	25 m
Encoder power supply	
Output voltage [3]	24 V
Load capacity	40 mA, important: 1 PTC for both encoder channels [4]
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Switching threshold	
Low	<5 V (against COM)
High	>15 V (against COM)
Temperature measurement	
Type	KTY
Values	0 to 110°C
Tolerance	5%
Incremental encoder operation	
Signal form	Square wave pulse
Evaluation	4x
Counter size	16-bit
Input frequency	Max. 50 kHz
Counter frequency	200 kHz
Input current at nominal voltage	Typ. 4 mA
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 17: 80SD100XD.W044-01 - Technical data

Order number	80SD100XD.W044-01
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	450 ms (Rev. < G0: 452 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < G0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Heat sink for wall mounting
Dimensions [5]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	930 g

Table 17: 80SD100XD.W044-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Depends on the power supply of the CPU component.
4) See section "Incremental encoder - Input circuit diagram" in chapter "X6 - Encoder inputs"
5) Without heat sink

3.2.9 80SD100XD.W0XX-01

3.2.9.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XD.W0XX-01	ACOPOSmicro stepper motor module, heat sink, X2X Link interface, 24-64 VDC ±25% power supply, 2 motor connections, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XSD100XD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021	
80XSD100XD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 18: 80SD100XD.W0XX-01 - Order data

3.2.9.2 Technical data

Order number	80SD100XD.W0XX-01
Short description	
Stepper motor module	Connection for two stepper motors without encoder, 2-phase bipolar
General information	
B&R ID code	0xC641
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 6 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.

Table 19: 80SD100XD.W0XX-01 - Technical data

Order number	80SD100XD.W0XX-01
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	30 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	450 ms (Rev. < G0: 452 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < G0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V

Table 19: 80SD100XD.W0XX-01 - Technical data

Order number	80SD100XD.W0XX-01
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Heat sink for wall mounting
Dimensions [3]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	930 g

Table 19: 80SD100XD.W0XX-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Including the enable input.
3) Without heat sink

3.2.10 80SD100XS.C04X-01

3.2.10.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XS.C04X-01	ACOPOSmicro stepper motor module, X2X Link interface, 1x 24 V incremental encoder, 24-64 VDC ±25% power supply, 1 motor connection, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XSD100XS.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.9021	
80XSD100XS.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 20: 80SD100XS.C04X-01 - Order data

3.2.10.2 Technical data

Order number	80SD100XS.C04X-01
Short description	
Stepper motor module	Connection for 1 stepper motor with ABR incremental encoder, 2-phase bipolar
General information	
B&R ID code	0xA780
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1)]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2)]	Max. 7 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"

Table 21: 80SD100XS.C04X-01 - Technical data

Order number	80SD100XS.C04X-01
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	1
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	15 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Encoder inputs	
Quantity	1
Type	ABR single-ended signals 24 V
Max. encoder cable length	25 m
Encoder power supply	
Output voltage [3]	24 V
Load capacity	40 mA [4]
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Switching threshold	
Low	<5 V (against COM)
High	>15 V (against COM)
Temperature measurement	
Type	KTY
Values	0 to 110°C
Tolerance	5%
Incremental encoder operation	
Signal form	Square wave pulse
Evaluation	4x
Counter size	16-bit
Input frequency	Max. 50 kHz
Counter frequency	200 kHz
Input current at nominal voltage	Typ. 4 mA
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 21: 80SD100XS.C04X-01 - Technical data

Order number	80SD100XS.C04X-01
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < M0: 867 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < M0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	1 input usable as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [5]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	700 g
Backplane	Always mount on conductive and earthed backplane.

Table 21: 80SD100XS.C04X-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Depends on the supply voltage of the CPU component.
4) See section "Incremental encoder - Input circuit diagram" in chapter "X6 - Encoder inputs"
5) Without heat spreader

3.2.11 80SD100XS.C04X-13

3.2.11.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XS.C04X-13	ACOPOSmicro stepper motor module, X2X Link interface, 1x 24 V incremental encoder, 24-64 VDC ±25% power supply, 1 motor connection, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, 4 digital inputs 24 VDC, sink, configurable as incremental encoder, 2 digital outputs 24 VDC, 0.5 A order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XSD100XS.C0-13A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-13: 1x 0TB1110.8010, 1x 0TB1106.8010, 1x 0TB2105.4021, 1x 0TB2105.9021	
80XSD100XS.C0-13B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-13: 1x 0TB1110.8110, 1x 0TB1106.8110, 1x 0TB2105.4121-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 22: 80SD100XS.C04X-13 - Order data

3.2.11.2 Technical data

Order number	80SD100XS.C04X-13
Short description	
Stepper motor module	Connection for 1 stepper motor with ABR incremental encoder, 2-phase bipolar
General information	
B&R ID code	0xA782
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Optional inputs/outputs	No
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1)]	Yes
24 VDC supply	
Input voltage	24 VDC ± 25%
Voltage monitoring	Yes
Power consumption	
CPU [2)]	Max. 7 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ± 25%
Inrush current	Max. 10 A

Table 23: 80SD100XS.C04X-13 - Technical data

Order number	80SD100XS.C04X-13
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	1
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	15 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ± 25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Encoder inputs	
Quantity	1
Type	ABR single-ended signals 24 V
Max. encoder cable length	25 m
Encoder power supply	
Output voltage [3]	24 V
Load capacity	40 mA [4]
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Switching threshold	
Low	<5 V (against COM)
High	>15 V (against COM)
Temperature measurement	
Type	KTY
Values	0 to 110°C
Tolerance	5%
Incremental encoder operation	
Signal form	Square wave pulse
Evaluation	4x
Counter size	16-bit
Input frequency	Max. 50 kHz
Counter frequency	200 kHz
Input current at nominal voltage	Typ. 4 mA
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ± 25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 23: 80SD100XS.C04X-13 - Technical data

Order number	80SD100XS.C04X-13
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < K0: 867 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < K0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	1 input usable as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Digital inputs (option board)	
Quantity	4
Additional functions	Incremental encoder, event counter, period or gate measurement
Input circuit	Sink
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 3.1 mA
Input resistance	Approx. 7.8 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 2 µs
Falling edge	[Instant recording] Typ. 3 µs
Electrical isolation	
Input - ACOPOS	No
Input - Input	No
Incremental encoder (option board)	
Counter size	16-bit
Input frequency	Max. 25 kHz
Evaluation	4x
Event counter (option board)	
Quantity	1
Signal form	Square wave pulse
Input frequency	Max. 50 kHz
Counter size	16-bit
Evaluation	Configurable
Gate measurement (option board)	
Quantity	1
Signal form	Square wave pulse
Evaluation	Configurable
Pulse length	≥10 µs
Length of pause between pulses	≥10 µs
Counter frequency	Configurable
Counter size	16-bit
Digital outputs (option board)	
Quantity	2
Nominal voltage	24 VDC
Switching voltage	24 VDC ±25%
Connection type	1-wire connections
Output circuit	Source
Output protection	Thermal shutdown in the event of overcurrent or short circuit
Design	High-side FET positive switching

Table 23: 80SD100XS.C04X-13 - Technical data

Order number	80SD100XS.C04X-13
Switching delay	
0 → 1	Max. 250 µs
1 → 0	Max. 270 µs
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Braking voltage when switching off inductive loads	47 V
Supply voltage	From the 24 VDC power supply
Max. internal resistance	0.3 Ω
Continuous current per output	0.5 A
Continuous current of all outputs [5]	1.0 A
Switching on after overload cutoff	Typ. 10 ms (depends on the module temperature)
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [6]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	700 g
Backplane	Always mount on conductive and earthed backplane.

Table 23: 80SD100XS.C04X-13 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Including the enable input.
3) Depends on the supply voltage of the CPU component.
4) See section "Incremental encoder - Input circuit diagram" in chapter "X6 - Encoder inputs"
5) The power required by the CPU is increased by the current consumed by the outputs.
6) Without heat spreader

3.2.12 80SD100XS.C0XX-01

3.2.12.1 Order data

Order number	Short description	Figure
	Stepper motor modules	
80SD100XS.C0XX-01	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% power supply, 1 motor connection, 10 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XSD100XS.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.9021	
80XSD100XS.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.9121-01	
	Optional accessories	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 24: 80SD100XS.C0XX-01 - Order data

3.2.12.2 Technical data

Order number	80SD100XS.C0XX-01
Short description	
Stepper motor module	Connection for one stepper motor without encoder, 2-phase bipolar
General information	
B&R ID code	0xA5AE
Status indicators	X2X Link, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
X2X Link	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Enable inputs	Yes
CPU - Motor holding brake	No
CPU - X2X Link	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 6 W
X2X Link power supply	Generated internally from the CPU power supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Power dissipation from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.

Table 25: 80SD100XS.C0XX-01 - Technical data

Order number	80SD100XS.C0XX-01
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	1
Nominal current	10 A_{Peak}
Max. current/motor	15 A_{Peak} (2 s)
Max. current/module	15 A_{Peak}
Nominal switching frequency	38.5 kHz
Max. motor line length	25 m
Step resolution	256 microsteps per full step
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	No
Undervoltage monitoring	Yes
Max. overcurrent limitation	8 A
Response threshold for undervoltage monitoring	≤11 VDC
Reference potential	GND for module power supply (X2 terminal, pin 10)
Interfaces	
X2X	
Design	4-pin male connector
Min. X2X Link cycle time	250 µs
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < L0: 867 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < L0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	1 input usable as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 3 µs
Falling edge	[Instant recording] Typ. 4 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V

Table 25: 80SD100XS.C0XX-01 - Technical data

Order number	80SD100XS.C0XX-01
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [3]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	650 g
Backplane	Always mount on conductive and earthed backplane.

Table 25: 80SD100XS.C0XX-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Without heat spreader

3.2.13 LED status indicators

<table>
<tr><th>Figure</th><th colspan="4">Description</th></tr>
<tr><td rowspan="20"> 
</td><td colspan="4">Status indicators for module functionality</td></tr>
<tr><td>LED</td><td>Color</td><td>State</td><td>Description</td></tr>
<tr><td>ERR</td><td>Red</td><td>Off</td><td>Module not supplied or ready for operation</td></tr>
<tr><td></td><td></td><td>On</td><td>Module in error mode or reset state</td></tr>
<tr><td>RDY</td><td>Green</td><td>Off</td><td>No power to module</td></tr>
<tr><td></td><td></td><td>Single flash</td><td>Mode "Reset"</td></tr>
<tr><td></td><td></td><td>Double flash</td><td>Firmware update mode</td></tr>
<tr><td></td><td></td><td>Blinking</td><td>Mode PREOPERATIONAL</td></tr>
<tr><td></td><td></td><td>On</td><td>Mode RUN</td></tr>
<tr><td colspan="4">Status indicators for X2X connection</td></tr>
<tr><td>X2Xe / X2Xr</td><td>Red (X2Xe)</td><td>Green (X2Xr)</td><td>Description</td></tr>
<tr><td></td><td>Off</td><td>Off</td><td>No power to X2X</td></tr>
<tr><td></td><td>On</td><td>On</td><td>PREOPERATIONAL: X2X Link supplied, module not initialized</td></tr>
<tr><td></td><td>Off</td><td>On</td><td>RUN: X2X Link supplied, communication OK</td></tr>
<tr><td></td><td>On</td><td>Off</td><td>X2X Link supplied, no X2X Link communication</td></tr>
<tr><td colspan="4">Status indicators for motors</td></tr>
<tr><td>LED</td><td>Color</td><td>State</td><td>Description</td></tr>
<tr><td>RUNx</td><td>Yellow</td><td>Off</td><td>Current not applied to motor 1/2</td></tr>
<tr><td></td><td></td><td>On</td><td>Current applied to motor 1/2</td></tr>
<tr><td>U/Dx</td><td>Yellow/Green</td><td>Yellow</td><td>Direction of rotation specification for motor 1/2
Direction of rotation (UP)</td></tr>
<tr><td></td><td></td><td>Green</td><td>Direction of rotation specification for motor 1/2
Opposite direction of rotation (DOWN)</td></tr>
</table>

Table 26: LED status indicators

The table above provides a description of the LED status indicators on 2-channel ACOPOSmicro stepper motor modules. 1-channel variants are equipped with only RUN LED and one U/D LED.

- 1-channel variant: RUN and U/D
- 2-channel variant: RUN1 and U/D1 for motor 1, RUN2 and U/D2 for motor 2

3.2.14 Monitoring the 24 VDC power supply

The module power supply voltage is continually monitored. Its status can be read. A "Module power supply error" occurs if the voltage falls below 18 V.

3.2.15 Monitoring the power supply

The supply voltage of power unit is monitored. Its status can be read. A "Module power supply error" occurs if the voltage (UDC) falls below 18 V or rises above 95 V.

Overvoltage cutoff

If the supply voltage on the module exceeds 95 V (e.g. through feedback during generator operation), then the motor output is switched off.

Valid for function model "Standard":

⇨ The motor output is reactivated as soon as the supply voltage is back within the valid range.

3.2.16 Overtemperature cutoff

Module temperature

If the module temperature[1)] reaches or exceeds 85°C, the following actions are performed:

- The "Overtemperature" error bit is set.
- The motor outputs are disabled.

Valid for function model "Standard":

⇨ Once the module temperature sinks to 83°C, the error bit is automatically cleared by the module and the outputs become operational again.

1) See register description "Temperature" on page 279 (for function model "Standard") and "Temperature" on page 334 (for function model "Ramp").

Heat sink temperature (temperature on the power unit):

If the temperature in the power unit[2)] reaches or exceeds 100°C, the following actions are performed:

- The "Overtemperature" error bit is set.
- The motor outputs are disabled.

Once the temperature on the power unit sinks to 98°C, the error bit is automatically cleared by the module and the outputs become operational again.

3.2.17 Switching inductive loads

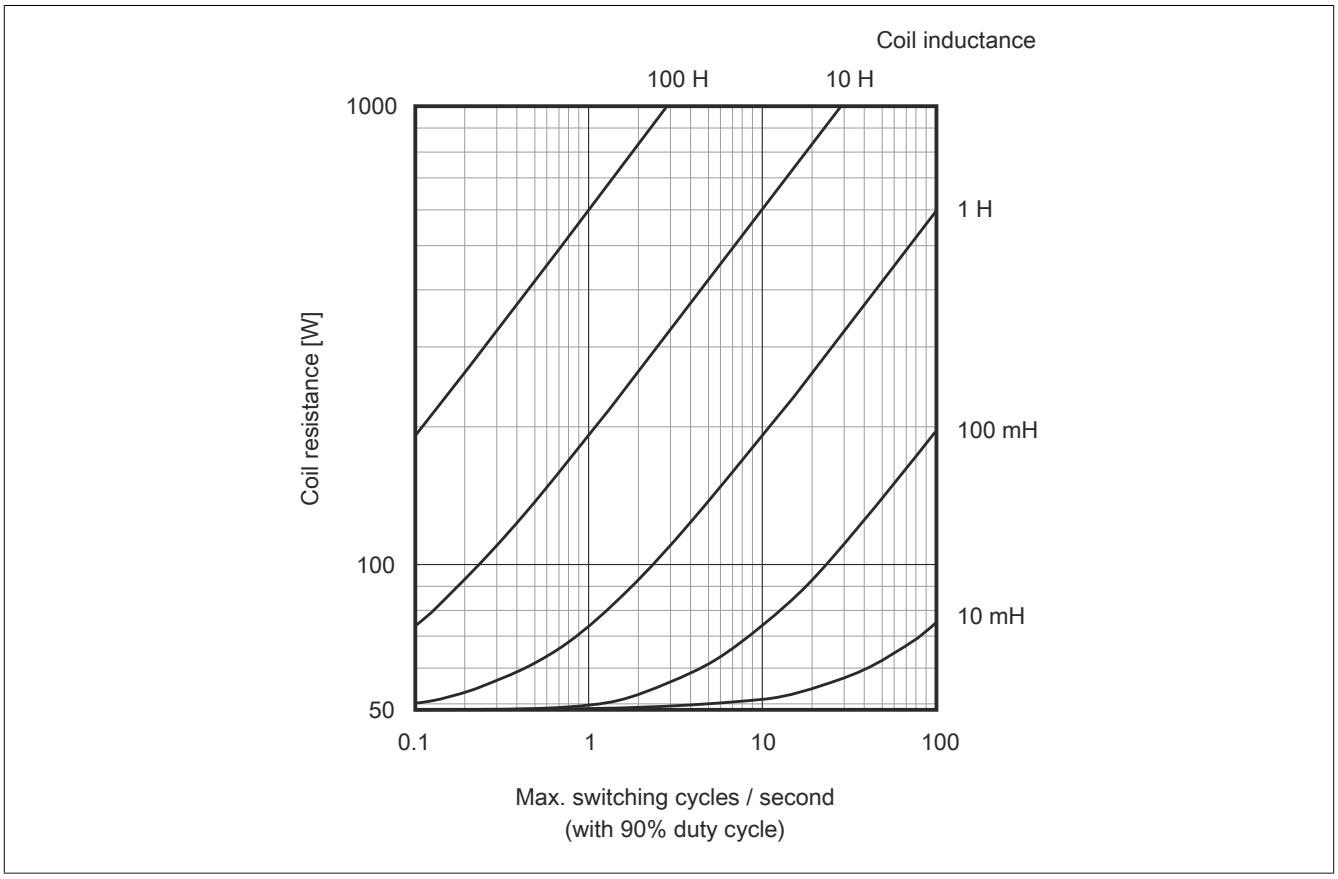


Figure 10: Additional digital inputs/outputs - Switching inductive loads

3.2.18 Power consumption

3.2.18.1 CPU power supply

The amount of power consumed by the module depends on the number of available encoder inputs:

Product ID	Stepper motor module	Power consumption
80SD100XD.C011-01	Connection for 2 stepper motors with HIPERFACE encoder, 2-phase bipolar	Max. 8 W
80SD100XD.C033-01	Connection for 2 stepper motors with SSI absolute encoder, 2-phase bipolar	Max. 8 W
80SD100XD.C044-01	Connection for 2 stepper motors with ABR incremental encoder, 2-phase bipolar	Max. 8 W
80SD100XD.C04X-13	Connection for 2 stepper motors with ABR incremental encoder, 2-phase bipolar	Max. 7 W
80SD100XD.C0XX-01	Connection for two stepper motors without encoder, 2-phase bipolar	Max. 6 W
80SD100XD.C0XX-21	Connection for two stepper motors without encoder, 2-phase bipolar	Max. 6 W
80SD100XD.W044-01	Connection for 2 stepper motors with ABR incremental encoder, 2-phase bipolar	Max. 8 W
80SD100XD.W0XX-01	Connection for two stepper motors without encoder, 2-phase bipolar	Max. 6 W
80SD100XS.C04X-01	Connection for 1 stepper motor with ABR incremental encoder, 2-phase bipolar	Max. 7 W
80SD100XS.C04X-13	Connection for 1 stepper motor with ABR incremental encoder, 2-phase bipolar	Max. 7 W
80SD100XS.C0XX-01	Connection for one stepper motor without encoder, 2-phase bipolar	Max. 6 W

2) See register description "Heat sink temperature" on page 280 (for function model "Standard") and "Temperature of the power output stage" on page 334 (for function model "Ramp").

3.2.18.2 Motor power supply

The power required to control the motor is generated externally (e.g. by the 80PS080X3.10-01 power supply module) and fed in via the power supply connection.

For more information, see section "Dimensioning" on page 211.

A power supply with secure isolation that conforms to EN 60664-1 must be used to ensure that no prohibited states result in the event of error (must be an ELV power supply with DVC A or DVC B circuit).

When using a transformer with downstream, unregulated rectification and smoothing using an electrolytic capacitor, keep in mind that the maximum output voltage DC+/DC- is greater than the output voltage of the transformer by a factor of $\sqrt{2}$ (square root of 2). In addition, voltage fluctuations from the power system also directly affect the output voltage.

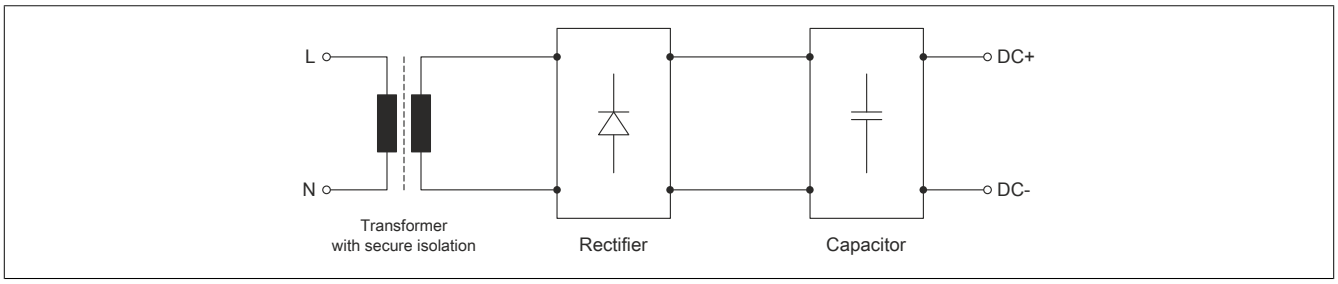


Figure 11: Transformer for motor supply

Example: 48 VAC output voltage from the transformer is rectified via a bridge connection. The output voltage increases if using ideal diodes, lossless lines and no load current:

$$48\ \mathrm{V} \cdot \sqrt{2} = 67.9\ \mathrm{VDC}$$

3.3 Inverter modules

Inverter modules from the ACOPOSmicro product family are used to control up to two servo motors. Servo motors from a wide range of 24 to 64 VDC ±25% nominal voltage and 8 A continuous current can be connected.

The inverter modules were designed for a nominal voltage of 80 VDC. The ability to withstand overvoltage up to 95 VDC also allows for increases in the DC bus voltage such as those that occur during braking procedures. This enables the ACOPOSmicro to provide additional safety.

- Motor connection: 24 to 64 VDC ±25%, nominal 8 A_{RMS}(maximum 10.6 A_{RMS})
- Switching frequency: 5, 10, 20 or 40 kHz
- Integrated motor detection (EnDat)
- Complete integration in Automation Studio and CNC applications
- Operation using PLCopen function blocks

Information:

At 40 kHz switching frequency starting at 45°C, observe current limiting of 6.5 A_{RMS}!

3.3.1 Overview

ACOPOSmicro inverter module variants cover a wide range of applications. The following variants are available:

Model number	Motor connections	Encoder	Additional inputs/outputs
80VD100PD.C000-01	2	2x EnDat 2.2 encoder	-
80VD100PD.C000-14	2	2x EnDat 2.2 encoder	2 digital outputs 1 digital input
80VD100PD.C022-01	2	2x resolver	-
80VD100PD.C022-14	2	2x resolver	2 digital outputs 1 digital input
80VD100PD.C033-01	2	2x SSI absolute encoder	-
80VD100PD.C088-01	2	2x SinCos encoder	-
80VD100PD.C144-01	2	2x incremental encoder	-
80VD100PD.C188-01	2	2x LinMot® encoder	-
80VD100PS.C00X-01	1	1x EnDat 2.2 encoder	-
80VD100PS.C02X-01	1	1x resolver	-
80VD100PS.C03X-01	1	1x SSI absolute encoder	-
80VD100PS.C08X-01	1	1x SinCos encoder	-

Table 27: Overview of available ACOPOSmicro inverter motor module variants

3.3.2 System requirements

Requirements for ACOPOSmicro inverter modules:

ACOPOSmicro	Automation Studio	ACP10 software	40 kHz switching frequency possible
80VD100PD.C000-01	3.0.81.SP3 or later	2.250 or later	Starting with hardware revision F3 and ACP10 3.150
80VD100PD.C000-14	3.0.81 SP3 or later	2.380 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PD.C022-01	3.0.81 or later	2.240 or later	Starting with hardware revision F3 and ACP10 3.150
80VD100PD.C022-14	3.0.81 SP3 or later	2.380 or later	Starting with hardware revision E3 and ACP10 3.150
80VD100PD.C033-01	3.0.90 or later	2.440 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PD.C088-01	3.0.90 or later	2.45.00 or later	Starting with hardware revision D3 and ACP10 3.150
80VD100PD.C144-01	4.1.7.61 or later	3.13 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PD.C188-01	3.0.90 or later	2.391 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PS.C00X-01	3.0.81.26 or later	2.271 or later	Starting with hardware revision E3 and ACP10 3.150
80VD100PS.C02X-01	3.0.81.28 or 3.0.81.26 or later [1]	2.271 or later	Starting with hardware revision E3 and ACP10 3.150
80VD100PS.C03X-01	3.0.90 or later	2.440 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PS.C08X-01	3.0.90 or later	2.45.00 or later	Starting with hardware revision C3 and ACP10 3.150

1 If the parameter group is added manually, see "Adding parameter groups manually" on page 365.

3.3.3 80VD100PD.C000-01

3.3.3.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PD.C000-01	ACOPOSmicro inverter module, POWERLINK interface, 2x EnDat 2.2, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks and encoder buffer battery 80XB120A2.36-00 separately!	
	Required accessories	
	Batteries	
80XB120A2.36-00	1x lithium battery, 1/2 AA 3.6 V	
	Terminal block sets	
80XVD100PD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2104.4022, 1x 0TB2102.4021, 1x 0TB2102.4022	
80XVD100PD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2104.4122-01, 1x 0TB2102.4121-01, 1x 0TB2102.4122-01	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 28: 80VD100PD.C000-01 - Order data

3.3.3.2 Technical data

Order number	80VD100PD.C000-01
Short description	
Inverter module	Connection for two servo motors with EnDat 2.2 encoder
General information	
B&R ID code	0xADF7
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - EnDat 2.2 interface	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 8 W

Table 29: 80VD100PD.C000-01 - Technical data

Order number	80VD100PD.C000-01
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	1.31 kW
Power dissipation depending on switching frequency [4]	
Switching frequency 5 kHz	$[0.24\times I_{M1}^2 + 0.216\times I_{M1} + 0.4]$ W + $[0.24\times I_{M2}^2 + 0.216\times I_{M2} + 0.4]$ W
Switching frequency 10 kHz	$[0.24\times I_{M1}^2 + 0.215\times I_{M1} + 0.8]$ W + $[0.24\times I_{M2}^2 + 0.215\times I_{M2} + 0.8]$ W
Switching frequency 20 kHz	$[0.24\times I_{M1}^2 + 0.214\times I_{M1} + 1.6]$ W + $[0.24\times I_{M2}^2 + 0.214\times I_{M2} + 1.6]$ W
Switching frequency 40 kHz	$[0.24\times I_{M1}^2 + 0.213\times I_{M1} + 3.2]$ W + $[0.24\times I_{M2}^2 + 0.213\times I_{M2} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	30 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [5]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	No
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Encoder inputs	
Quantity	2
Type	EnDat 2.2
Max. encoder cable length	25 m
Encoder power supply	
Output voltage [6]	Typ. 12.5 VDC
Load capacity	Max. 250 mA
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Synchronous serial interface	
Signal transmission	RS485
Data transfer rate	6.25 Mbit/s
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 29: 80VD100PD.C000-01 - Technical data

Order number	80VD100PD.C000-01
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < G0: 551 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < G0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [7]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	750 g
Backplane	Always mount on conductive and earthed backplane.

Table 29: 80VD100PD.C000-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
4) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
   I_{M2} ... Mean value of the currents on the axis 2 motor connection [A].
5) 40 kHz possible starting with hardware revision F3 and ACP10 V3.150
6) Depends on the supply voltage of the CPU component
7) Without heat spreader

3.3.4 80VD100PD.C000-14

3.3.4.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PD.C000-14	ACOPOSmicro inverter module, POWERLINK interface, 2x EnDat 2.2, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital input 24 VDC, sink, 2 digital outputs 24 VDC, 1 A, order terminal blocks and encoder buffer battery 80XB120A2.36-00 separately!	
	Required accessories	
	Batteries	
80XB120A2.36-00	1x lithium battery, 1/2 AA 3.6 V	
	Terminal block sets	
80XVD100PD.C0-14A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-14: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2104.4022, 1x 0TB2102.4021, 1x 0TB2102.4022, 1x 0TB1106.8010	
80XVD100PD.C0-14B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-14: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2104.4122-01, 1x 0TB2102.4121-01, 1x 0TB2102.4122-01, 1x 0TB1106.8110	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 30: 80VD100PD.C000-14 - Order data

3.3.4.2 Technical data

Order number	80VD100PD.C000-14
Short description	
Inverter module	Connection for two servo motors with EnDat 2.2 encoder
General information	
B&R ID code	0xC9DE
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - EnDat 2.2 interface	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 8 W

Table 31: 80VD100PD.C000-14 - Technical data

Order number	80VD100PD.C000-14
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	1.31 kW
Power dissipation depending on switching frequency [4]	
Switching frequency 5 kHz	$[0.24\times I_{M1}^2 + 0.216\times I_{M1} + 0.4]$ W + $[0.24\times I_{M2}^2 + 0.216\times I_{M2} + 0.4]$ W
Switching frequency 10 kHz	$[0.24\times I_{M1}^2 + 0.215\times I_{M1} + 0.8]$ W + $[0.24\times I_{M2}^2 + 0.215\times I_{M2} + 0.8]$ W
Switching frequency 20 kHz	$[0.24\times I_{M1}^2 + 0.214\times I_{M1} + 1.6]$ W + $[0.24\times I_{M2}^2 + 0.214\times I_{M2} + 1.6]$ W
Switching frequency 40 kHz	$[0.24\times I_{M1}^2 + 0.213\times I_{M1} + 3.2]$ W + $[0.24\times I_{M2}^2 + 0.213\times I_{M2} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	30 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [5]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	2
Can be used for	
Axis 1	Yes
Axis 2	Yes
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Encoder inputs	
Quantity	2
Type	EnDat 2.2
Max. encoder cable length	25 m
Encoder power supply	
Output voltage	Typ. 12.5 VDC
Load capacity	Max. 250 mA
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Synchronous serial interface	
Signal transmission	RS485
Data transfer rate	6.25 Mbit/s
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ± 25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 31: 80VD100PD.C000-14 - Technical data

Order number	80VD100PD.C000-14
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < D0: 551 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < D0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Digital inputs (option board)	
Quantity	1
Additional functions	None
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 404 µs
Falling edge	[Instant recording] Typ. 405 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Digital outputs (option board)	
Quantity	1
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Continuous current	1 A
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 31: 80VD100PD.C000-14 - Technical data

Order number	80VD100PD.C000-14
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [6]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	755 g
Backplane	Always mount on conductive and earthed backplane.

Table 31: 80VD100PD.C000-14 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
4) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
   I_{M2} ... Mean value of the currents on the axis 2 motor connection [A].
5) 40 kHz possible starting with hardware revision C3 and ACP10 V3.150
6) Without heat spreader

3.3.5 80VD100PD.C022-01

3.3.5.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PD.C022-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x resolver, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	
	Required accessories	
	Terminal block sets	
80XVD100PD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2104.4022, 1x 0TB2102.4021, 1x 0TB2102.4022	
80XVD100PD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2104.4122-01, 1x 0TB2102.4121-01, 1x 0TB2102.4122-01	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 32: 80VD100PD.C022-01 - Order data

3.3.5.2 Technical data

Order number	80VD100PD.C022-01
Short description	
Inverter module	Connection for 2 servo motors with resolver
General information	
B&R ID code	0xAB6D
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - Resolver interface	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 8 W
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A

Table 33: 80VD100PD.C022-01 - Technical data

Order number	80VD100PD.C022-01
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	1.31 kW
Power dissipation depending on switching frequency [4]	
Switching frequency 5 kHz	$[0.24\times I_{M1}^2 + 0.216\times I_{M1} + 0.4]$ W + $[0.24\times I_{M2}^2 + 0.216\times I_{M2} + 0.4]$ W
Switching frequency 10 kHz	$[0.24\times I_{M1}^2 + 0.215\times I_{M1} + 0.8]$ W + $[0.24\times I_{M2}^2 + 0.215\times I_{M2} + 0.8]$ W
Switching frequency 20 kHz	$[0.24\times I_{M1}^2 + 0.214\times I_{M1} + 1.6]$ W + $[0.24\times I_{M2}^2 + 0.214\times I_{M2} + 1.6]$ W
Switching frequency 40 kHz	$[0.24\times I_{M1}^2 + 0.213\times I_{M1} + 3.2]$ W + $[0.24\times I_{M2}^2 + 0.213\times I_{M2} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	30 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [5]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	No
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Resolver inputs	
Quantity	2
Reference output	
Output voltage	3.4 V_{eff}
Output current	Max. 50 mA_{eff}
Frequency	10 kHz
Signal transmission	Differential signal
Angular position resolution	14 bits/rev
Short circuit protection	Yes
Input impedance	10.4 kΩ - j 11.1 kΩ
Resolver transformation ratio	
BRX	0.5 (±10%)
BRT	0.5 (±10%) with limitations
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 33: 80VD100PD.C022-01 - Technical data

Order number	80VD100PD.C022-01
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < G0: 551 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < G0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [6]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	750 g
Backplane	Always mount on conductive and earthed backplane.

Table 33: 80VD100PD.C022-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
4) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
   I_{M2} ... Mean value of the currents on the axis 2 motor connection [A].
5) 40 kHz possible starting with hardware revision F3 and ACP10 V3.150
6) Without heat spreader

3.3.6 80VD100PD.C022-14

3.3.6.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PD.C022-14	ACOPOSmicro inverter module, POWERLINK interface, 2x resolver, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital input 24 VDC, sink, 2 digital outputs 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XVD100PD.C0-14A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-14: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2104.4022, 1x 0TB2102.4021, 1x 0TB2102.4022, 1x 0TB1106.8010	
80XVD100PD.C0-14B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-14: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2104.4122-01, 1x 0TB2102.4121-01, 1x 0TB2102.4122-01, 1x 0TB1106.8110	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 34: 80VD100PD.C022-14 - Order data

3.3.6.2 Technical data

Order number	80VD100PD.C022-14
Short description	
Inverter module	Connection for 2 servo motors with resolver
General information	
B&R ID code	0xCE69
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - Resolver interface	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1)]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2)]	Max. 8 W
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A

Table 35: 80VD100PD.C022-14 - Technical data

Order number	80VD100PD.C022-14
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	1.31 kW
Power dissipation depending on switching frequency [4]	
Switching frequency 5 kHz	$[0.24\times I_{M1}^2 + 0.216\times I_{M1} + 0.4]$ W + $[0.24\times I_{M2}^2 + 0.216\times I_{M2} + 0.4]$ W
Switching frequency 10 kHz	$[0.24\times I_{M1}^2 + 0.215\times I_{M1} + 0.8]$ W + $[0.24\times I_{M2}^2 + 0.215\times I_{M2} + 0.8]$ W
Switching frequency 20 kHz	$[0.24\times I_{M1}^2 + 0.214\times I_{M1} + 1.6]$ W + $[0.24\times I_{M2}^2 + 0.214\times I_{M2} + 1.6]$ W
Switching frequency 40 kHz	$[0.24\times I_{M1}^2 + 0.213\times I_{M1} + 3.2]$ W + $[0.24\times I_{M2}^2 + 0.213\times I_{M2} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	30 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [5]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	2
Can be used for	
Axis 1	Yes
Axis 2	Yes
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Resolver inputs	
Quantity	2
Reference output	
Output voltage	3.4 V_{eff}
Output current	Max. 50 mA_{eff}
Frequency	10 kHz
Signal transmission	Differential signal
Angular position resolution	14 bits/rev
Short circuit protection	Yes
Input impedance	10.4 kΩ - j 11.1 kΩ
Resolver transformation ratio	
BRX	0.5 (±10%)
BRT	0.5 (±10%) with limitations
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 35: 80VD100PD.C022-14 - Technical data

Order number	80VD100PD.C022-14
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < F0: 551 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < F0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Digital inputs (option board)	
Quantity	1
Additional functions	None
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 404 µs
Falling edge	[Instant recording] Typ. 405 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Digital outputs (option board)	
Quantity	1
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Max. switching frequency	100 Hz
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Continuous current	1 A
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 35: 80VD100PD.C022-14 - Technical data

Order number	80VD100PD.C022-14
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [6]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	750 g
Backplane	Always mount on conductive and earthed backplane.

Table 35: 80VD100PD.C022-14 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
4) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
   I_{M2} ... Mean value of the currents on the axis 2 motor connection [A].
5) 40 kHz possible starting with hardware revision E3 and ACP10 V3.150
6) Without heat spreader

3.3.7 80VD100PD.C033-01

3.3.7.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PD.C033-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x SSI absolute encoder, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	
	Required accessories	
	Terminal block sets	
80XVD100PD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2104.4022, 1x 0TB2102.4021, 1x 0TB2102.4022	
80XVD100PD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2104.4122-01, 1x 0TB2102.4121-01, 1x 0TB2102.4122-01	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 36: 80VD100PD.C033-01 - Order data

3.3.7.2 Technical data

Order number	80VD100PD.C033-01
Short description	
Inverter module	Connection for two servo motors with SSI absolute encoder
General information	
B&R ID code	0xE4DC
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [1)]	Max. 8 W
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A

Table 37: 80VD100PD.C033-01 - Technical data

Order number	80VD100PD.C033-01
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [2]	1.31 kW
Power dissipation depending on switching frequency [3]	
Switching frequency 5 kHz	$[0.24\times I_{M1}^2 + 0.216\times I_{M1} + 0.4]$ W + $[0.24\times I_{M2}^2 + 0.216\times I_{M2} + 0.4]$ W
Switching frequency 10 kHz	$[0.24\times I_{M1}^2 + 0.215\times I_{M1} + 0.8]$ W + $[0.24\times I_{M2}^2 + 0.215\times I_{M2} + 0.8]$ W
Switching frequency 20 kHz	$[0.24\times I_{M1}^2 + 0.214\times I_{M1} + 1.6]$ W + $[0.24\times I_{M2}^2 + 0.214\times I_{M2} + 1.6]$ W
Switching frequency 40 kHz	$[0.24\times I_{M1}^2 + 0.213\times I_{M1} + 3.2]$ W + $[0.24\times I_{M2}^2 + 0.213\times I_{M2} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	30 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [4]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	No
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Encoder inputs	
Quantity	2
Type	SSI absolute encoder
Max. encoder cable length	25 m
Encoder power supply	
Output voltage	5 V ±5%
Load capacity	250 mA
Synchronous serial interface	
Signal transmission	RS485
Data transfer rate	Configurable (100 to 400 kbit/s)
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < E0: 551 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}

Table 37: 80VD100PD.C033-01 - Technical data

Order number	80VD100PD.C033-01
Input capacitance	10 nF (Rev. < E0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [5]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	750 g
Backplane	Always mount on conductive and earthed backplane.

Table 37: 80VD100PD.C033-01 - Technical data

1) Includes the enable input
2) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
3) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
   I_{M2} ... Mean value of the currents on the axis 2 motor connection [A].
4) 40 kHz possible starting with hardware revision C3 and ACP10 V3.150
5) Without heat spreader

3.3.8 80VD100PD.C088-01

3.3.8.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PD.C088-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x SinCos encoder, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	
	Required accessories	
	Terminal block sets	
80XVD100PD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2104.4022, 1x 0TB2102.4021, 1x 0TB2102.4022	
80XVD100PD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2104.4122-01, 1x 0TB2102.4121-01, 1x 0TB2102.4122-01	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 38: 80VD100PD.C088-01 - Order data

3.3.8.2 Technical data

Order number	80VD100PD.C088-01
Short description	
Inverter module	Connection for two servo motors with SinCos encoder
General information	
B&R ID code	0xE4AB
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [1)]	Max. 8 W
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A

Table 39: 80VD100PD.C088-01 - Technical data

Order number	80VD100PD.C088-01
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [2]	1.31 kW
Power dissipation depending on switching frequency [3]	
Switching frequency 5 kHz	$[0.24\times I_{M1}^2 + 0.216\times I_{M1} + 0.4]$ W + $[0.24\times I_{M2}^2 + 0.216\times I_{M2} + 0.4]$ W
Switching frequency 10 kHz	$[0.24\times I_{M1}^2 + 0.215\times I_{M1} + 0.8]$ W + $[0.24\times I_{M2}^2 + 0.215\times I_{M2} + 0.8]$ W
Switching frequency 20 kHz	$[0.24\times I_{M1}^2 + 0.214\times I_{M1} + 1.6]$ W + $[0.24\times I_{M2}^2 + 0.214\times I_{M2} + 1.6]$ W
Switching frequency 40 kHz	$[0.24\times I_{M1}^2 + 0.213\times I_{M1} + 3.2]$ W + $[0.24\times I_{M2}^2 + 0.213\times I_{M2} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	30 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [4]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	No
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Encoder inputs	
Quantity	2
Type	SinCos encoder
Max. encoder cable length	25 m
Encoder power supply	
Output voltage	5 V ±5%
Load capacity	300 mA
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Sine/Cosine inputs	
Signal transmission	Differential signals, symmetrical
Signal frequency (-3 dB)	DC up to 300 kHz
Signal frequency (-5 dB)	DC up to 400 kHz
Differential voltage	0.5 to 1.25 V_{SS}
Common-mode voltage	TBD
Terminating resistor	120 Ω
ADC resolution	12-bit
Bit width of position value	14-bit [5]
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink

Table 39: 80VD100PD.C088-01 - Technical data

Order number	80VD100PD.C088-01
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < E0: 551 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < E0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Typ. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [6]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	750 g
Backplane	Always mount on conductive and earthed backplane.

Table 39: 80VD100PD.C088-01 - Technical data

1) Includes the enable input
2) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
3) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
   I_{M2} ... Mean value of the currents on the axis 2 motor connection [A].
4) 40 kHz possible starting with hardware revision D3 and ACP10 V3.150
5) This value corresponds to the minimum position resolution (SCALE_ENCOD_INCR) configured in Automation Studio.
6) Without heat spreader

3.3.9 80VD100PD.C144-01

3.3.9.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PD.C144-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x incremental encoder, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately.	
	Required accessories	
	Terminal block sets	
80XVD100PD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2104.4022, 1x 0TB2102.4021, 1x 0TB2102.4022	
80XVD100PD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2104.4122-01, 1x 0TB2102.4121-01, 1x 0TB2102.4122-01	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 40: 80VD100PD.C144-01 - Order data

3.3.9.2 Technical data

Order number	80VD100PD.C144-01
Short description	
Inverter module	Connection for two servo motors with incremental encoder
General information	
B&R ID code	0xAB6D
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - Incremental encoder	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [1)]	Max. 8 W
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A

Table 41: 80VD100PD.C144-01 - Technical data

Order number	80VD100PD.C144-01
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [2]	1.31 kW
Power dissipation depending on switching frequency [3]	
Switching frequency 5 kHz	$[0.24\times I_{M1}^2 + 0.216\times I_{M1} + 0.4]$ W + $[0.24\times I_{M2}^2 + 0.216\times I_{M2} + 0.4]$ W
Switching frequency 10 kHz	$[0.24\times I_{M1}^2 + 0.215\times I_{M1} + 0.8]$ W + $[0.24\times I_{M2}^2 + 0.215\times I_{M2} + 0.8]$ W
Switching frequency 20 kHz	$[0.24\times I_{M1}^2 + 0.214\times I_{M1} + 1.6]$ W + $[0.24\times I_{M2}^2 + 0.214\times I_{M2} + 1.6]$ W
Switching frequency 40 kHz	$[0.24\times I_{M1}^2 + 0.213\times I_{M1} + 3.2]$ W + $[0.24\times I_{M2}^2 + 0.213\times I_{M2} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	2
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	30 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [4]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	No
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Incremental encoder	
Quantity	2
Counter size	32-bit
Input frequency	Max. 200 kHz
Evaluation	4x
Signal form	Square wave pulse
Counter frequency	Max. 800 kHz
Reference frequency	Max. 200 kHz
Distance between edges	Min 0.6 µs
Inputs	A, A\, B, B\, R, R\
Differential voltage inputs A, B, R	
Minimum	2.5 V
Maximum	6 V
Load capacity of encoder power supply	350 mA at 5 VDC
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 41: 80VD100PD.C144-01 - Technical data

Order number	80VD100PD.C144-01
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < D0: 551 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < D0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [5]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	750 g
Backplane	Always mount on conductive and earthed backplane.

Table 41: 80VD100PD.C144-01 - Technical data

1) Includes the enable input
2) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
3) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
   I_{M2} ... Mean value of the currents on the axis 2 motor connection [A].
4) 40 kHz possible starting with hardware revision C3 and ACP10 V3.150
5) Without heat spreader

3.3.10 80VD100PD.C188-01

3.3.10.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PD.C188-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 2x LinMot®, 24-64 VDC ±25% power supply, 2 motor connections, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XVD100PD.C1-01A	Screw clamp terminal block set for ACOPOSmicro module 80VD100PD.C188-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2105.4031, 1x 0TB2105.4032	
80XVD100PD.C1-01B	Cage clamp terminal block set for ACOPOSmicro module 80VD100PD.C188-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2105.4131, 1x 0TB2105.4132	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 42: 80VD100PD.C188-01 - Order data

3.3.10.2 Technical data

Order number	80VD100PD.C188-01
Short description	
Inverter module	Connection for 2 servo motors with LinMot® encoder
General information	
B&R ID code	0xC2B0
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - LinMot® interface	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [1]	Max. 8 W
Power supply [2]	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	1.31 kW

Table 43: 80VD100PD.C188-01 - Technical data

Order number	80VD100PD.C188-01
Power dissipation depending on switching frequency [4]	
Switching frequency 5 kHz	$[0.24\times I_{M1}^2 + 0.216\times I_{M1} + 0.4]$ W + $[0.24\times I_{M2}^2 + 0.216\times I_{M2} + 0.4]$ W
Switching frequency 10 kHz	$[0.24\times I_{M1}^2 + 0.215\times I_{M1} + 0.8]$ W + $[0.24\times I_{M2}^2 + 0.215\times I_{M2} + 0.8]$ W
Switching frequency 20 kHz	$[0.24\times I_{M1}^2 + 0.214\times I_{M1} + 1.6]$ W + $[0.24\times I_{M2}^2 + 0.214\times I_{M2} + 1.6]$ W
Switching frequency 40 kHz	$[0.24\times I_{M1}^2 + 0.213\times I_{M1} + 3.2]$ W + $[0.24\times I_{M2}^2 + 0.213\times I_{M2} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection [2]	
Quantity	2
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak} [5]
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak} [5]
Max. current/module	30 A_{Peak} [5]
Max. phase voltage	
Linear motor	Input voltage of the power supply / $\sqrt{2}$ [6]
Rotary motor	Power supply input voltage [6]
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [7]
Max. motor line length	20 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	No
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Encoder inputs	
Quantity	2
Type	LinMot®
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < D0: 551 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < D0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink

Table 43: 80VD100PD.C188-01 - Technical data

Order number	80VD100PD.C188-01
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [8]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	780 g
Backplane	Always mount on conductive and earthed backplane.

Table 43: 80VD100PD.C188-01 - Technical data

1) Including the enable input.
2) For linear motors, the phase voltage at the motor connection is limited to:
   Input voltage of the power supply / √2.
   This results in an output voltage of approx. 56.5 VDC at the motor connection at 80 VDC input voltage.
   In addition, the switching losses of the transistors and voltage losses of the motor cable must also be taken into account!
3) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
4) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
   I_{M2} ... Mean value of the currents on the axis 2 motor connection [A].
5) If the motor voltage is increased, the maximum permitted peak current of the module is 25 A_{Peak} (There is no automatic current limiting!). In this case, the two channels are only permitted to be operated under the following restrictions:
   (a) Operate both channels with a maximum peak current of 12.5 A_{Peak}.
   (b) Or operate one channel with a maximum peak current of15 A_{Peak} and the other channel with a maximum of 10 A_{Peak}.
   The nominal current is not affected by this restriction.
6) The type of motor (linear or rotary motor) being operated by the ACOPOSmicro drive is configured via software using a Parameter ID (see the "Operation" section).
7) 40 kHz possible starting with hardware revision C3 and ACP10 V3.150
8) Without heat spreader

3.3.11 80VD100PS.C00X-01

3.3.11.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PS.C00X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x EnDat 2.2, 24-64 VDC ±25% power supply, 1 motor connection, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks and encoder buffer battery 80XB120A2.36-00 separately!	
	Required accessories	
	Batteries	
80XB120A2.36-00	1x lithium battery, 1/2 AA 3.6 V	
	Terminal block sets	
80XVD100PS.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2102.4021	
80XVD100PS.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2102.4121-01	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 44: 80VD100PS.C00X-01 - Order data

3.3.11.2 Technical data

Order number	80VD100PS.C00X-01
Short description	
Inverter module	Connection for 1 servo motor with EnDat 2.2 encoder
General information	
B&R ID code	0xB01C
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - EnDat 2.2 interface	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 8 W
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A

Table 45: 80VD100PS.C00X-01 - Technical data

Order number	80VD100PS.C00X-01
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	655 W
Power dissipation depending on switching frequency [4]	
Switching frequency 5 kHz	$[0.24 \times I_{M1}^2 + 0.216 \times I_{M1} + 0.4]$ W
Switching frequency 10 kHz	$[0.24 \times I_{M1}^2 + 0.215 \times I_{M1} + 0.8]$ W
Switching frequency 20 kHz	$[0.24 \times I_{M1}^2 + 0.214 \times I_{M1} + 1.6]$ W
Switching frequency 40 kHz	$[0.24 \times I_{M1}^2 + 0.213 \times I_{M1} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	1
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	15 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [5]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	-
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Encoder inputs	
Quantity	1
Type	EnDat 2.2
Max. encoder cable length	25 m
Encoder power supply	
Output voltage [6]	Typ. 12.5 VDC
Load capacity	Max. 250 mA
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Synchronous serial interface	
Signal transmission	RS485
Data transfer rate	6.25 Mbit/s
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 45: 80VD100PS.C00X-01 - Technical data

Order number	80VD100PS.C00X-01
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < F0: 1082 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < F0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [7]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	750 g
Backplane	Always mount on conductive and earthed backplane.

Table 45: 80VD100PS.C00X-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
4) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
5) 40 kHz possible starting with hardware revision E3 and ACP10 V3.150
6) Depends on the supply voltage of the CPU component.
7) Without heat spreader

3.3.12 80VD100PS.C02X-01

3.3.12.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PS.C02X-01	ACOPOSmicro inverter module, X2X POWERLINK interface, 1x resolver, 24-64 VDC ±25% power supply, 1 motor connection, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XVD100PS.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2102.4021	
80XVD100PS.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2102.4121-01	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 46: 80VD100PS.C02X-01 - Order data

3.3.12.2 Technical data

Order number	80VD100PS.C02X-01
Short description	
Inverter module	Connection for 1 servo motor with resolver
General information	
B&R ID code	0xAB6E
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - Resolver interface	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Functional safety [1]	Yes
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [2]	Max. 8 W
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A

Table 47: 80VD100PS.C02X-01 - Technical data

Order number	80VD100PS.C02X-01
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	655 W
Power dissipation depending on switching frequency [4]	
Switching frequency 5 kHz	$[0.24 \times I_{M1}^2 + 0.216 \times I_{M1} + 0.4]$ W
Switching frequency 10 kHz	$[0.24 \times I_{M1}^2 + 0.215 \times I_{M1} + 0.8]$ W
Switching frequency 20 kHz	$[0.24 \times I_{M1}^2 + 0.214 \times I_{M1} + 1.6]$ W
Switching frequency 40 kHz	$[0.24 \times I_{M1}^2 + 0.213 \times I_{M1} + 3.2]$ W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	1
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	15 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [5]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	-
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Resolver inputs	
Quantity	1
Reference output	
Output voltage	3.4 V_{eff}
Output current	Max. 50 mA_{eff}
Frequency	10 kHz
Signal transmission	Differential signal
Angular position resolution	14 bits/rev
Short circuit protection	Yes
Input impedance	10.4 kΩ - j 11.1 kΩ
Resolver transformation ratio	
BRX	0.5 (±10%)
BRT	0.5 (±10%) with limitations
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 47: 80VD100PS.C02X-01 - Technical data

Order number	80VD100PS.C02X-01
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < F0: 1082 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < F0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [6]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	700 g
Backplane	Always mount on conductive and earthed backplane.

Table 47: 80VD100PS.C02X-01 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Includes the enable input
3) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
4) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
5) 40 kHz possible starting with hardware revision E3 and ACP10 V3.150
6) Without heat spreader

3.3.13 80VD100PS.C03X-01

3.3.13.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PS.C03X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x SSI absolute encoder, 24-64 VDC ±25% power supply, 1 motor connection, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XVD100PS.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2102.4021	
80XVD100PS.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2102.4121-01	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 48: 80VD100PS.C03X-01 - Order data

3.3.13.2 Technical data

Order number	80VD100PS.C03X-01
Short description	
Inverter module	Connection for one servo motor with SSI absolute encoder
General information	
B&R ID code	0xE4DB
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - Resolver interface	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [1]	Max. 8 W
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [2]	655 W

Table 49: 80VD100PS.C03X-01 - Technical data

Order number	80VD100PS.C03X-01
Power dissipation depending on switching frequency [3]	
Switching frequency 5 kHz	[0.24×I_{M1}^2 + 0.216×I_{M1} + 0.4] W
Switching frequency 10 kHz	[0.24×I_{M1}^2 + 0.215×I_{M1} + 0.8] W
Switching frequency 20 kHz	[0.24×I_{M1}^2 + 0.214×I_{M1} + 1.6] W
Switching frequency 40 kHz	[0.24×I_{M1}^2 + 0.213×I_{M1} + 3.2] W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	1
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	15 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [4]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	-
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Encoder inputs	
Quantity	1
Type	SSI absolute encoder
Max. encoder cable length	25 m
Encoder power supply	
Output voltage	5 V ±5%
Load capacity	250 mA
Synchronous serial interface	
Signal transmission	RS485
Data transfer rate	Configurable (100 to 400 kbit/s)
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < D0: 1082 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < D0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2

Table 49: 80VD100PS.C03X-01 - Technical data

Order number	80VD100PS.C03X-01
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold-plate.
Dimensions [5]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	700 g
Backplane	Always mount on conductive and earthed backplane.

Table 49: 80VD100PS.C03X-01 - Technical data

1) Includes the enable input
2) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
3) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
4) 40 kHz possible starting with hardware revision C3 and ACP10 V3.150
5) Without heat spreader

3.3.14 80VD100PS.C08X-01

3.3.14.1 Order data

Order number	Short description	Figure
	Inverter modules	
80VD100PS.C08X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x Sin-Cos encoder, 24-64 VDC ±25% power supply, 1 motor connection, 8 A continuous current, 2 digital inputs 24 VDC, sink, can be used as trigger inputs, 1 digital output 24 VDC, 1 A, order terminal blocks separately!	
	Required accessories	
	Terminal block sets	
80XVD100PS.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2102.4021	
80XVD100PS.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2102.4121-01	
	Optional accessories	
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	
	Terminal blocks	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	

Table 50: 80VD100PS.C08X-01 - Order data

3.3.14.2 Technical data

Order number	80VD100PS.C08X-01
Short description	
Inverter module	Connection for one servo motor with SinCos encoder
General information	
B&R ID code	0xE4AC
Status indicators	POWERLINK, operating state, module status, motor information
Diagnostics	
Module run/error	Yes, using status LED and software
Module temperature / Cooling unit temperature	Yes, using software
Motor status	Yes, using status LED and software
POWERLINK	Yes, using status LED
Electrical isolation	
CPU - 24 VDC supply	No
CPU - Power supply	Yes
CPU - Motor connection	Yes
CPU - Digital inputs	Yes
CPU - Trigger inputs	Yes
CPU - Enable inputs	Yes
CPU - Encoder	No
CPU - Motor holding brake	No
CPU - POWERLINK	Yes
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
24 VDC supply	
Input voltage	24 VDC ±25%
Voltage monitoring	Yes
Power consumption	
CPU [1]	Max. 8 W
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [2]	665 W

Table 51: 80VD100PS.C08X-01 - Technical data

Order number	80VD100PS.C08X-01
Power dissipation depending on switching frequency [3]	
Switching frequency 5 kHz	[0.24×I_{M1}^2 + 0.216×I_{M1} + 0.4] W
Switching frequency 10 kHz	[0.24×I_{M1}^2 + 0.215×I_{M1} + 0.8] W
Switching frequency 20 kHz	[0.24×I_{M1}^2 + 0.214×I_{M1} + 1.6] W
Switching frequency 40 kHz	[0.24×I_{M1}^2 + 0.213×I_{M1} + 3.2] W
Inrush current limitation	Yes, PTC (min. 9 Ω), is bypassed during operation by means of relay contact.
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must occur externally
Reverse polarity protection	Yes
Motor connection	
Quantity	1
Nominal current	Up to 20 kHz: 8 A_{RMS} / 11.3 A_{Peak} At 40 kHz and greater than 45°C: 6.5 A_{RMS} / 9.2 A_{Peak}
Max. current/motor	10.6 A_{RMS} / 15 A_{Peak}
Max. current/module	15 A_{Peak}
Nominal switching frequency	5 kHz
Possible switching frequencies	5 / 10 / 20 / 40 kHz [4]
Max. motor line length	25 m
Controller frequency	20 kHz
DC bus capacitance	940 µF
Motor holding brake connection	
Quantity	1
Can be used for	
Axis 1	Yes
Axis 2	No
Nominal voltage	24 VDC
Continuous current	1 A
Max. internal resistance	0.3 Ω
Switching frequency	
Resistive load	100 Hz
Inductive load	See section "Switching inductive loads"
Protective measures	
Overload and short circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	<100 mA
Response threshold for undervoltage monitoring	≤23.5 V
Interfaces	
POWERLINK	
Design	RJ45 female connector
Electrical isolation	Yes
Encoder inputs	
Quantity	1
Type	SinCos encoder
Max. encoder cable length	25 m
Encoder power supply	
Output voltage	5 V ±5%
Load capacity	300 mA
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Sine/Cosine inputs	
Signal transmission	Differential signals, symmetrical
Signal frequency (-3 dB)	DC up to 300 kHz
Signal frequency (-5 dB)	DC up to 400 kHz
Differential voltage	0.5 to 1.25 V_{SS}
Common-mode voltage	TBD
Terminating resistor	120 Ω
ADC resolution	12-bit
Bit width of position value	14-bit [5]
Enable inputs	
Quantity	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 60 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC

Table 51: 80VD100PS.C08X-01 - Technical data

Order number	80VD100PS.C08X-01
Switching delay at nominal input voltage	
Enable 1 → 0, PWM off	
Maximum	500 ms (Rev. < D0: 1082 ms)
Enable 0 → 1, ready for PWM	
Maximum	500 ms
Isolation voltage between input and bus	500 V_{eff}
Input capacitance	10 nF (Rev. < D0: 100 µF)
Digital inputs / Trigger inputs	
Quantity	2
Additional functions	Can be used as trigger input
Input circuit	Sink
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	Approx. 7.5 mA
Input resistance	Approx. 3.2 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Switching delay	
Rising edge	[Instant recording] Typ. 52 µs
Falling edge	[Instant recording] Typ. 53 µs
Electrical isolation	
Input - ACOPOS	Yes, 500 V_{eff}
Input - Input	Yes, 500 V_{eff}
Modulation compared to ground potential	Max. ±38 V
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-25 to 55°C
Transport	-25 to 55°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order terminal blocks and cables separately!
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold plate
Dimensions [6]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	700 g
Backplane	Always mount on conductive and earthed backplane.

Table 51: 80VD100PS.C08X-01 - Technical data

1) Includes the enable input
2) Valid under the following conditions: DC bus voltage 80 VDC, switching frequency 5 kHz, 45°C ambient temperature.
3) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
4) 40 kHz possible starting with hardware revision C3 and ACP10 V3.150
5) This value corresponds to the minimum position resolution (SCALE_ENCOD_INCR) configured in Automation Studio.
6) Without heat spreader

3.3.15 LED status indicators

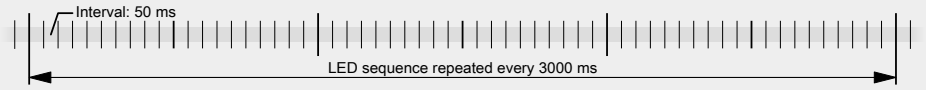
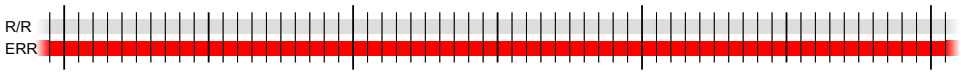
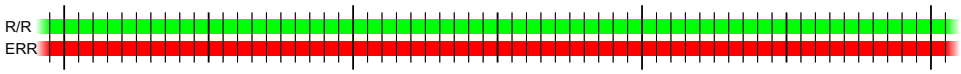
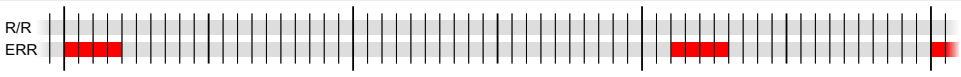
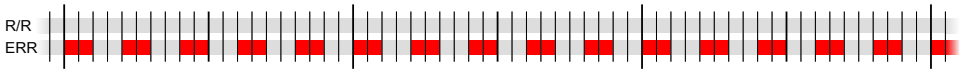
<table>
<tr><th>Figure</th><th colspan="4">Description</th></tr>
<tr><td rowspan="20"> 
</td><td colspan="4">Status indicators for module functionality</td></tr>
<tr><td>LED</td><td>Color</td><td>State</td><td>Description</td></tr>
<tr><td>ERR</td><td>Red</td><td>Off</td><td>Module not supplied or ready for operation</td></tr>
<tr><td></td><td></td><td>On</td><td>Module in error mode or reset state.
Possible causes:
• Permanent overcurrent
• Invalid data in EPROM</td></tr>
<tr><td>R/Rx</td><td>Green</td><td>Blinking
(firmware V2.25.0 or later)</td><td>The module is not ready for operation.
Possible causes:
• No signal on the enable input
• DC bus voltage outside the tolerance range
• Overtemperature on the motor (temperature sensor)
• Motor feedback not connected or defective
• Motor temperature sensor not connected or defective
• Overtemperature
• Disturbance on network</td></tr>
<tr><td></td><td></td><td>On</td><td>Mode "Ready": The module is operational and the power stage can be enabled (operating system present and booted, no permanent or temporary errors).</td></tr>
<tr><td></td><td>Yellow</td><td>On</td><td>Mode "RUN": The module's power stage is enabled.</td></tr>
<tr><td colspan="4">Status indicators for POWERLINK</td></tr>
<tr><td>LED</td><td>Color</td><td>State</td><td>Description</td></tr>
<tr><td>R/E</td><td>Red/Green</td><td>Off</td><td>Module not supplied or initialization of the network interface failed.</td></tr>
<tr><td></td><td></td><td>Solid red</td><td>The POWERLINK node number of the module is 0.</td></tr>
<tr><td></td><td></td><td>Blinking red/green</td><td>The client is in an error state (drops out of cyclic operation).</td></tr>
<tr><td></td><td></td><td>Blinking green (1x)</td><td>The client detects a valid POWERLINK frame on the network.</td></tr>
<tr><td></td><td></td><td>Blinking green (2x)</td><td>Cyclic operation on the network. The client itself is not yet in cyclic operation.</td></tr>
<tr><td></td><td></td><td>Blinking green (3x)</td><td>Cyclic operation of the client is in preparation.</td></tr>
<tr><td></td><td></td><td>Solid green</td><td>The client is participating in cyclic operation.</td></tr>
<tr><td></td><td></td><td>Flickering green</td><td>The client is not participating in cyclic operation and also does not detect any other stations on the network participating in cyclic operation.</td></tr>
<tr><td>L/D1</td><td>Green</td><td>Blinking</td><td>A connection has been established to another station on the network.</td></tr>
<tr><td></td><td></td><td>On</td><td>Activity on port 1</td></tr>
<tr><td>L/D2</td><td>Green</td><td>Blinking</td><td>A connection has been established to another station on the network.</td></tr>
<tr><td></td><td></td><td>On</td><td>Activity on port 2</td></tr>
<tr><td colspan="4">Status indicators for motors</td></tr>
<tr><td>LED</td><td>Color</td><td>State</td><td>Description</td></tr>
<tr><td>U/Dx</td><td>Yellow/Green</td><td>Yellow</td><td>Direction of rotation specification for motor 1/2
Direction of rotation (UP)</td></tr>
<tr><td></td><td></td><td>Green</td><td>Direction of rotation specification for motor 1/2
Opposite direction of rotation (DOWN)</td></tr>
</table>

Table 52: LED status indicators

The table above provides a description of the LED status indicators on 2-channel ACOPOSmicro inverter modules. 1-channel variants are equipped with only RUN LED and one U/D LED.

- 1-channel variant: R/R and U/D
- 2-channel variant: R/R1 and U/D1 for motor 1, R/R2 and U/D2 for motor 2

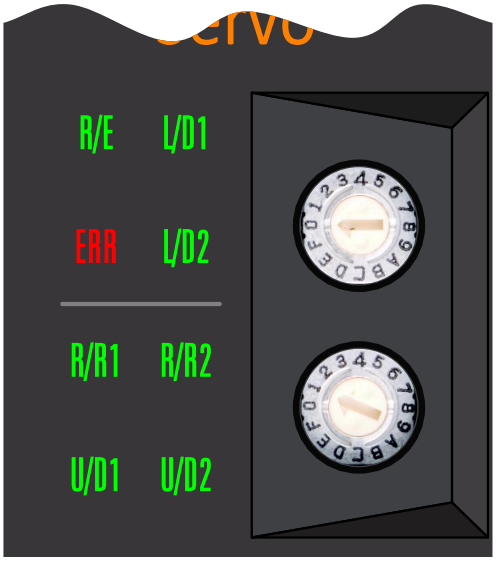
3.3.15.1 Status changes when starting up the operating system loader

Status		LED sequence
Intervals		
1.	Boot procedure for base hardware active	
2.	Network configuration active	
3.	Waiting for network telegram	
4.	Network communication active	
5.	Transferring/Burning the ACOPOSmicro operating system	

3.3.16 POWERLINK node number switches

The two hex switches (x16 top, x1 bottom) are used to set the node number.

To adjust the switches, the cover must be folded down (see additionally the figure and description under "Changing the battery" on page 111).



Information:

Node numbers changed during operation will not take effect until the ACOPOSmicro device is restarted.

3.3.17 Power consumption

3.3.17.1 CPU power supply

The amount of power consumed by the module depends on the number of available encoder inputs:

Product ID	Inverter module	Power consumption
80VD100PD.C000-01	Connection for two servo motors with EnDat 2.2 encoder	Max. 8 W
80VD100PD.C000-14	Connection for two servo motors with EnDat 2.2 encoder	Max. 8 W
80VD100PD.C022-01	Connection for 2 servo motors with resolver	Max. 8 W
80VD100PD.C022-14	Connection for 2 servo motors with resolver	Max. 8 W
80VD100PD.C033-01	Connection for two servo motors with SSI absolute encoder	Max. 8 W
80VD100PD.C088-01	Connection for two servo motors with SinCos encoder	Max. 8 W
80VD100PD.C144-01	Connection for two servo motors with incremental encoder	Max. 8 W
80VD100PD.C188-01	Connection for 2 servo motors with LinMot® encoder	Max. 8 W

Product ID	Inverter module	Power consumption
80VD100PS.C00X-01	Connection for 1 servo motor with EnDat 2.2 encoder	Max. 8 W
80VD100PS.C02X-01	Connection for 1 servo motor with resolver	Max. 8 W
80VD100PS.C03X-01	Connection for one servo motor with SSI absolute encoder	Max. 8 W
80VD100PS.C08X-01	Connection for one servo motor with SinCos encoder	Max. 8 W

3.3.17.2 Motor power supply

The power required to control the motor is generated externally (e.g. by the 80PS080X3.10-01 power supply module) and fed in via the power supply connection.

For more information, see section "Dimensioning" on page 211.

A power supply with secure isolation that conforms to EN 60664-1 must be used to ensure that no prohibited states result in the event of error (must be an ELV power supply with DVC A or DVC B circuit).

When using a transformer with downstream, unregulated rectification and smoothing using an electrolytic capacitor, keep in mind that the maximum output voltage DC+/DC- is greater than the output voltage of the transformer by a factor of √2 (square root of 2). In addition, voltage fluctuations from the power system also directly affect the output voltage.

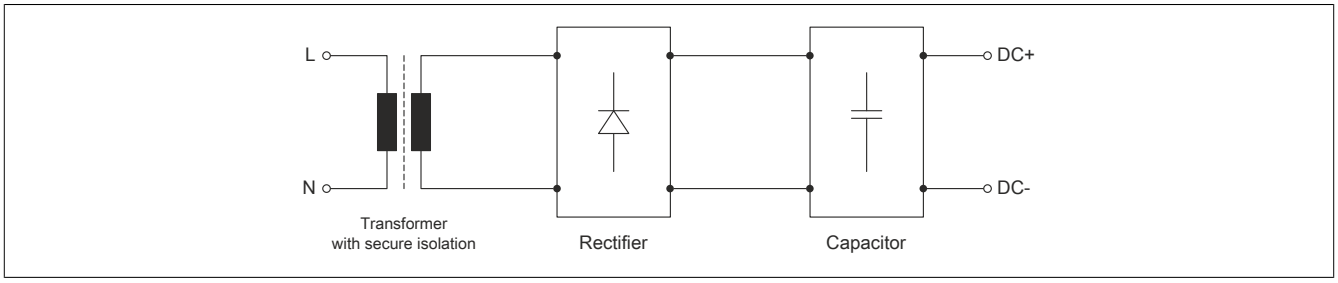


Figure 12: Transformer for motor supply

Example: 48 VAC output voltage from the transformer is rectified via a bridge connection. The output voltage increases if using ideal diodes, lossless lines and no load current:

$$48\ \mathrm{V} \cdot \sqrt{2} = 67.9\ \mathrm{VDC}$$

3.3.18 Backup battery for ACOPOSmicro with EnDat encoder inputs

3.3.18.1 Service life

The service life of the battery depends heavily on the following factors:

- Average ACOPOSmicro service life
- Number of EnDat 2.2 encoders being used

The following estimate only applies to the 80XB120A2.36-00 accessory battery available from B&R:

Number of EnDat 2.2 encoders used	ACOPOSmicro service life		
	24 VDC CPU power supply always off	24 VDC CPU power supply power at 50%	24 VDC CPU power supply always on
1	At least 3.5 years	>5 years	>5 years
2	At least 2 years	At least 3 years	>5 years

Table 53: Service life of the backup battery

Information:

Recommendation: Exchange the battery at least every 5 years, regardless of how extensively it is used.

3.3.18.2 Battery-backed (EBI) encoder

The EnDat encoder built into the 8LVA motors is a battery-backed encoder (EBI), which means revolutions are only added to the current position in increments and saved. The backup battery ensures that the encoder also registers position changes when the drive is switched off.

If the battery supply fails, the encoder is no longer able to detect position changes when the drive is switched off. As a result, there is no guarantee that the multi-turn position is correct and an alarm is registered (see "Power failure", "Faulty position value", "Battery charge too low"). The error will not be acknowledged automatically. It must be actively cleared by the user by writing the value 1 to ENCOD_CMD (par_id = 719). It will then be required to measure the multi-turn position again!

3.3.18.3 Changing the battery

The following requirements must be met for the position of the encoder position to be maintained when changing the backup battery:

- The R/E LED on the ACOPOSmicro module must be lit.
- The encoder must be connected to this ACOPOSmicro module.

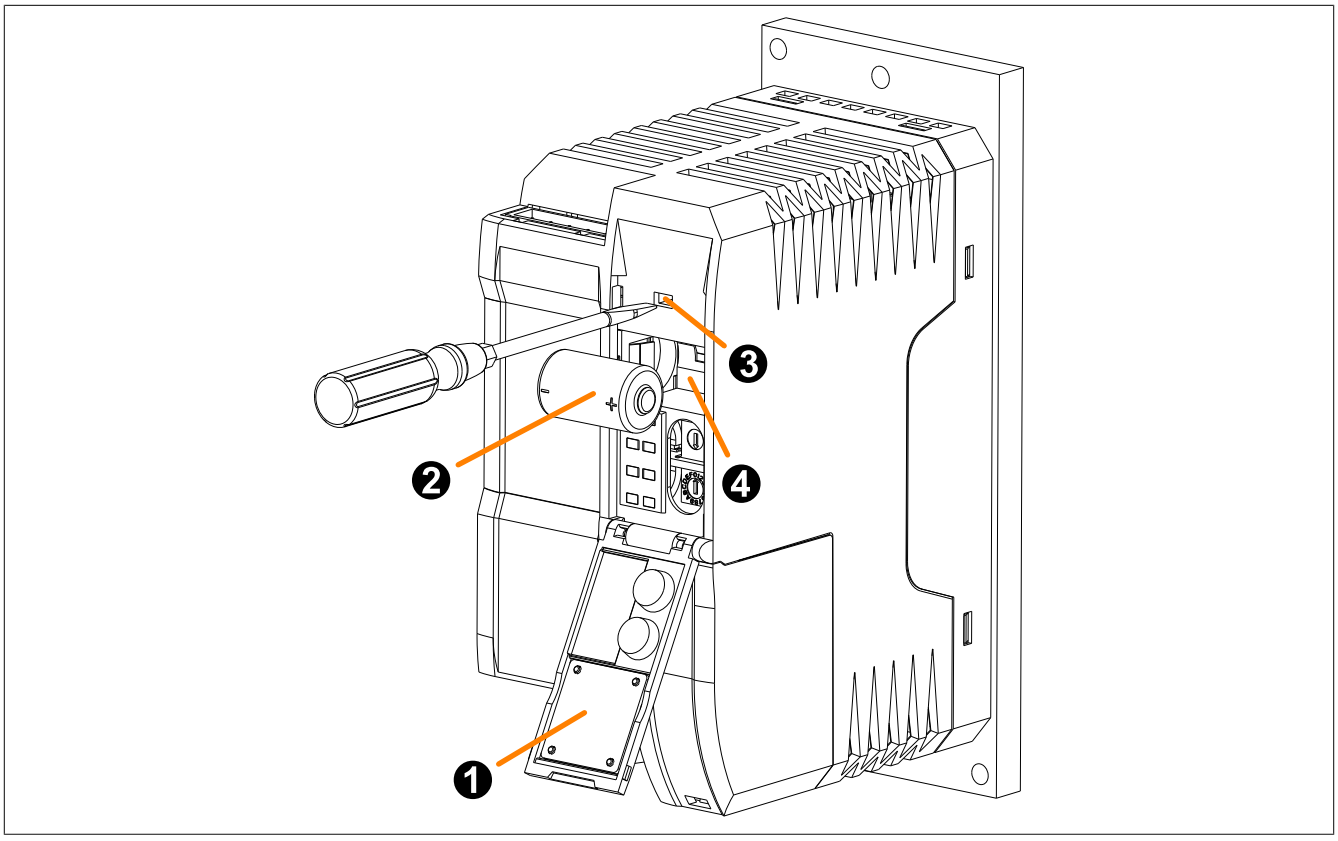
Information:

Make sure to insert the battery with correct polarity!

Used batteries must be disposed of properly!

Replacing/Inserting the backup battery

1. Open the ACOPOSmicro cover flap ❶ from top to bottom.
2. If there is already a backup battery in the module:
   - ⇨ Slide a screwdriver into the opening ❸.
   - ⇨ This will cause the battery to fall out of the battery compartment ❹.
3. Insert the new backup battery ❷ into the battery holder ❹ as shown.
4. Close the cover ❶.



3.4 Power supply module

The 80PS080X3.10-01 power supply module is equipped with integrated diagnostic options, a chopper output for connecting an external braking resistor, an additional 24 V output and the ability to connect multiple modules in parallel. The output voltage and current limiting is configurable via the fieldbus (X2X Link).

- Input: 3x 380 to 480 VAC ±10%
- Output voltage adjustable via X2X Link
- Status information readable via X2X Link
- Chopper output for connecting an external braking resistor
- 3-phase wide range input
- Closed metal housing

3.4.1 Order data

Order number	Short description	Figure
	Power supply modules	
80PS080X3.10-01	Power supply module, input 3x 380-480 VAC ±10%, power output 24-80 VDC 16.6 A (max. 1000 W), voltage output 24 VDC 2 A, X2X Link interface, integrated brake chopper, wall mounting. Order terminal blocks separately.	
	Required accessories	
	Terminal block sets	
80XPS080X3.10-01A	Screw clamp terminal block set for 80PS080X3.10-01: 1x 0TB3104-7021, 1x 0TB3104-7022, 1x 0TB3102-7010, 1x 0TB1110.8010, 1x 0TB103.3	
	Optional accessories	
	Braking resistor	
80XBR0025.010-11	Braking resistor for power supply module 80PS080X3.10-01, 2.5 Ω, 100 W	

Table 54: 80PS080X3.10-01 - Order data

For the data sheet, see www.br-automation.com.

3.4.2 Technical data

Order number	80PS080X3.10-01
General information	
B&R ID code	0xA7A9
Status LED	Yes
Electrical isolation	
Mains input - Power output	Yes
Mains input - 24 VDC	Yes
Power output - 24 VDC	No
X2X Link - Mains input	Yes
X2X Link - Power output	Yes
X2X Link - 24 VDC	Yes
Connection type	Maximum 25 m cable length to the power supply module
Certifications	
CE	Yes
KC	Yes
EAC	Yes
UL	cULus E225616 Power conversion equipment
Mains input	
Input voltage range	3x 380 to 480 VAC ±10%
Input current at full load	3x 2.2 A at 400 VAC 3x 1.8 A at 480 VAC
Frequency range of mains voltage	50 to 60 Hz ±5%
Phase failure detector	Yes
Power failure bypass	10 ms (at full load)
Power factor (cos φ)	0.72 @ 400 V 1 kW 0.69 @ 480 V 1 kW
Leakage current to PE	<3.5 mA
Protective circuit	Transient surge protection with varistor

Table 55: 80PS080X3.10-01 - Technical data

Order number	80PS080X3.10-01
Fuse protection	
Internal	Each phase internally fused (5 A)
External	External fuse required for line protection
Power output	
Output power	Max. 1000 W continuous power
Output protection	Short circuit, overload and open circuit protection
Control accuracy	±2%
Power back immunity	Yes, <100 VDC
Output voltage [1]	24 to 80 VDC
Output current	
24 to 60 VDC	Max. 16.6 A continuous current
60 to 80 VDC	Max. 16.6 to 12.5 A continuous current
Overload/Pulse capacity	
Overload current	20% overcurrent
Overload duration	2 s
Switch-on time	<5 s (does not apply during firmware update)
Parallel connection	Yes, max. 3 power supplies, for redundancy and increased power
Series connection	No
Max. capacitive load	Unlimited
24 VDC voltage output	
Voltage range	24 VDC ±10%
Output current	Max. 2 A continuous current
Output protection	Short circuit, overload and open circuit protection
Parallel connection	No
Chopper output [1]	
Response threshold for chopper activation	29 to 95 VDC (adjustable)
Overtemperature protection (chopper-internal)	Yes
Output current / Output power	
Continuous current / Continuous power	30 A
Maximum current / Maximum power	40 A
Interfaces	
User interface	
Variant	10-pin terminal block
Type	X2X Link
Min. X2X Link cycle time	250 µs
Efficiency, reliability	
Efficiency	>92%
Power dissipation	
Rated load	90 W
No-load operation	30 W
Operating conditions	
Mounting orientation	
Vertical	Yes
Ventilation/Cooling	Internally controlled fan
Degree of protection per EN 60529	IP20
Ambient conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 85°C
Transport	-25 to 85°C
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Material	Robust metal housing
Dimensions	
Width	67.5 mm
Height	257 mm
Depth	219 mm
Weight	3.75 kg

Table 55: 80PS080X3.10-01 - Technical data

1) Adjustable via X2X communication.

3.4.3 LED status indicators

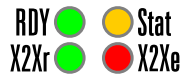
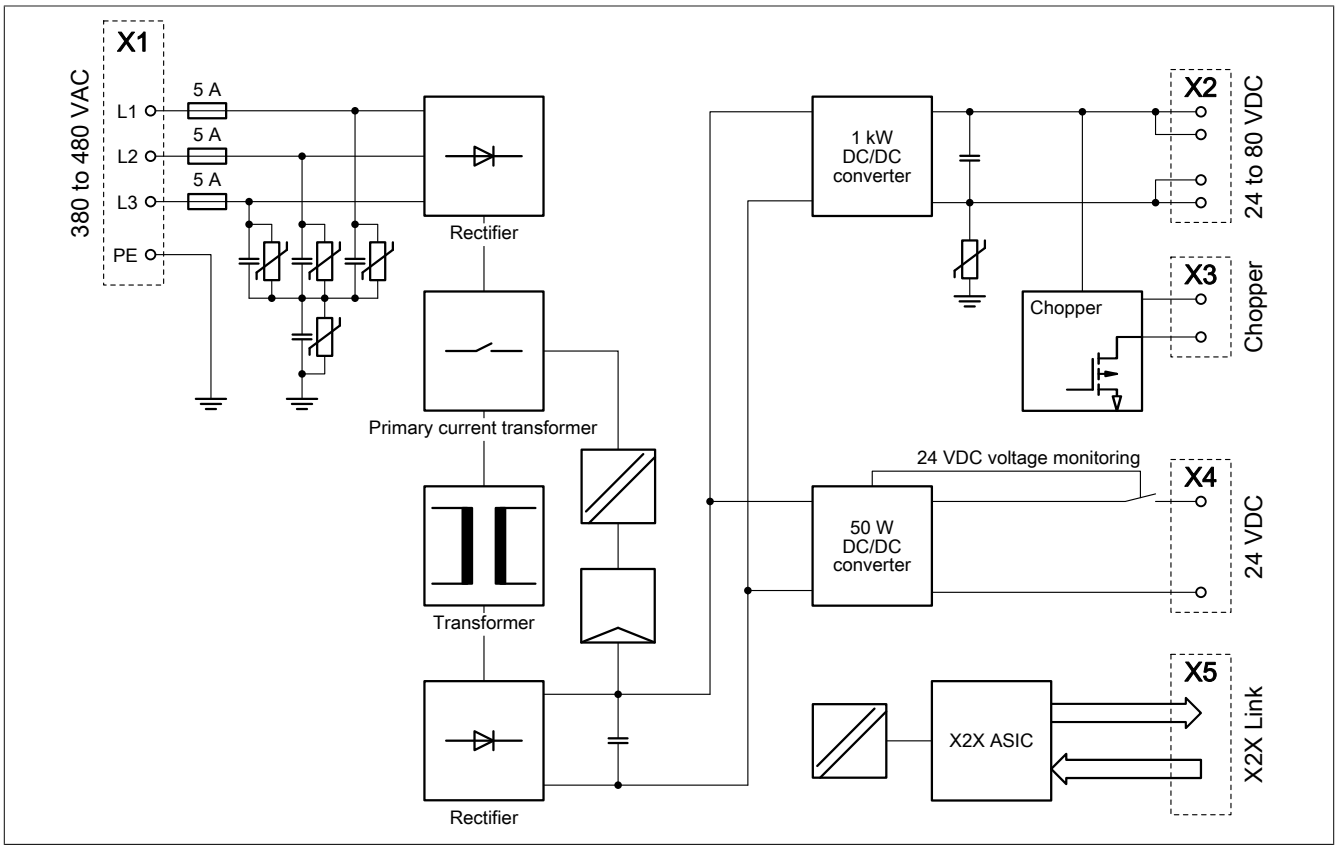
Figure	Description			
	**Status indicators for module functionality**			
	RDY	**Color**	**State**	**Description**
		Red	Off	Module not supplied or ready for operation
			On	Module in error mode or reset state
			Single flash	I/O channel warning/error, power output is off
			Double flash	24 VDC output is off
		Green	Off	No power to module
			Single flash	Mode "Reset"
			Double flash	Firmware update mode
			Blinking	Mode PREOPERATIONAL
			On	Mode RUN
	Status indicators for X2X connection			
	X2Xe / X2Xr	**Red (X2Xe)**	**Green (X2Xr)**	**Description**
		Off	Off	No power to X2X
		On	On	PREOPERATIONAL: X2X Link supplied, module not initialized
		Off	On	RUN: X2X Link supplied, communication OK
		On	Off	X2X Link supplied, no X2X Link communication
	Status indicators for motors			
	LED	**Color**	**State**	**Description**
	Stat	Orange	Off	Brake chopper off
			On	Brake chopper on

Table 56: LED status indicators

3.4.4 Block diagram



Grounding the minus port (-) of the ACOPOSmicro power supply X2 is possible.

3.4.5 Parallel operation

If more output current is required, several power supply modules can be connected together and operated in parallel. In addition, the PLC has to ensure that the same voltage is set for the connected outputs.

Enabling parallel operation keeps the load on the connected power supply modules as evenly distributed as possible. With high output currents, however, the voltage is slightly lower than the configured voltage. The reduction of the output voltage is approximately 0.2 V per A of the output current from a power supply.

Information:

Parallel operation has the following requirements:

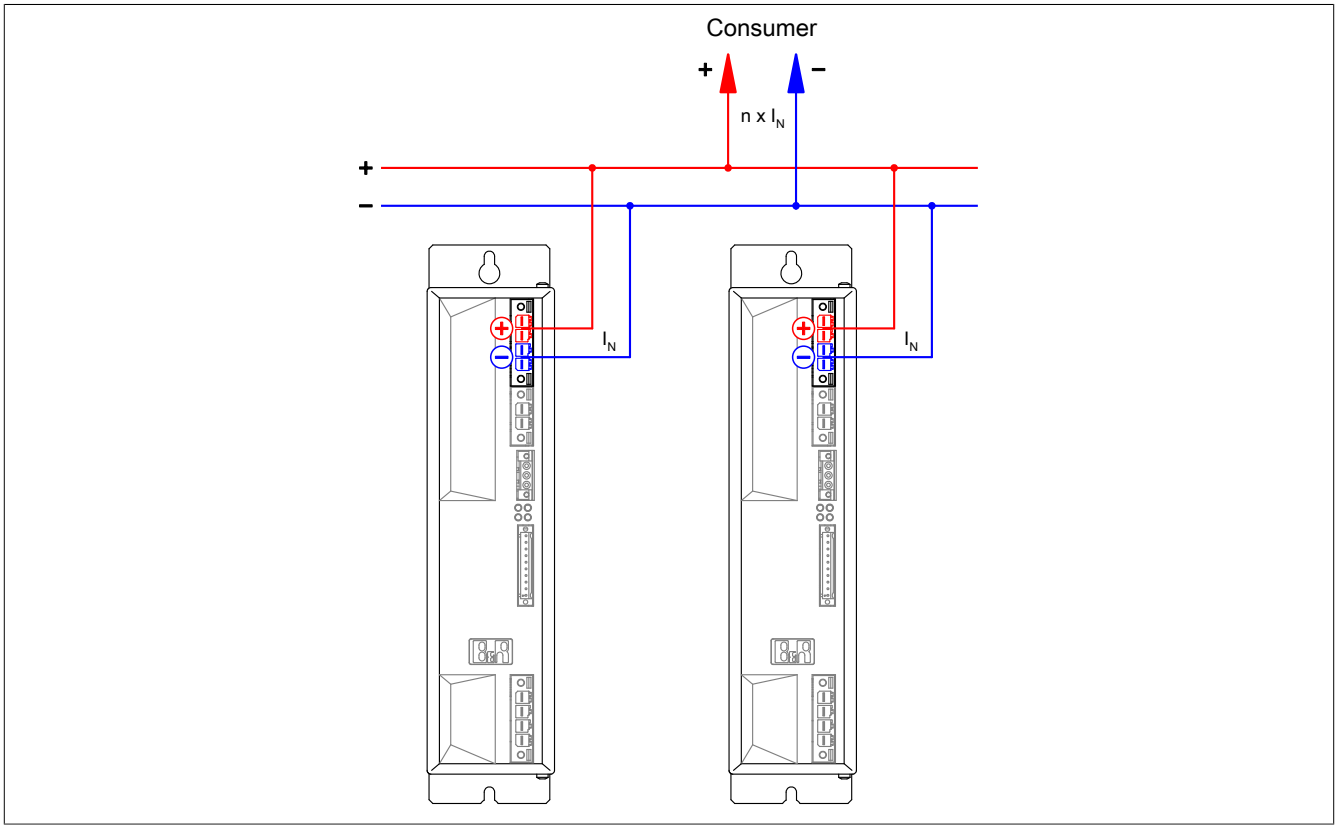
- **All power supply modules must be configured for parallel operation before the output is switched on when the voltage configuration is written.**
- **The same voltage must be set for every power supply module.**

To ensure symmetrical current distribution, we recommend connecting the power supply modules to a busbar using cables with the same length and cross section.

Increasing power

With **n** power supply modules connected in parallel, the available output current is **n x I_N**.

A parallel connection for increasing power can be implemented when extending existing systems. A parallel connection is recommended if a single power supply unit cannot cover the requirements of the most powerful consumer. Otherwise, the consumers should be distributed over several independent power supply modules.



Information:

A maximum of three (3) power supply modules can be connected in parallel!

Redundant operation

This type of parallel operation is suitable for supplying systems with particularly high requirements on operational safety. If a fault occurs in the primary circuit of the first power supply module, the other module automatically takes over the full power supply without interruption.

To achieve this, the power supply modules connected in parallel must be large enough that the total current consumption of all consumers can be fully met by a single power supply module. External decoupling diodes are required for 100% redundancy!

3.4.6 Error monitoring

3.4.6.1 Phase detection

If one of the three phases on the power mains fails, then power is no longer delivered to the power output.

3.4.6.2 Overload monitoring

Power output is monitored for overload. Short-term overload currents up to 120% of the nominal current are permitted for up to 2 s (pulse load).

If overload monitoring is enabled, the output current is limited to 90% of the nominal voltage. Acknowledging the overload error allows overload operation to be reactivated.

The power supply is designed for a nominal power of P_N = 1000 W:

- **U ≤ 60 V:**
  Overload monitoring with a constant nominal current of I_N = 16.6 A
- **60 V < U < 80 V:**
  The nominal current for overload monitoring is calculated as $I_N = P_N / U$
- **U = 80 V:**
  Overload monitoring with a constant nominal current of I_N = 12.5 A

3.4.6.2.1 Cutoff characteristic - Power output

The following cutoff characteristic applies to the power supply's output power:

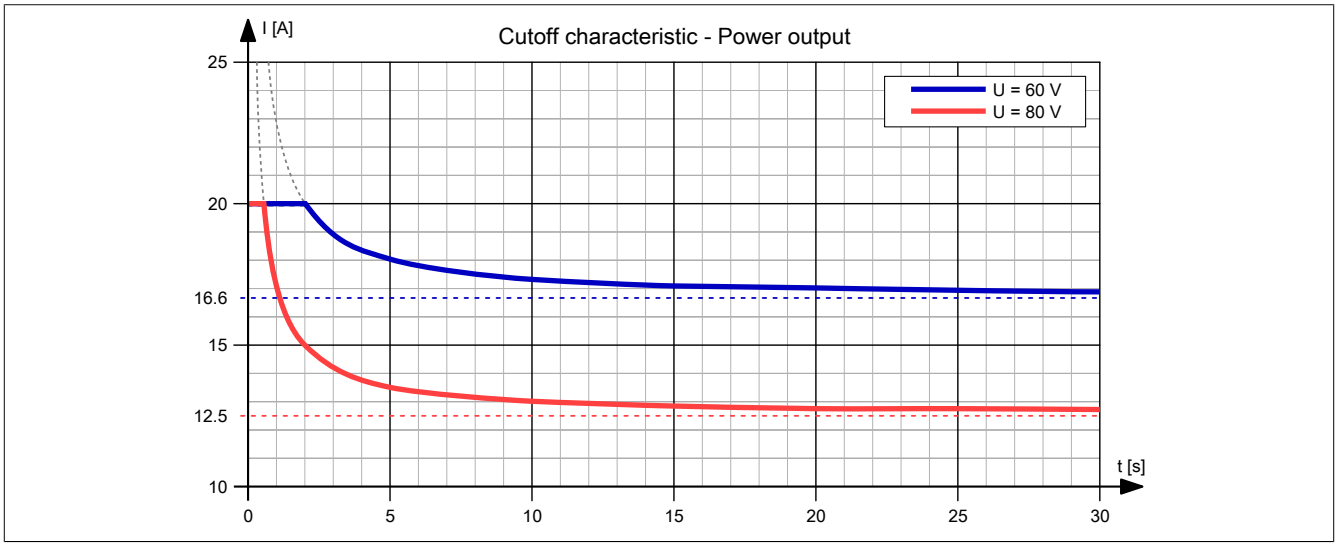


Figure 13: Cutoff characteristic - Power output

* Due to internal capacities, it is possible that more than the limited current is output.

The cutoff characteristic is limited by the maximum output current I_{max} = 20 A.

3.4.6.2.2 Output current during overload

The cutoff characteristic permits the power supply module to handle a **brief** overload:

Output voltage	Nominal output current (=100%)	120% overload for max. 2 s	Maximum overload		
			I_{max}	Overload	Max. duration
24 to 60 VDC	16.6 A	20 A	20 A	120%	2 s
60 to 80 VDC	Output current $I_N = P_N / U$	1.2 * I_N	20 A	20 A / I_N	Diagram
80 VDC	12.5 A	15 A	20 A	160%	0.57 s

Table 57: Overload characteristics

3.4.6.3 Temperature error

If the measured temperature exceeds the maximum temperature of 80°C, the power output is switched off and an error message is generated. Once the temperature drops back below 75°C, the output can be put back into operation by acknowledging the error.

3.4.6.4 Temperature model for the braking resistor

The temperature of the braking resistor is not measured, it is calculated using thermal model parameters.

The following formula applies when P_B = constant:

$$T_B = P_B \cdot R_{Bth} - (P_B \cdot R_{Bth} - T_{B0} + T_{Amb}) \cdot e^{-\left(\frac{t}{C_{Bth} \cdot R_{Bth}}\right)} + T_{Amb}$$

Legend for the formula:

T_B	... Temperature of the braking resistor	[°C]
P_B	... Power at the braking resistor	[W]
R_{Bth}	... Thermal resistance	[K/W]
C_{Bth}	... Thermal capacity	[Ws/K]
T_{Amb}	... Ambient temperature of the braking resistor	[°C]
T_{B0}	... Initial thermal load	[°C]

If the modeled braking resistor temperature (T_B) exceeds the maximum temperature (T_{Blim}), the corresponding status bit is set in the status register.

If there is a known initial load (T_{B0}) on the braking resistor, then the temperature model must be initialized with this value after startup (see the description of the register "TempLimitBleeder01" on page 373).

3.5 Accessories

3.5.1 Overview

Order number	Short description	Page
	1.5 mm² hybrid motor cable	
8CH003.1A-1	ACOPOSmicro hybrid motor cable, length 3 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH005.1A-1	ACOPOSmicro hybrid motor cable, length 5 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH007.1A-1	ACOPOSmicro hybrid motor cable, length 7 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH010.1A-1	ACOPOSmicro hybrid motor cable, length 10 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH015.1A-1	ACOPOSmicro hybrid motor cable, length 15 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH020.1A-1	ACOPOSmicro hybrid motor cable, length 20 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
8CH025.1A-1	ACOPOSmicro hybrid motor cable, length 25 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	187
	Accessories	
8BCM0003.1B470-0	8WS hybrid motor cable extension, length 3 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG+3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	197
8BCM0005.1B470-0	8WS hybrid motor cable extension, length 5 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG+3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	197
8BCM0010.1B470-0	8WS hybrid motor cable extension, length 10 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG+3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	197
8BCM0015.1B470-0	8WS hybrid motor cable extension, length 15 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG+3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	197
8BCM00X5.1B48E-0	8WS/ACOPOSmicro hybrid motor cable, length 0.5 m, ((2x(2x26AWG) + 2x24AWG)C + 3x16AWG)C, female 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	183
	Batteries	
80XB120A2.36-00	1x lithium battery, 1/2 AA 3.6 V	203
	Braking resistor	
80XBR0025.010-11	Braking resistor for power supply module 80PS080X3.10-01 2.5 Ω 100 W	200
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	201
	EnDat 2.2 cables	
8BCF0002.1221B-0	EnDat 2.2 cable, length 2 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0005.1221B-0	EnDat 2.2 cable, length 5 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0007.1221B-0	EnDat 2.2 cable, length 7 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0010.1221B-0	EnDat 2.2 cable, length 10 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0015.1221B-0	EnDat 2.2 cable, length 15 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0020.1221B-0	EnDat 2.2 cable, length 20 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
8BCF0025.1221B-0	EnDat 2.2 cable, length 25 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	174
	Hiperface encoder cables	
80CM01005.65-01	HIPERFACE encoder cable, length 1 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
80CM02005.65-01	HIPERFACE encoder cable, length 2 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
80CM03005.65-01	HIPERFACE encoder cable, length 3 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
80CM05005.65-01	HIPERFACE encoder cable, length 5 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
80CM10005.65-01	HIPERFACE encoder cable, length 10 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
80CM15005.65-01	HIPERFACE encoder cable, length 15 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
80CM20005.65-01	HIPERFACE encoder cable, length 20 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	158
	Hiperface motor cables	
80CM01001.61-01	Motor cable, length 1 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	146
80CM02001.61-01	Motor cable, length 2 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	146
80CM03001.61-01	Motor cable, length 3 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	146
80CM05001.61-01	Motor cable, length 5 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	146
80CM10001.61-01	Motor cable, length 10 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	146
80CM15001.61-01	Motor cable, length 15 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	146

Order number	Short description	Page
80CM20001.61-01	Motor cable, length 20 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	146
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	202
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	202
	Hybrid cables	
80CM01013.21-01	Hybrid cable, length 1 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	161
80CM02013.21-01	Hybrid cable, length 2 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	161
80CM03013.21-01	Hybrid cable, length 3 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	161
80CM05013.21-01	Hybrid cable, length 5 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	161
80CM10013.21-01	Hybrid cable, length 10 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	161
80CM15013.21-01	Hybrid cable, length 15 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	161
	Incremental encoder cables	
80CM01003.25-01	Incremental encoder cable, length 1 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	152
80CM02003.25-01	Incremental encoder cable, length 2 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	152
80CM03003.25-01	Incremental encoder cable, length 3 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	152
80CM05003.25-01	Incremental encoder cable, length 5 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	152
80CM10003.25-01	Incremental encoder cable, length 10 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	152
80CM15003.25-01	Incremental encoder cable, length 15 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	152
80CM20003.25-01	Incremental encoder cable, length 20 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	152
80CM25003.25-01	Incremental encoder cable, length 25 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	152
	LinMot hybrid cable	
80CM01016.77-01	ACOPOSmicro LinMot hybrid cable, length 1 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed	177
80CM01016.87-01	ACOPOSmicro LinMot hybrid cable, length 1 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed	180
80CM02016.77-01	ACOPOSmicro LinMot hybrid cable, length 2 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed	177
80CM02016.87-01	ACOPOSmicro LinMot hybrid cable, length 2 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed	180
80CM03016.77-01	ACOPOSmicro LinMot hybrid cable, length 3 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed	177
80CM03016.87-01	ACOPOSmicro LinMot hybrid cable, length 3 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed	180
80CM05016.77-01	ACOPOSmicro LinMot hybrid cable, length 5 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed	177
80CM05016.87-01	ACOPOSmicro LinMot hybrid cable, length 5 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed	180
80CM10016.77-01	ACOPOSmicro LinMot hybrid cable, length 10 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed	177
80CM10016.87-01	ACOPOSmicro LinMot hybrid cable, length 10 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed	180
80CM15016.77-01	ACOPOSmicro LinMot hybrid cable, length 15 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed	177
80CM15016.87-01	ACOPOSmicro LinMot hybrid cable, length 15 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed	180
80CM20016.77-01	ACOPOSmicro LinMot hybrid cable, length 20 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed	177
80CM20016.87-01	ACOPOSmicro LinMot hybrid cable, length 20 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed	180
	Motor cables	
80CM01001.21-01	Motor cable, length 1 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	143

Order number	Short description	Page
80CM02001.21-01	Motor cable, length 2 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	143
80CM03001.21-01	Motor cable, length 3 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	143
80CM05001.21-01	Motor cable, length 5 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	143
80CM10001.21-01	Motor cable, length 10 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	143
80CM15001.21-01	Motor cable, length 15 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	143
80CM20001.21-01	Motor cable, length 20 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	143
80CM25001.21-01	Motor cable, length 25 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	143
8BCM0002.1034C-0	Motor cable, length 2 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	164
8BCM0002.3034C-0	Motor cable, length 2 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	166
8BCM0005.1034C-0	Motor cable, 5 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in drag chains, UL/CSA listed	164
8BCM0005.3034C-0	Motor cable, length 5 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	166
8BCM0007.1034C-0	Motor cable, length 7 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	164
8BCM0007.3034C-0	Motor cable, length 7 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	166
8BCM0010.1034C-0	Motor cable, length 10 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	164
8BCM0010.3034C-0	Motor cable, length 10 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	166
8BCM0015.1034C-0	Motor cable, length 15 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	164
8BCM0015.3034C-0	Motor cable, length 15 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	166
8BCM0020.1034C-0	Motor cable, length 20 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	164
8BCM0020.3034C-0	Motor cable, length 20 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	166
8BCM0025.1034C-0	Motor cable, length 25 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	164
8BCM0025.3034C-0	Motor cable, length 25 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	166
	Motor cables 0.75 mm² SpringTec connector	
8BCM0005.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 5 m, can be used in cable drag chains, UL/CSA listed	191
8BCM0006.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 6 m, can be used in cable drag chains, UL/CSA listed	191
8BCM0007.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 7 m, can be used in cable drag chains, UL/CSA listed	191
8BCM0010.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 10 m, can be used in cable drag chains, UL/CSA listed	191
8BCM0015.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 15 m, can be used in cable drag chains, UL/CSA listed	191
8BCM0017.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 17 m, can be used in cable drag chains, UL/CSA listed	191
8BCM0020.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 20 m, can be used in cable drag chains, UL/CSA listed	191
8BCM0025.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 25 m, can be used in cable drag chains, UL/CSA listed	191
	Motor cables with brake	
80CM01002.21-01	Motor cable, length 1 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	149
80CM02002.21-01	Motor cable, length 2 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	149
80CM03002.21-01	Motor cable, length 3 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	149
80CM05002.21-01	Motor cable, length 5 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	149
80CM10002.21-01	Motor cable, length 10 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	149
80CM15002.21-01	Motor cable, length 15 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	149
80CM20002.21-01	Motor cable, length 20 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	149
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	134
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	134
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	134
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	134
X20CA0E61.00040	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.4 m	134
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	134
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	134
X20CA0E61.00150	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1.5 m	134
X20CA0E61.00200	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 2 m	134
X20CA0E61.00500	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 5 m	134
X20CA0E61.01000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 10 m	134

Order number	Short description	Page
X20CA0E61.01500	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 15 m	134
X20CA0E61.02000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 20 m	134
X20CA0E61.0300	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 30 m	137
X20CA0E61.0500	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 50 m	137
X20CA0E61.0600	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 60 m	137
X20CA0E61.1000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 100 m	137
X20CA3E61.0100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, can be used in cable drag chains, 10 m	132
X20CA3E61.0150	POWERLINK/Ethernet connection cable, RJ45 to RJ45, can be used in cable drag chains, 15 m	132
X20CA3E61.0200	POWERLINK connection cable, RJ45 to RJ45, can be used in cable drag chains, 20 m	132
	Resolver Cables SpringTec connector	
8BCR0005.11230-0	Cable extension for resolver cable with springtec connector, length 5 m, can be used in cable drag chains, UL/CSA listed	194
8BCR0007.11230-0	Cable extension for resolver cable with springtec connector, length 7 m, can be used in cable drag chains, UL/CSA listed	194
8BCR0010.11230-0	Cable extension for resolver cable with springtec connector, length 10 m, can be used in cable drag chains, UL/CSA listed	194
8BCR0015.11230-0	Cable extension for resolver cable with springtec connector, length 15 m, can be used in cable drag chains, UL/CSA listed	194
8BCR0017.11230-0	Cable extension for resolver cable with springtec connector, length 17 m, can be used in cable drag chains, UL/CSA listed	194
8BCR0020.11230-0	Cable extension for resolver cable with springtec connector, length 20 m, can be used in cable drag chains, UL/CSA listed	194
8BCR0025.11230-0	Cable extension for resolver cable with springtec connector, length 25 m, can be used in cable drag chains, UL/CSA listed	194
	Resolver cables	
8BCR0002.1121A-0	Resolver cable, length 2 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	169
8BCR0002.3121A-0	Resolver cable, length 2 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	171
8BCR0005.1121A-0	Resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	169
8BCR0005.3121A-0	Resolver cable, length 5 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	171
8BCR0007.1121A-0	Resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	169
8BCR0007.3121A-0	Resolver cable, length 7 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	171
8BCR0010.1121A-0	Resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	169
8BCR0010.3121A-0	Resolver cable, length 10 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	171
8BCR0015.1121A-0	Resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	169
8BCR0015.3121A-0	Resolver cable, length 15 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	171
8BCR0020.1121A-0	Resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	169
8BCR0020.3121A-0	Resolver cable, length 20 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	171
8BCR0025.1121A-0	Resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	169
8BCR0025.3121A-0	Resolver cable, length 25 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	171
	SSI encoder cables	
80CM01004.25-01	SSI encoder cable, length 1 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	155
80CM02004.25-01	SSI encoder cable, length 2 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	155
80CM03004.25-01	SSI encoder cable, length 3 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	155
80CM05004.25-01	SSI encoder cable, length 5 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	155
80CM10004.25-01	SSI encoder cable, length 10 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	155
80CM15004.25-01	SSI encoder cable, length 15 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	155
80CM20004.25-01	SSI encoder cable, length 20 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	155
	Terminal blocks	
0TB103.3	Accessory terminal block, 3-pin male, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	130
0TB1106.8010	Accessory terminal block, 6-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	124
0TB1106.8110	Accessory terminal block, 6-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	124
0TB1110.8010	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	125
0TB1110.8110	Accessory terminal block, 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	125

Order number	Short description	Page
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	125
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block 1.5 mm², protected against vibration by the screw flange, with labeling	125
0TB1410.8110-01	Accessory terminal block, 3x 10-pin, cage clamp terminal block 1.5 mm², protected against vibration by the screw flange, with labeling and LED	125
0TB2102.4021	Accessory terminal block, 2-pin, AX1, screw clamp terminal block 2.5 mm²	126
0TB2102.4022	Accessory terminal block, 2-pin, AX2, screw clamp terminal block 2.5 mm²	126
0TB2102.4121-01	Accessory terminal block, 2-pin, AX1, cage clamp terminal block 2.5 mm²	127
0TB2102.4122-01	Accessory terminal block, 2-pin, AX2, cage clamp terminal block 2.5 mm²	127
0TB2104.4021	Accessory terminal block, 4-pin, AX1, screw clamp terminal block 2.5 mm²	126
0TB2104.4022	Accessory terminal block, 4-pin, AX2, screw clamp terminal block 2.5 mm²	126
0TB2104.4121-01	Accessory terminal block, 4-pin, AX1, cage clamp terminal block 2.5 mm²	127
0TB2104.4122-01	Accessory terminal block, 4-pin, AX2, cage clamp terminal block 2.5 mm²	127
0TB2105.4021	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm²	126
0TB2105.4022	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm²	126
0TB2105.4031	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm², for LinMot	126
0TB2105.4032	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm², LinMot	126
0TB2105.4121-01	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm²	127
0TB2105.4122-01	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm²	127
0TB2105.4131	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm², LinMot	127
0TB2105.4132	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm², LinMot	127
0TB2105.9021	Accessory terminal block, 5-pin, DC, screw clamp terminal block 2.5 mm²	128
0TB2105.9121-01	Accessory terminal block, 5-pin, DC, cage clamp terminal block 2.5 mm²	128
0TB3102-7010	Accessory terminal block, 2-pin, screw clamp terminal block 6 mm²	129
0TB3104-7021	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled + + - -	129
0TB3104-7022	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled L1 L2 L3 PE	129
0TB710.90	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm²	130
0TB710.91	Accessory terminal block, 10-pin, cage clamp terminal block 1.5 mm²	130
	Thru-bulkhead receptacles	
8BXC004.0000-00	Signal connector, 9-pin, for motor cables with springtec connector, UL/CSA listed	203
8BXC005.0000-00	Signal connector, 12-pin, for resolver cables with springtec connector, UL/CSA listed	203
8BXC009.0000-00	Signal connector, 12-pin, for encoder cables with springtec connector, UL/CSA listed	203
	X2X Link cable	
X20CA0X48.0010	X2X Link attachment cable, open-ended on one side, 1 m	139
X20CA0X48.0020	X2X Link attachment cable, open-ended on one side, 2 m	139
X20CA0X48.0050	X2X Link attachment cable, open-ended on one side, 5 m	139
X20CA0X48.0100	X2X Link attachment cable, open-ended on one side, 10 m	139
X20CA0X48.0200	X2X Link attachment cable, open-ended on one side, 20 m	139
X20CA0X68.0003	X2X Link connection cable, 0.3 m	141
X20CA0X68.0010	X2X Link connection cable, 1 m	141
X20CA0X68.0020	X2X Link connection cable, 2 m	141
X20CA0X68.0050	X2X Link connection cable, 5 m	141
X20CA0X68.0100	X2X Link connection cable, 10 m	141

3.5.2 Terminal blocks

The following table shows an overview of the terminal blocks, their number of pins and the coding used:

Model number	Short description	Number of pins	Coding
0TB103.3	Accessory terminal block, 3-pin male, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	3 (male)	
0TB1106.8010	Accessory terminal block, 6-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	6	
0TB1106.8110	Accessory terminal block, 6-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	6	
0TB1110.8010	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	10	
0TB1110.8110	Accessory terminal block, 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	10	
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	30	
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block 1.5 mm², protected against vibration by the screw flange, with labeling	30	
0TB1410.8110-01	Accessory terminal block, 3x 10-pin, cage clamp terminal block 1.5 mm², protected against vibration by the screw flange, with labeling and LED	30	
0TB2102.4021	Accessory terminal block, 2-pin, AX1, screw clamp terminal block 2.5 mm²	2	AX1
0TB2102.4022	Accessory terminal block, 2-pin, AX2, screw clamp terminal block 2.5 mm²	2	AX2
0TB2102.4121-01	Accessory terminal block, 2-pin, AX1, cage clamp terminal block 2.5 mm²	2	AX1
0TB2102.4122-01	Accessory terminal block, 2-pin, AX2, cage clamp terminal block 2.5 mm²	2	AX2
0TB2104.4021	Accessory terminal block, 4-pin, AX1, screw clamp terminal block 2.5 mm²	4	AX1
0TB2104.4022	Accessory terminal block, 4-pin, AX2, screw clamp terminal block 2.5 mm²	4	AX2
0TB2104.4121-01	Accessory terminal block, 4-pin, AX1, cage clamp terminal block 2.5 mm²	4	AX1
0TB2104.4122-01	Accessory terminal block, 4-pin, AX2, cage clamp terminal block 2.5 mm²	4	AX2
0TB2105.4021	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm²	5	AX1
0TB2105.4022	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm²	5	AX2
0TB2105.4031	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm², for LinMot	5	AX1
0TB2105.4032	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm², LinMot	5	AX2
0TB2105.4121-01	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm²	5	AX1
0TB2105.4122-01	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm²	5	AX2
0TB2105.4131	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm², LinMot	5	AX1
0TB2105.4132	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm², LinMot	5	AX2
0TB2105.9021	Accessory terminal block, 5-pin, DC, screw clamp terminal block 2.5 mm²	5	DC
0TB2105.9121-01	Accessory terminal block, 5-pin, DC, cage clamp terminal block 2.5 mm²	5	DC
0TB3102-7010	Accessory terminal block, 2-pin, screw clamp terminal block 6 mm²	2	
0TB3104-7021	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled + + - -	4	
0TB3104-7022	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled L1 L2 L3 PE	4	
0TB710.90	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm²	10	
0TB710.91	Accessory terminal block, 10-pin, cage clamp terminal block 1.5 mm²	10	

3.5.2.1 Terminal block for connecting additional inputs/outputs

3.5.2.1.1 Order data



0TB1106.8010



0TB1106.8110

Order number	Short description
	Terminal blocks
0TB1106.8010	Accessory terminal block, 6-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange
0TB1106.8110	Accessory terminal block, 6-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange

Table 58: 0TB1106.8010, 0TB1106.8110 - Order data

3.5.2.1.2 Technical data

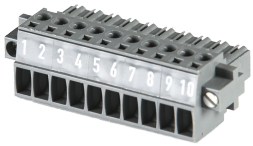
Order number	0TB1106.8010	0TB1106.8110
Terminal block		
Note	Protected against vibration by the screw flange, nominal data per UL	
Number of pins	6	
Type of terminal block	Screw clamp terminal block variant	Cage clamp terminal block variant
Cable type	Only copper wires (no aluminum wires!)	
Pitch	3.5 mm	
Connection cross section		
AWG wire	28 to 14 AWG	26 to 14 AWG
Wire end sleeves with plastic covering	0.20 to 1.50 mm²	0.20 to 1.00 mm²
Solid wires	0.20 to 1.50 mm²	
Fine-stranded wires	0.20 to 1.50 mm²	
With wire end sleeves	0.20 to 1.50 mm²	
Tightening torque	0.2 to 0.25 Nm	-
Electrical properties		
Nominal voltage	300 V	
Nominal current [1)]	10 A / contact	
Contact resistance	≤4.2 mΩ	

Table 59: 0TB1106.8010, 0TB1106.8110 - Technical data

1) The respective limit data of the I/O modules must be taken into account!

3.5.2.2 Terminal blocks for connecting the I/O and CPU power supplies

3.5.2.2.1 Order data



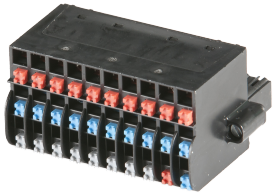
0TB1110.8010



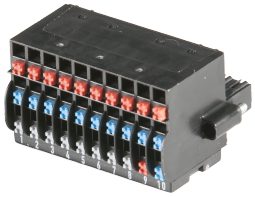
0TB1110.8110

Order number	Short description
	Terminal blocks
0TB1110.8010	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange
0TB1110.8110	Accessory terminal block, 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange

Table 60: 0TB1110.8010, 0TB1110.8110 - Order data



0TB1310.3100



0TB1310.8110



0TB1410.8110-01

Order number	Short description
	Terminal blocks
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block 1.5 mm², protected against vibration by the screw flange, with labeling
0TB1410.8110-01	Accessory terminal block, 3x 10-pin, cage clamp terminal block 1.5 mm², protected against vibration by the screw flange, with labeling and LED

Table 61: 0TB1310.3100, 0TB1310.8110, 0TB1410.8110-01 - Order data

3.5.2.2.2 Technical data

Order number	0TB1110.8010	0TB1110.8110	0TB1310.3100	0TB1310.8110	0TB1410.8110-01
General information					
Certification					
CE	Yes		-		
EAC	Product family certification		-		
UL	cULus E115267 Industrial control equipment		-		
Terminal block					
Note	Protected against vibration by the screw flange, nominal values according to UL		Nominal values according to UL	with labeling, nominal values according to UL	With LED status indicator, nominal data in accordance with UL
Number of pins	10		30		
Type of terminal block	Screw clamp terminal block	Cage clamp terminal block			
Cable type	Only copper wires (no aluminum wires!)				
Distance between contacts	3.5 mm				
Connection cross section					
AWG wire	28 to 14 AWG	26 to 14 AWG	24 to 16 AWG	22 to 16 AWG	
Wire end sleeves with plastic covering	0.20 to 1.50 mm²	0.20 to 1.00 mm²	0.20 to 0.75 mm²	0.20 to 1.50 mm²	
Solid wires	0.20 to 1.50 mm²				
Fine strand wires	0.20 to 1.50 mm²				
With wire end sleeves	0.20 to 1.50 mm²		0.20 to 1.00 mm²	0.20 to 1.50 mm²	
Tightening torque	0.2 to 0.25 Nm	-			
Electrical characteristics					
Nominal voltage	300 V				50 V
Nominal current [1]	10 A / contact		5 A / contact or busbar		
Contact resistance	≤4.2 mΩ				

Table 62: 0TB1110.8010, 0TB1110.8110, 0TB1310.3100, 0TB1310.8110, 0TB1410.8110-01 - Technical data

1) The limit data for each I/O module must be taken into consideration.

3.5.2.3 Terminal blocks for connecting motors

3.5.2.3.1 Screw clamp terminals

3.5.2.3.1.1 Order data



0TB2102.4021
0TB2102.4022



0TB2104.4021
0TB2104.4022



0TB2105.4021
0TB2105.4022



0TB2105.4031
0TB2105.4032

Order number	Short description
	Terminal blocks
0TB2102.4021	Accessory terminal block, 2-pin, AX1, screw clamp terminal block 2.5 mm²
0TB2102.4022	Accessory terminal block, 2-pin, AX2, screw clamp terminal block 2.5 mm²
0TB2104.4021	Accessory terminal block, 4-pin, AX1, screw clamp terminal block 2.5 mm²
0TB2104.4022	Accessory terminal block, 4-pin, AX2, screw clamp terminal block 2.5 mm²
0TB2105.4021	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm²
0TB2105.4022	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm²
0TB2105.4031	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm², for LinMot
0TB2105.4032	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm², LinMot

Table 63: 0TB2102.4021, 0TB2102.4022, 0TB2104.4021, 0TB2104.4022, 0TB2105.4021, 0TB2105.4022, 0TB2105.4031, 0TB2105.4032 - Order data

3.5.2.3.1.2 Technical data

Order number	0TB2102. 4021	0TB2102. 4022	0TB2104. 4021	0TB2104. 4022	0TB2105. 4021	0TB2105. 4022	0TB2105. 4031	0TB2105. 4032
Terminal block								
Note	Nominal data per UL							
Number of pins	2		4		5			
Type of terminal block	Screw clamp terminal block variant							
Cable type	Only copper wires (no aluminum wires!)							
Keying	AX1	AX2	AX1	AX2	AX1	AX2	AX1	AX2
Distance between contacts	5.08 mm							
Connection cross section								
AWG wire	26 to 12 AWG							
Wire end sleeves with plastic covering	0.25 to 2.50 mm²							
Solid wires	0.20 to 2.50 mm²							
Fine strand wires	0.20 to 2.50 mm²							
With wire end sleeves	0.20 to 2.50 mm²							
Tightening torque	0.4 to 0.5 Nm							
Electrical characteristics								
Nominal voltage	300 V							
Nominal current [1)]	15 A / contact							
Contact resistance	≤2 mΩ							

Table 64: 0TB2102.4021, 0TB2102.4022, 0TB2104.4021, 0TB2104.4022, 0TB2105.4021, 0TB2105.4022, 0TB2105.4031, 0TB2105.4032 - Technical data

1) The respective limit data of the I/O modules must be taken into account!

3.5.2.3.2 Cage clamp terminals

3.5.2.3.2.1 Order data



0TB2102.4121-01
0TB2102.4122-01



0TB2104.4121-01
0TB2104.4122-01



0TB2105.4121-01
0TB2105.4122-01



0TB2105.4131
0TB2105.4132

Order number	Short description
	Terminal blocks
0TB2102.4121-01	Accessory terminal block, 2-pin, AX1, cage clamp terminal block 2.5 mm²
0TB2102.4122-01	Accessory terminal block, 2-pin, AX2, cage clamp terminal block 2.5 mm²
0TB2104.4121-01	Accessory terminal block, 4-pin, AX1, cage clamp terminal block 2.5 mm²
0TB2104.4122-01	Accessory terminal block, 4-pin, AX2, cage clamp terminal block 2.5 mm²
0TB2105.4121-01	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm²
0TB2105.4122-01	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm²
0TB2105.4131	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm², LinMot
0TB2105.4132	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm², LinMot

Table 65: 0TB2102.4121-01, 0TB2102.4122-01, 0TB2104.4121-01, 0TB2104.4122-01, 0TB2105.4121-01, 0TB2105.4122-01, 0TB2105.4131, 0TB2105.4132 - Order data

3.5.2.3.2.2 Technical data

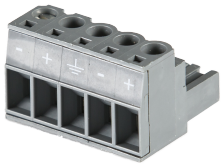
Order number	0TB2102. 4121-01	0TB2102. 4122-01	0TB2104. 4121-01	0TB2104. 4122-01	0TB2105. 4121-01	0TB2105. 4122-01	0TB2105. 4131	0TB2105. 4132
Terminal block								
Note	Nominal data per UL							
Number of pins	2		4		5			
Type of terminal block	Cage clamp terminal block variant							
Cable type	Only copper wires (no aluminum wires!)							
Keying	AX1	AX2	AX1	AX2	AX1	AX2	AX1	AX2
Distance between contacts	5.08 mm							
Connection cross section								
AWG wire	26 to 12 AWG							
Wire end sleeves with plastic covering	0.20 to 1.50 mm²							
Solid wires	0.20 to 2.50 mm²							
Fine strand wires	0.20 to 2.50 mm²							
With wire end sleeves	0.20 to 2.50 mm²							
Electrical characteristics								
Nominal voltage	300 V							
Nominal current [1)]	15 A / contact							
Contact resistance	≤5 mΩ							

Table 66: 0TB2102.4121-01, 0TB2102.4122-01, 0TB2104.4121-01, 0TB2104.4122-01, 0TB2105.4121-01, 0TB2105.4122-01, 0TB2105.4131, 0TB2105.4132 - Technical data

1) The respective limit data of the I/O modules must be taken into account!

3.5.2.4 Terminal blocks for the connection of power supply units

3.5.2.4.1 Order data



0TB2105.9021



0TB2105.9121-01

Order number	Short description
	Terminal blocks
0TB2105.9021	Accessory terminal block, 5-pin, DC, screw clamp terminal block 2.5 mm²
0TB2105.9121-01	Accessory terminal block, 5-pin, DC, cage clamp terminal block 2.5 mm²

Table 67: 0TB2105.9021, 0TB2105.9121-01 - Order data

3.5.2.4.2 Technical data

Order number	0TB2105.9021	0TB2105.9121-01
Terminal block		
Note	Nominal data per UL	
Number of pins	5	
Type of terminal block	Screw clamp terminal block variant	Cage clamp terminal block variant
Cable type	Only copper wires (no aluminum wires!)	
Keying	DC	
Distance between contacts	5.08 mm	
Connection cross section		
AWG wire	26 to 12 AWG	
Wire end sleeves with plastic covering	0.25 to 2.50 mm²	0.20 to 1.50 mm²
Solid wires	0.20 to 2.50 mm²	
Fine strand wires	0.20 to 2.50 mm²	
With wire end sleeves	0.20 to 2.50 mm²	
Tightening torque	0.4 to 0.5 Nm	-
Electrical characteristics		
Nominal voltage	300 V	
Nominal current [1)]	15 A / contact	
Contact resistance	≤2 mΩ	≤5 mΩ

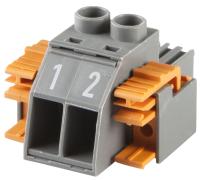
Table 68: 0TB2105.9021, 0TB2105.9121-01 - Technical data

1) The respective limit data of the I/O modules must be taken into account!

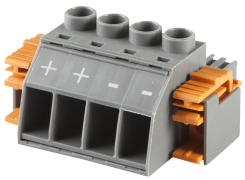
3.5.2.5 Terminal blocks for the connection of power supply modules

3.5.2.5.1 Terminal blocks with multi-function flange

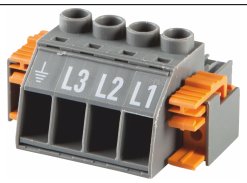
3.5.2.5.1.1 Order data



0TB3102-7010



0TB3104-7021



0TB3104-7022

Order number	Short description
	Terminal blocks
0TB3102-7010	Accessory terminal block, 2-pin, screw clamp terminal block 6 mm²
0TB3104-7021	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled + + - -
0TB3104-7022	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled L1 L2 L3 PE

Table 69: 0TB3102-7010, 0TB3104-7021, 0TB3104-7022 - Order data

3.5.2.5.1.2 Technical data

Order number	0TB3102-7010	0TB3104-7021	0TB3104-7022
Terminal block			
Note	Multi-function flange for secure, fast and tool-free locking Nominal data per UL		
Number of pins	2	4	
Type of terminal block	Screw clamp terminal block variant		
Cable type	Only copper wires (no aluminum wires!)		
Distance between contacts	7.62 mm		
Connection cross section			
AWG wire	22 to 10 AWG		
Wire end sleeves with plastic covering	0.25 to 6 mm²		
Solid wires	0.20 to 6 mm²		
Fine strand wires	0.50 to 6 mm²		
With wire end sleeves	0.25 to 6 mm²		
Tightening torque	0.5 to 0.6 Nm		
Electrical characteristics			
Nominal voltage	600 V		
Nominal current [1)]	31 A		
Contact resistance	≤4.5 mΩ		

Table 70: 0TB3102-7010, 0TB3104-7021, 0TB3104-7022 - Technical data

1) The respective limit data of the I/O modules must be taken into account!

3.5.2.5.2 Terminal blocks without multi-function flange

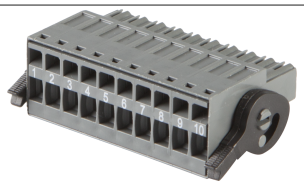
3.5.2.5.2.1 Order data



0TB103.3



0TB710.90



0TB710.91

Order number	Short description
	Terminal blocks
0TB103.3	Accessory terminal block, 3-pin male, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange
0TB710.90	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm²
0TB710.91	Accessory terminal block, 10-pin, cage clamp terminal block 1.5 mm²

Table 71: 0TB103.3, 0TB710.90, 0TB710.91 - Order data

3.5.2.5.2.2 Technical data

Order number	0TB103.3	0TB710.90	0TB710.91
General information			
Certifications			
CE		Yes	
UL	cULus E115267 Industrial control equipment	-	cULus E115267 Industrial control equipment
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta (see user's manual) FTZÚ 09 ATEX 0083X	-	
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)	-	
Terminal block			
Note	Protected against vibration by the screw flange Nominal data per UL	Mechanical removal aid Nominal data per UL	
Number of pins	3 (male)	10	
Type of terminal block	Screw clamp terminal block variant		Cage clamp terminal block variant
Cable type	Only copper wires (no aluminum wires!)		
Pitch	5.08 mm	3.5 mm	
Connection cross section			
AWG wire	26 to 14 AWG		
Wire end sleeves with plastic covering	0.20 to 1.50 mm²	0.20 to 1.00 mm²	
Solid wires	0.20 to 2.50 mm²	0.20 to 1.50 mm²	
Fine-stranded wires	0.20 to 1.50 mm²		
With wire end sleeves	0.20 to 1.50 mm²		
Electrical properties			
Nominal voltage	300 V		
Nominal current [1)]	10 A / contact		
Contact resistance	≤5 mΩ	≤4.2 mΩ	

Table 72: 0TB103.3, 0TB710.90, 0TB710.91 - Technical data

1) The respective limit data of the I/O modules must be taken into account!

3.5.2.6 Terminal block sets

To simplify the ordering process, there are terminal block sets available for each ACOPOSmicro that provide the required number of terminal blocks for the respective module.

3.5.2.6.1 Screw clamp terminal block sets

Model number	Short description
80XSD100XD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021
80XSD100XD.C0-13A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-13: 1x 0TB1110.8010, 1x 0TB1106.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021
80XSD100XD.C0-21A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-21: 1x 0TB1110.8010, 1x 0TB1106.8010, 1x 0TB2105.4021, 1x 0TB2105.4022, 1x 0TB2105.9021
80XSD100XS.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.4021, 1x 0TB2105.9021
80XSD100XS.C0-13A	Screw clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-13: 1x 0TB1110.8010, 1x 0TB1106.8010, 1x 0TB2105.4021, 1x 0TB2105.9021
80XVD100PD.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2104.4022, 1x 0TB2102.4021, 1x 0TB2102.4022
80XVD100PD.C0-14A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-14: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2104.4022, 1x 0TB2102.4021, 1x 0TB2102.4022, 1x 0TB1106.8010
80XVD100PD.C1-01A	Screw clamp terminal block set for ACOPOSmicro module 80VD100PD.C188-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2105.4031, 1x 0TB2105.4032
80XVD100PS.C0-01A	Screw clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8010, 1x 0TB2105.9021, 1x 0TB2104.4021, 1x 0TB2102.4021
80XPS080X3.10-01A	Screw clamp terminal block set for 80PS080X3.10-01: 1x 0TB3104-7021, 1x 0TB3104-7022, 1x 0TB3102-7010, 1x 0TB1110.8010, 1x 0TB103.3

3.5.2.6.2 Cage clamp terminal block sets

Model number	Short description
80XSD100XD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01
80XSD100XD.C0-13B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-13: 1x 0TB1110.8110, 1x 0TB1106.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01
80XSD100XD.C0-21B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XD.xxxx-21: 1x 0TB1110.8110, 1x 0TB1106.8110, 1x 0TB2105.4121-01, 1x 0TB2105.4122-01, 1x 0TB2105.9121-01
80XSD100XS.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.4121-01, 1x 0TB2105.9121-01
80XSD100XS.C0-13B	Cage clamp terminal block set for ACOPOSmicro modules 80SD100XS.xxxx-13: 1x 0TB1110.8110, 1x 0TB1106.8110, 1x 0TB2105.4121-01, 1x 0TB2105.9121-01
80XVD100PD.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2104.4122-01, 1x 0TB2102.4121-01, 1x 0TB2102.4122-01
80XVD100PD.C0-14B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PD.xxxx-14: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2104.4122-01, 1x 0TB2102.4121-01, 1x 0TB2102.4122-01, 1x 0TB1106.8110
80XVD100PD.C1-01B	Cage clamp terminal block set for ACOPOSmicro module 80VD100PD.C188-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2105.4131, 1x 0TB2105.4132
80XVD100PS.C0-01B	Cage clamp terminal block set for ACOPOSmicro modules 80VD100PS.xxxx-01: 1x 0TB1110.8110, 1x 0TB2105.9121-01, 1x 0TB2104.4121-01, 1x 0TB2102.4121-01

3.5.3 Cables

3.5.3.1 General information

B&R offers cables for the ACOPOSmicro drive system in the following lengths. [3)]

[3)] Custom assembly of motor cables is available on request. For custom assembly of motor cables, the connector size must be matched to the motor being used!

3.5.3.2 X20 POWERLINK cables

3.5.3.2.1 Can be used in cable drag chains

3.5.3.2.1.1 X20CA3E61.xxxx - POWERLINK cables

Order data

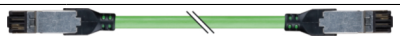
	
Order number	**Short description**
	POWERLINK/Ethernet cables
X20CA3E61.0100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, can be used in cable drag chains, 10 m
X20CA3E61.0150	POWERLINK/Ethernet connection cable, RJ45 to RJ45, can be used in cable drag chains, 15 m
X20CA3E61.0200	POWERLINK connection cable, RJ45 to RJ45, can be used in cable drag chains, 20 m

Table 73: X20CA3E61.0100, X20CA3E61.0150, X20CA3E61.0200 - Order data

Technical data

Order number	X20CA3E61.0100	X20CA3E61.0150	X20CA3E61.0200
Short description			
Accessories	-		POWERLINK/Ethernet connection cable, RJ45 to RJ45, can be used in cable drag chains, 20 m
General information			
Durability	Oil resistant in accordance with VDE 0473 part 811-2-1 (IEC 60811-2-1) Flame resistant in accordance with IEC 60332-1-2 UV resistant		Flame-retardant per IEC 60332-1-2 ROHS 2011/65/EU
Short description	POWERLINK connection cable RJ45 to RJ45, 10 m	POWERLINK connection cable RJ45 to RJ45, 15 m	-
Type	Connection cables		
Cable cross section			
AWG	4x 22 AWG		
mm²	4x 0.34 mm²		
Cable construction			
Inner jacket	-		Halogen-free, flame-retardant
Outer jacket			
Material	Polyurethane (PUR) GN		
Properties	Halogen-free		
Color	Green		
Labeling	X20CA3E61.xxxx		-
Wires			
Wire insulation	Polyethylene (PE)		
Wire colors	Red, white, yellow, blue		White, yellow, blue, orange
Shield	Aluminum-clad foil (overlapping), tinned copper braiding, 85% covering		Overlapping aluminum-clad foil, tinned copper braiding, 85% coverage
Type	Tinned copper wire AWG 22/7		Tinned copper strand 22/7 AWG
Stranding	Yellow with yellow, orange with orange, white with white, blue with blue		Complete stranding 4 wires to the star quad
Electrical properties			
Operating voltage	-		Max. 60 V for PoE
Test voltage			
Wire - Wire	-		2000 V
Conductor resistance	≤120 Ω/km at 20°C		
Transfer properties	Category 5 / Class D up to 100 MHz in accordance with ISO/IEC 11801 (EN50173-1), ISO/IEC 24702 (EN 50173-3)		Category 5 / Class D up to 100 MHz per ISO/IEC 11801 (EN 50173-1), ISO/IEC 24702 (EN 50173-3)
Transfer rate	10/100 Mbit/s		
Insulation resistance	≥500 MΩ/km at 20°C		
Operating conditions			
Degree of protection per EN 60529			
Cables	IP67		IP65
RJ45 connector	IP20, only when connected properly		IP20, only when properly connected
Ambient conditions			
Temperature			
Transport	-50 to 70°C		
Fixed installation	-25 to 60°C		-40 to 70°C
Flexible installation	-20 to 60°C		
Mechanical properties			
Dimensions			
Length	10 m	15 m	20 m
Diameter	6.5 mm ±0.2 mm		
Bend radius			
Fixed installation	-		≥3x outer diameter
Flexible installation	-		≥7x outer diameter
After installation	≥7x outer diameter		-
During installation	≥3x outer diameter		-
Drag chain data			
Acceleration	4 m/s²		
Flex cycles	Min. 3 million		
Velocity	4 m/s		
Bend radius	-		200 mm
Weight	0.061 kg/m		

Table 74: X20CA3E61.0100, X20CA3E61.0150, X20CA3E61.0200 - Technical data

3.5.3.2.2 Cannot be used in cable drag chains

3.5.3.2.2.1 X20CA0E61.xxxxx - POWERLINK cables

Order data

Order number	Short description	Figure
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00040	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.4 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
X20CA0E61.00150	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1.5 m	
X20CA0E61.00200	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 2 m	
X20CA0E61.00500	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 5 m	
X20CA0E61.01000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 10 m	
X20CA0E61.01500	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 15 m	
X20CA0E61.02000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 20 m	

Table 75: X20CA0E61.00020, X20CA0E61.00025, X20CA0E61.00030, X20CA0E61.00035, X20CA0E61.00040, X20CA0E61.00050, X20CA0E61.00100, X20CA0E61.00150, X20CA0E61.00200, X20CA0E61.00500, X20CA0E61.01000, X20CA0E61.01500, X20CA0E61.02000 - Order data

Technical data

Order number	X20CA0E61.00020	X20CA0E61.00025	X20CA0E61.00030	X20CA0E61.00035	X20CA0E61.00040	X20CA0E61.00050	X20CA0E61.00100
General information							
Durability	Flame-retardant per IEC 60332-3-24 ROHS 2002/95/EC Can be used in industrial buildings and outdoors						
Short description	POWERLINK connection cable RJ45 to RJ45						
Type	Connection cables						
Cable cross section							
AWG	4x 2x 26 AWG						
mm²	4x 2x 0.14 mm²						
Cable construction							
Inner jacket	halogen-free, flame-retardant						
Outer jacket							
Material	PVC						
Color	Black (RAL 9005)						
Labeling	B&R X20CA0E61.xxxxx						
Lines							
Wire insulation	Polyethylene (PE)						
Wire colors	Blue-white, blue, orange-white, orange, green-white, green, brown-white, brown						
Shield	Aluminum foil and braided wire shield composed of tinned copper wires						
Type	Stranded wire 26 AWG, tinned 4x 2x 26 AWG						
Stranding	Blue-white with blue, orange-white with orange, green-white with green, brown-white with brown						
Electrical characteristics							
Operating voltage	Max. 125 V						
Test voltage							
Wire/Wire	1000 V						
Conductor resistance	≤145 Ω/km at 20°C						
Transfer properties	Category 5 per EN 50288-2-2 (2004) / IEC 61156-6 (2002)						
Transfer rate	10/100 Mbit/s						
Insulation resistance	≥5 GΩ/km at 20°C						
Operating conditions							
Degree of protection per EN 60529							
Cables	IP67						
RJ45 connector	IP20, only when properly connected						
Environmental conditions							
Temperature							
Fixed installation	-40 to 80°C						
Flexible installation	-10 to 60°C						
Mechanical properties							
Dimensions							
Length	0.2 m	0.25 m	0.3 m	0.35 m	0.4 m	0.5 m	1 m
Diameter	6.7 mm ±0.2 mm						
Bend radius							
After installation	≥4x outer diameter						
During installation	≥8x outer diameter						
Weight	0.058 kg/m						

Table 76: X20CA0E61.00020, X20CA0E61.00025, X20CA0E61.00030, X20CA0E61.00035, X20CA0E61.00040, X20CA0E61.00050, X20CA0E61.00100 - Technical data

Order number	X20CA0E61.00150	X20CA0E61.00200	X20CA0E61.00500	X20CA0E61.01000	X20CA0E61.01500	X20CA0E61.02000
General information						
Durability	Flame-retardant per IEC 60332-3-24 ROHS 2002/95/EC Can be used in industrial buildings and outdoors					
Short description	POWERLINK connection cable RJ45 to RJ45					
Type	Connection cables					
Cable cross section						
AWG	4x 2x 26 AWG					
mm²	4x 2x 0.14 mm²					
Cable construction						
Inner jacket	halogen-free, flame-retardant					
Outer jacket						
Material	PVC					
Color	Black (RAL 9005)					
Labeling	B&R X20CA0E61.xxxxx					
Lines						
Wire insulation	Polyethylene (PE)					
Wire colors	Blue-white, blue, orange-white, orange, green-white, green, brown-white, brown					
Shield	Aluminum foil and braided wire shield composed of tinned copper wires					
Type	Stranded wire 26 AWG, tinned 4x 2x 26 AWG					
Stranding	Blue-white with blue, orange-white with orange, green-white with green, brown-white with brown					
Electrical characteristics						
Operating voltage	Max. 125 V					
Test voltage						
Wire/Wire	1000 V					
Conductor resistance	≤145 Ω/km at 20°C					
Transfer properties	Category 5 per EN 50288-2-2 (2004) / IEC 61156-6 (2002)					
Transfer rate	10/100 Mbit/s					
Insulation resistance	≥5 GΩ/km at 20°C					
Operating conditions						
Degree of protection per EN 60529						
Cables	IP67					
RJ45 connector	IP20, only when properly connected					
Environmental conditions						
Temperature						
Fixed installation	-40 to 80°C					
Flexible installation	-10 to 60°C					
Mechanical properties						
Dimensions						
Length	1.5 m	2 m	5 m	10 m	15 m	20 m
Diameter	6.7 mm ±0.2 mm					
Bend radius						
After installation	≥4x outer diameter					
During installation	≥8x outer diameter					
Weight	0.058 kg/m					

Table 77: X20CA0E61.00150, X20CA0E61.00200, X20CA0E61.00500, X20CA0E61.01000, X20CA0E61.01500, X20CA0E61.02000 - Technical data

3.5.3.2.2.2 X20CA0E61.xxxx - POWERLINK cables

Order data

Order number	Short description	Figure
	POWERLINK/Ethernet cables	
X20CA0E61.0300	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 30 m	
X20CA0E61.0500	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 50 m	
X20CA0E61.0600	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 60 m	
X20CA0E61.1000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 100 m	

Table 78: X20CA0E61.0300, X20CA0E61.0500, X20CA0E61.0600, X20CA0E61.1000 - Order data

Technical data

Order number	X20CA0E61.0300	X20CA0E61.0500	X20CA0E61.0600	X20CA0E61.1000
General information				
Durability	Oil resistance per VED 0473 part 811-2-1 (EN 60811-2-1) Flame-retardant per IEC 60332-1-2 UV-resistant			
Short description	POWERLINK connection cable RJ45 to RJ45, 30.0 m	POWERLINK connection cable RJ45 to RJ45, 50.0 m	POWERLINK connection cable RJ45 to RJ45, 60.0 m	POWERLINK connection cable RJ45 to RJ45, 100.0 m
Type	Connection cables			
Cable cross section				
AWG	4x 22 AWG			
mm²	4x 0.34 mm²			
Cable construction				
Outer jacket				
Material	Polyurethane (PUR) GN			
Properties	Halogen-free			
Color	Green			
Labeling	B&R X20CA0E61.xxxx			
Lines				
Wire insulation	Polyethylene (PE)			
Wire colors	White, yellow, blue, orange			
Shield	Aluminum foil and braided wire shield composed of tinned copper wires			
Type	Stranded wire 0.34 mm² (22 AWG), tinned			
Stranding	4-wire twisted pair			
Electrical characteristics				
Conductor resistance	≤120 Ω/km at 20°C			
Transfer properties	Category 5 / Class D up to 100 MHz in accordance with ISO/IEC 11801 (EN 50173-1), ISO/IEC 24702 (EN 50173-3)			
Transfer rate	10/100 Mbit/s			
Insulation resistance	≥500 MΩ/km at 20°C			
Operating conditions				
Degree of protection per EN 60529				
Cables	IP67			
RJ45 connector	IP20, only when properly connected			
Environmental conditions				
Temperature				
Transport	-50 to 70°C			
Fixed installation	-25 to 60°C			
Flexible installation	-20 to 60°C			
Mechanical properties				
Installation	Easy snap-on mounting onto the DIN rail			
Dimensions				
Length	30 m	50 m	60 m	100 m
Diameter	6.5 mm ±0.2 mm			
Bend radius				
After installation	≥7x outer diameter			
During installation	≥3x outer diameter			
Weight	0.061 kg/m			

Table 79: X20CA0E61.0300, X20CA0E61.0500, X20CA0E61.0600, X20CA0E61.1000 - Technical data

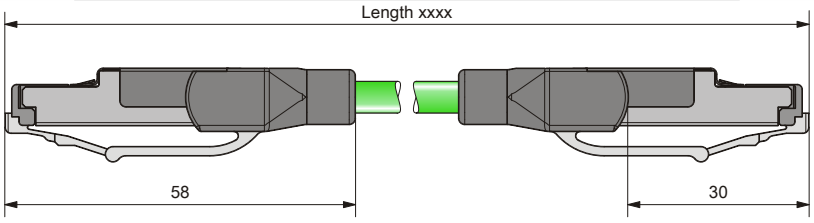
3.5.3.2.3 Wiring

3.5.3.2.3.1 X20CA0E61.xxxx and X20CA3E61.xxxx

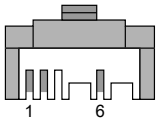
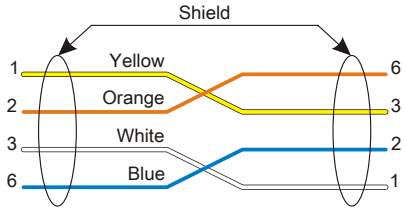
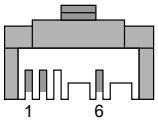
This cable is offered in 2 variants:

- X20CA0E61: Standard design
- X20CA3E61: Can be used in cable drag chains

Dimensions



Pinout

Male RJ45 connector		Male RJ45 connector
		

3.5.3.3 X2X Link cables

3.5.3.3.1 X20CA0X48.xxxx - X2X Link device attachment cables

3.5.3.3.1.1 Order data

Order number	Short description	Figure
	X2X Link cable	
X20CA0X48.0010	X2X Link attachment cable, open-ended on one side, 1 m	
X20CA0X48.0020	X2X Link attachment cable, open-ended on one side, 2 m	
X20CA0X48.0050	X2X Link attachment cable, open-ended on one side, 5 m	
X20CA0X48.0100	X2X Link attachment cable, open-ended on one side, 10 m	
X20CA0X48.0200	X2X Link attachment cable, open-ended on one side, 20 m	

Table 80: X20CA0X48.0010, X20CA0X48.0020, X20CA0X48.0050, X20CA0X48.0100, X20CA0X48.0200 - Order data

3.5.3.3.1.2 Technical data

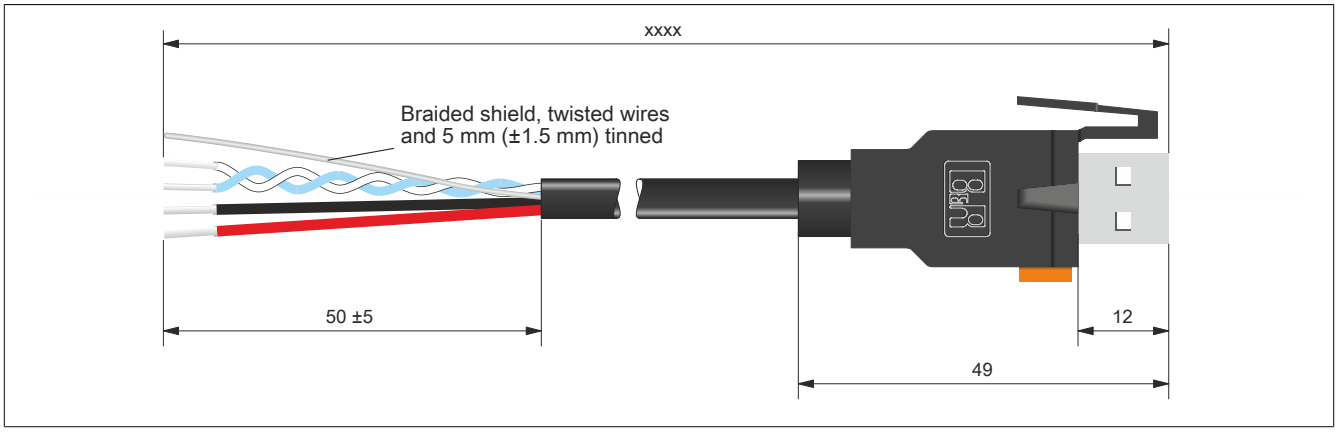
Order number	X20CA0X48.0010	X20CA0X48.0020	X20CA0X48.0050	X20CA0X48.0100	X20CA0X48.0200
General information					
Durability	Flame-retardant per VW-1 and FT1				
Nominal voltage	30 V				
Cable cross section					
Data cables					
AWG	2x 24 AWG				
mm²	2x 0.25 mm²				
Supply lines					
AWG	2x 22 AWG				
mm²	2x 0.34 mm²				
RoHS-compliant [1]	Yes				
Cable construction					
Signal lines					
Shield	Pair shielding with aluminum foil				
Stranding	Twisted pair wires				
Outer jacket					
Material	PVC				
Color	Black				
Lines					
Properties	Tinned copper stranded wire				
Wire colors					
Data cables	Blue, white				
Supply lines	Red, black				
Wire insulation					
Data cables	Polyethylene foam				
Supply lines	SR PVC				
Electrical characteristics					
Conductor resistance	24 AWG <93.2 Ω/km at 20°C, 22 AWG <55 Ω/km at 20°C				
Environmental conditions					
Temperature					
Fixed installation	-25 to 80°C				
Flexible installation	-20 to 80°C				
Mechanical properties					
Dimensions					
Length	1.0 m	2.0 m	5.0 m	10.0 m	20.0 m
Diameter	7 mm ± 0.19 mm				

Table 81: X20CA0X48.0010, X20CA0X48.0020, X20CA0X48.0050, X20CA0X48.0100, X20CA0X48.0200 - Technical data

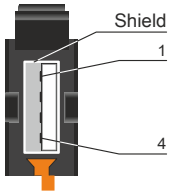
1) RoHS (Restriction of the use of certain Hazardous Substances) limits the use of the following substances in electrical and electronic devices: lead, mercury, cadmium, chrome VI as well as flame-retardant polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE).

3.5.3.3.1.3 Wiring

Dimensions



Pinout

Open-ended	Pin	Description	Wire color	Connector
for custom wiring	1	X2X+	Red	
	2	X2X\	Blue	
	3	X2X	White	
	4	X2X⊥	Black	
	Connector	SHLD	Shield	

Coding for X3A

3.5.3.3.2 X20CA0X68.xxxx - X2X Link device connection cables

3.5.3.3.2.1 Order data

Order number	Short description	Figure
	X2X Link cable	
X20CA0X68.0003	X2X Link connection cable, 0.3 m	
X20CA0X68.0010	X2X Link connection cable, 1 m	
X20CA0X68.0020	X2X Link connection cable, 2 m	
X20CA0X68.0050	X2X Link connection cable, 5 m	
X20CA0X68.0100	X2X Link connection cable, 10 m	

Table 82: X20CA0X68.0003, X20CA0X68.0010, X20CA0X68.0020, X20CA0X68.0050, X20CA0X68.0100 - Order data

3.5.3.3.2.2 Technical data

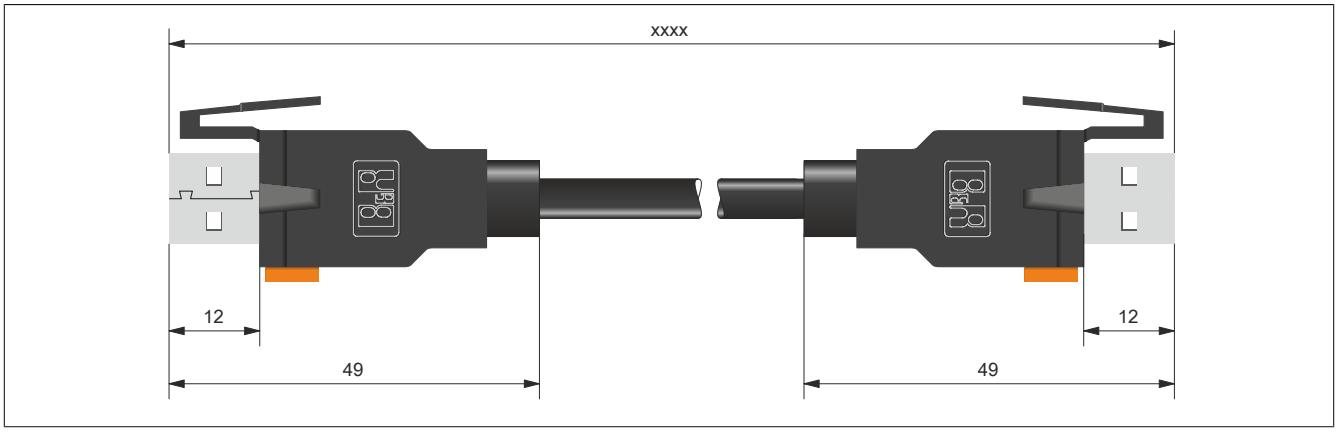
Order number	X20CA0X68.0003	X20CA0X68.0010	X20CA0X68.0020	X20CA0X68.0050	X20CA0X68.0100
General information					
Durability	Flame-retardant per VW-1 and FT1				
Nominal voltage	30 V				
Cable cross section					
Data cables					
AWG	2x 24 AWG				
mm²	2x 0.25 mm²				
Supply lines					
AWG	2x 22 AWG				
mm²	2x 0.34 mm²				
RoHS-compliant [1]	Yes				
Cable construction					
Signal lines					
Shield	Pair shielding with aluminum foil				
Stranding	Twisted pair wires				
Outer jacket					
Material	PVC				
Color	Black				
Lines					
Properties	Tinned copper stranded wire				
Wire colors					
Data cables	Blue, white				
Supply lines	Red, black				
Wire insulation					
Data cables	Polyethylene foam				
Supply lines	SR PVC				
Electrical characteristics					
Conductor resistance	24 AWG <93.2 Ω/km at 20°C, 22 AWG <55 Ω/km at 20°C				
Environmental conditions					
Temperature					
Fixed installation	-25 to 80°C				
Flexible installation	-20 to 80°C				
Mechanical properties					
Dimensions					
Length	0.3 m	1.0 m	2.0 m	5.0 m	10.0 m
Diameter	7 mm ± 0.19 mm				

Table 83: X20CA0X68.0003, X20CA0X68.0010, X20CA0X68.0020, X20CA0X68.0050, X20CA0X68.0100 - Technical data

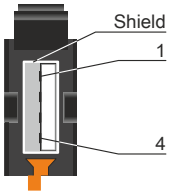
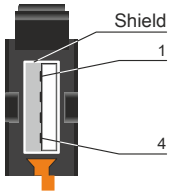
1) RoHS (Restriction of the use of certain Hazardous Substances) limits the use of the following substances in electrical and electronic devices: lead, mercury, cadmium, chrome VI as well as flame-retardant polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE).

3.5.3.3.2.3 Wiring

Dimensions



Pinout

Connector	Pin	Description	Wire color	Connector
 Coding for X3B	1	X2X+	Red	 Coding for X3A
	2	X2X\	Blue	
	3	X2X	White	
	4	X2X⊥	Black	
	Connector	SHLD	Shield	

3.5.3.4 Cables for stepper motor modules

3.5.3.4.1 Motor cable

3.5.3.4.1.1 Standard motor cable

Order data

Order number	Short description	Figure
	Motor cables	
80CM01001.21-01	Motor cable, length 1 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	
80CM02001.21-01	Motor cable, length 2 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	
80CM03001.21-01	Motor cable, length 3 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	
80CM05001.21-01	Motor cable, length 5 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	
80CM10001.21-01	Motor cable, length 10 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	
80CM15001.21-01	Motor cable, length 15 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	
80CM20001.21-01	Motor cable, length 20 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	
80CM25001.21-01	Motor cable, length 25 m, 5x 0.75 mm², 4-pin male connector on the motor side, can be used in cable drag chains, UL listed	

Table 84: 80CM01001.21-01, 80CM02001.21-01, 80CM03001.21-01, 80CM05001.21-01, 80CM10001.21-01, 80CM15001.21-01, 80CM20001.21-01, 80CM25001.21-01 - Order data

Technical data

Order number	80CM01001.21-01	80CM02001.21-01	80CM03001.21-01	80CM05001.21-01	80CM10001.21-01	80CM15001.21-01	80CM20001.21-01	80CM25001.21-01
General information								
Cable cross section	5x 0.75 mm²							
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils							
Certification	UL AWM Style 20234, 80°C, 1000 V, E63216 and CSA AWM I/II A/B, 90°C, 1000 V, FT2 LL46064							
Cable construction								
Power lines								
Quantity	5							
Wire insulation	Special thermoplastic material							
Wire colors	Black, brown, blue, gray, yellow/green							
Design	Tinned copper stranded wire							
Cross section	0.75 mm²							
Stranding	No							
Cable stranding	With filler elements and foil shield							
Complete shielding	Tinned copper braiding, optical coverage > 85% and foil shield							
Outer jacket								
Material	PUR							
Color	Orange, similar to RAL 2003 flat							
Labeling	B&R 5x0,75 FLEX UL AWM STYLE 20234 80°C 1000 V E63216 CSA AWM I/II A/B 90°C 1000 V FT2 LL46064							
Electrical characteristics								
Test voltage								
Wire/Wire	3 kV							
Wire/Shield	3 kV							
Conductor resistance								
Power lines	≤29 Ω/km							
Insulation resistance	>200 MΩ/km							
Current-carrying capacity per DIN VDE 0298 part 4, table 11								
Wall mounting	13 A							
Installed in conduit or cable duct	11.5 A							
Installed in cable tray	13.5 A							
Environmental conditions								
Temperature								
Moving	-10 to 70°C							
Static	-20 to 90°C							
Mechanical properties								
Dimensions								
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m	25 m
Diameter	8.5 mm ±0.3 mm							
Bend radius								
Single bend	>34 mm							
Moving	≥85 mm							
Drag chain data								
Acceleration	<60 m/s²							
Flex cycles [1)]	≥3,000,000							
Speed	≤4 m/s							
Weight	0.128 kg/m							

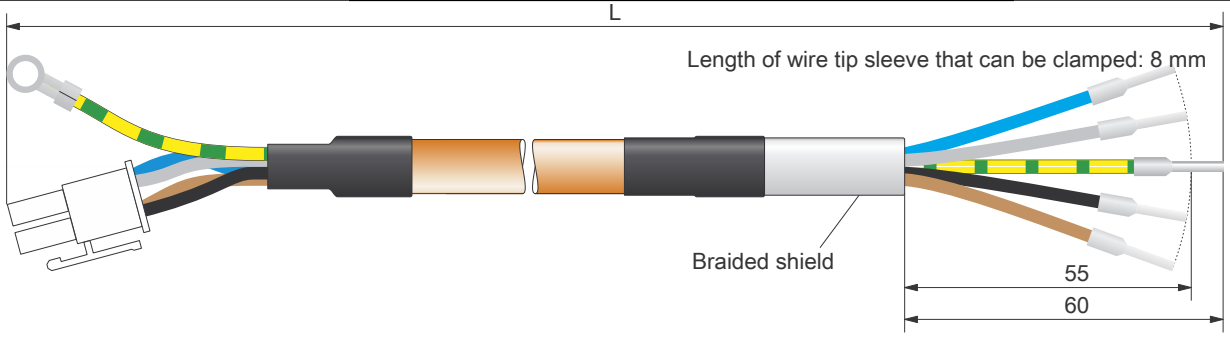
Table 85: 80CM01001.21-01, 80CM02001.21-01, 80CM03001.21-01, 80CM05001.21-01, 80CM10001.21-01, 80CM15001.21-01, 80CM20001.21-01, 80CM25001.21-01 - Technical data

1) At an ambient temperature of 20°C and bend radius of 125 mm.

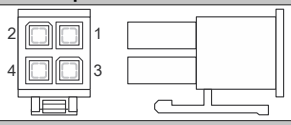
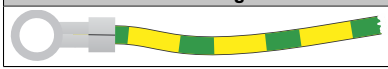
Wiring

Pinout

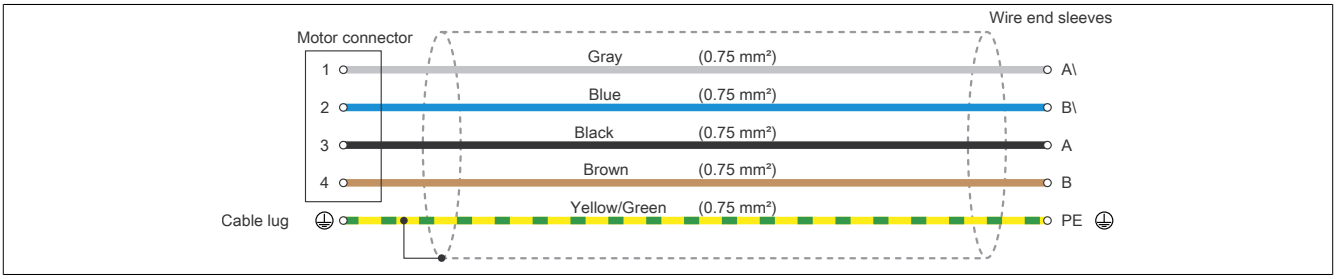
Dimensions



Pinout

4-pin terminal block	Pin	Description	Wire colors	Open-ended
	1	A\	Gray	For custom wiring Connection to drive system
	2	B\	Blue	
	3	A	Black	
	4	B	Brown	
Cable lug	**Pin**	**Description**	**Wire colors**	
	-	PE wire / Shield	Yellow/Green	

Cable lengths (L)	
Model number	**Length [m]**
80CM**01**001.21-01	1
80CM**02**001.21-01	2
80CM**03**001.21-01	3
80CM**05**001.21-01	5
80CM**10**001.21-01	10
80CM**15**001.21-01	15
80CM**20**001.21-01	20
80CM**25**001.21-01	25



3.5.3.4.1.2 Motor cable HIPERFACE

Order data

Order number	Short description	Figure
	Hiperface motor cables	
80CM01001.61-01	Motor cable, length 1 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	
80CM02001.61-01	Motor cable, length 2 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	
80CM03001.61-01	Motor cable, length 3 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	
80CM05001.61-01	Motor cable, length 5 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	
80CM10001.61-01	Motor cable, length 10 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	
80CM15001.61-01	Motor cable, length 15 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	
80CM20001.61-01	Motor cable, length 20 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoder, springtec connector on the motor side, can be used in cable drag chains, UL listed	

Table 86: 80CM01001.61-01, 80CM02001.61-01, 80CM03001.61-01, 80CM05001.61-01, 80CM10001.61-01, 80CM15001.61-01, 80CM20001.61-01 - Order data

Technical data

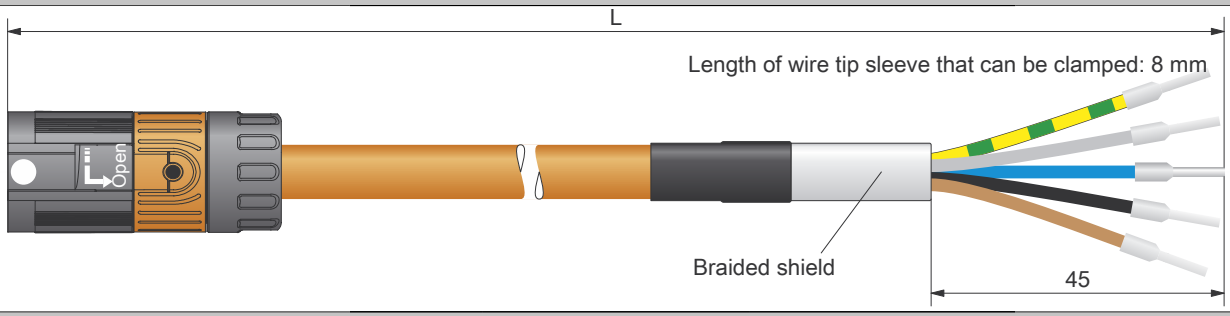
Order number	80CM01001.61-01	80CM02001.61-01	80CM03001.61-01	80CM05001.61-01	80CM10001.61-01	80CM15001.61-01	80CM20001.61-01
General information							
Cable cross section	5x 0.75 mm²						
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils						
Certification	UL AWM Style 20234, 80°C, 1000 V, E63216 and CSA AWM I/II A/B, 90°C, 1000 V, FT2 LL46064						
Cable construction							
Power lines							
Quantity	5						
Wire insulation	Special thermoplastic material						
Wire colors	Black, brown, blue, gray, yellow/green						
Design	Tinned copper stranded wire						
Cross section	0.75 mm²						
Shield	No						
Stranding	No						
Cable stranding	With filler elements and foil shield						
Complete shielding	Tinned copper braiding, optical coverage > 85% and foil shield						
Outer jacket							
Material	PUR						
Color	Orange, similar to RAL 2003 flat						
Labeling	B&R 5x0,75 FLEX UL AWM STYLE 20234 80°C 1000 V E63216 CSA AWM I/II A/B 90°C 1000 V FT2 LL46064						
Electrical characteristics							
Test voltage							
Wire/Wire	3 kV						
Wire/Shield	3 kV						
Conductor resistance							
Power lines	≤29 Ω/km						
Insulation resistance	>200 MΩ/km						
Current-carrying capacity per DIN VDE 0298 part 4, table 11							
Wall mounting	13 A						
Installed in conduit or cable duct	11.5 A						
Installed in cable tray	13.5 A						
Environmental conditions							
Temperature							
Moving	-10 to 70°C						
Static	-20 to 90°C						
Mechanical properties							
Dimensions							
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m
Diameter	8.5 mm ±0.3 mm						
Bend radius							
Single bend	>34 mm						
Moving	≥85 mm						
Drag chain data							
Acceleration	<60 m/s²						
Flex cycles [1)]	≥3,000,000						
Speed	≤4 m/s						
Weight	0.128 kg/m						

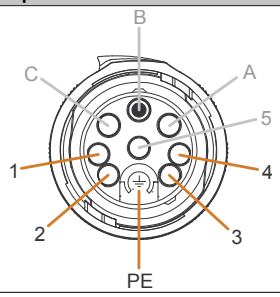
Table 87: 80CM01001.61-01, 80CM02001.61-01, 80CM03001.61-01, 80CM05001.61-01, 80CM10001.61-01, 80CM15001.61-01, 80CM20001.61-01 - Technical data

1) At an ambient temperature of 20°C and bend radius of 125 mm.

Wiring

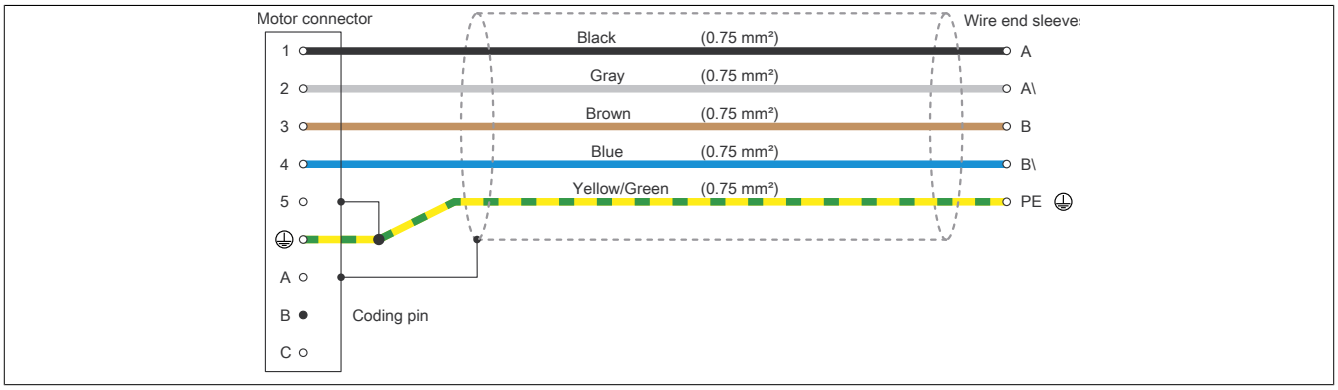
Pinout

Dimensions


Pinout				
9-pin circularfemale connector	**Pin**	**Description**	**Wire colors**	**Open-ended**
	1	A	Black	For custom wiring Connection to drive system
	2	A\	Gray	
	3	B	Brown	
	4	B\	Blue	
	5	NC	-	
	A	NC	-	
	B	Used for coding purposes and to prevent improper connections.		
	C	NC	-	
	PE	PE wire / Shield	Yellow / green	

Cable lengths (L)	
Model number	**Length [m]**
80CM**01**001.61-01	1
80CM**02**001.61-01	2
80CM**03**001.61-01	3
80CM**05**001.61-01	5
80CM**10**001.61-01	10
80CM**15**001.61-01	15
80CM**20**001.61-01	20

Cable diagram



3.5.3.4.1.3 Motor cable (incl. brake lines)

Order data

Order number	Short description	Figure
	Motor cables with brake	
80CM01002.21-01	Motor cable, length 1 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM02002.21-01	Motor cable, length 2 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM03002.21-01	Motor cable, length 3 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM05002.21-01	Motor cable, length 5 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM10002.21-01	Motor cable, length 10 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM15002.21-01	Motor cable, length 15 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM20002.21-01	Motor cable, length 20 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motors with brake, 4-pin and 2-pin connectors on the motor side, can be used in cable drag chains, UL listed	

Table 88: 80CM01002.21-01, 80CM02002.21-01, 80CM03002.21-01, 80CM05002.21-01, 80CM10002.21-01, 80CM15002.21-01, 80CM20002.21-01 - Order data

Technical data

Order number	80CM01002.21-01	80CM02002.21-01	80CM03002.21-01	80CM05002.21-01	80CM10002.21-01	80CM15002.21-01	80CM20002.21-01
General information							
Cable cross section	5x 0.75 mm² + 1x 2x 0.5 mm²						
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils						
Certification	UL AWM Style 20234, 80°C, 1000 V, E63216 and CSA AWM I/II A/B, 90°C, 1000 V, FT2 LL46064						
Cable construction							
Power lines							
Quantity	5						
Wire insulation	Special thermoplastic material						
Wire colors	Black, brown, blue, gray, yellow/green						
Design	Tinned copper stranded wire						
Cross section	0.75 mm²						
Shield	No						
Stranding	No						
Signal lines							
Quantity	2						
Wire insulation	Special thermoplastic material						
Wire colors	White, white/red						
Design	Tinned copper stranded wire						
Cross section	0.5 mm²						
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage > 85% and foil shield						
Stranding	White with white/red						
Cable stranding	With filler elements and foil shield						
Complete shielding	Tinned copper braiding, optical coverage > 85% and foil shield						
Outer jacket							
Material	PUR						
Color	Orange, similar to RAL 2003 flat						
Labeling	B&R 5x0,75+1x2x0,5 FLEX UL AWM STYLE 20234 80°C 1000 V E63216 CSA AWM I/II A/B 90°C 1000 V FT2 LL46064						
Electrical characteristics							
Test voltage							
Wire/Wire	3 kV						
Wire/Shield	3 kV						
Conductor resistance							
Power lines	≤29 Ω/km						
Signal lines	≤39 Ω/km						
Insulation resistance	>200 MΩ/km						
Current-carrying capacity per DIN VDE 0298 part 4, table 11							
Wall mounting	13 A						
Installed in conduit or cable duct	11.5 A						
Installed in cable tray	13.5 A						
Environmental conditions							
Temperature							
Moving	-10 to 70°C						
Static	-20 to 90°C						
Mechanical properties							
Dimensions							
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m
Diameter	10.8 mm ±0.4 mm						
Bend radius							
Single bend	>34 mm						
Moving	≥85 mm						
Drag chain data							
Acceleration	<60 m/s²						
Flex cycles [1]	≥3,000,000						
Speed	≤4 m/s						
Weight	0.26 kg/m						

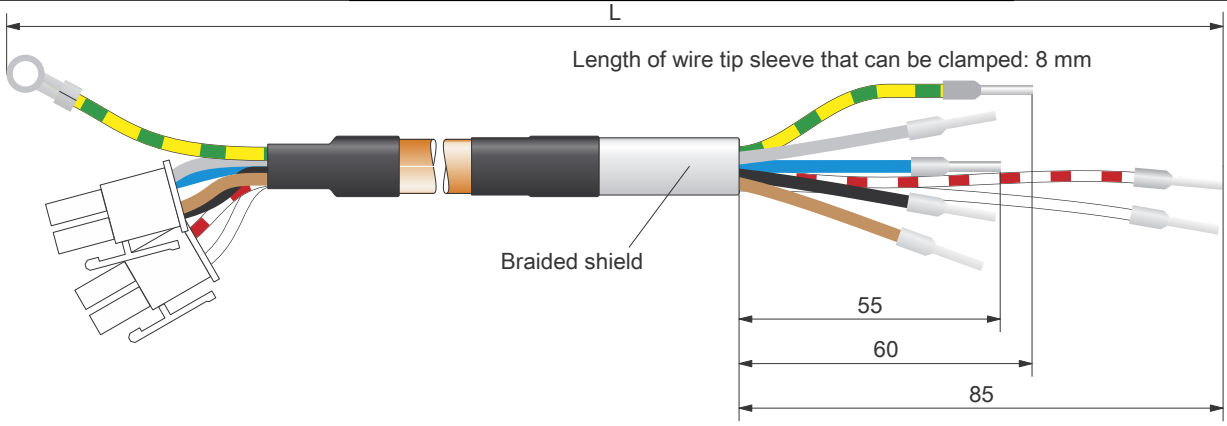
Table 89: 80CM01002.21-01, 80CM02002.21-01, 80CM03002.21-01, 80CM05002.21-01, 80CM10002.21-01, 80CM15002.21-01, 80CM20002.21-01 - Technical data

1) At an ambient temperature of 20°C and bend radius of 125 mm.

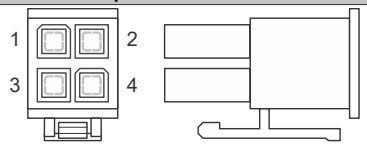
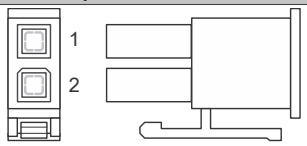
Wiring

Pinout

Dimensions

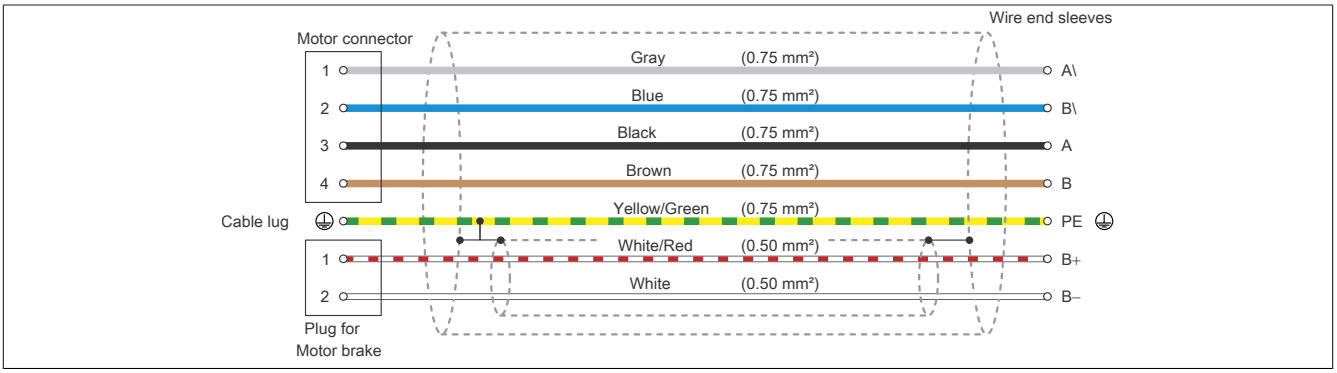


Pinout

4-pin terminal block	Pin	Description	Wire colors	Open-ended
	1	A\	Gray	For custom wiring Connection to drive system
	2	B\	Blue	
	3	A	Black	
	4	B	Brown	
2-pin terminal block	**Pin**	**Description**	**Wire colors**	
	1	24 VDC brake	White / red	
	2	GND	White	
Cable lug	**Pin**	**Description**	**Wire colors**	
	-	PE wire / Shield	Yellow / green	

Cable lengths (L)	
Model number	**Length [m]**
80CM**01**002.21-01	1
80CM**02**002.21-01	2
80CM**03**002.21-01	3
80CM**05**002.21-01	5
80CM**10**002.21-01	10
80CM**15**002.21-01	15
80CM**20**002.21-01	20

Cable diagram



3.5.3.4.2 Encoder cable

3.5.3.4.2.1 80CMxx003.25-01 - ABR incremental encoder cable

Order data

Order number	Short description	Figure
	Incremental encoder cables	
80CM01003.25-01	Incremental encoder cable, length 1 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM02003.25-01	Incremental encoder cable, length 2 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM03003.25-01	Incremental encoder cable, length 3 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM05003.25-01	Incremental encoder cable, length 5 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM10003.25-01	Incremental encoder cable, length 10 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM15003.25-01	Incremental encoder cable, length 15 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM20003.25-01	Incremental encoder cable, length 20 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM25003.25-01	Incremental encoder cable, length 25 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	

Table 90: 80CM01003.25-01, 80CM02003.25-01, 80CM03003.25-01, 80CM05003.25-01, 80CM10003.25-01, 80CM15003.25-01, 80CM20003.25-01, 80CM25003.25-01 - Order data

Technical data

Order number	80CM01003.25-01	80CM02003.25-01	80CM03003.25-01	80CM05003.25-01	80CM10003.25-01	80CM15003.25-01	80CM20003.25-01	80CM25003.25-01
General information								
Cable cross section	4x 0.14 mm² + 2x 0.35 mm²							
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils							
Certification	UL AWM Style 20963, 80°C, 30 V, E63216							
Cable construction								
Supply lines								
Quantity	2							
Wire insulation	Special thermoplastic material							
Wire colors	Red, black							
Variant	Tinned copper stranded wire							
Cross section	0.35 mm²							
Shield	No							
Stranding	No							
Signal line								
Quantity	4							
Wire insulation	Special thermoplastic material							
Wire colors	Gray, yellow, green, white							
Variant	Tinned copper stranded wire							
Shield	No							
Stranding	All 4 wires together							
Cable stranding	With terminating foil shield							
Cable shield	Copper braiding, optical coverage ≥ 85% and foil shield							
Outer jacket								
Material	PUR							
Color	Gray							
Labeling	B&R 4x0,14+2x0,35 FLEX UL AWM STYLE 20963 80°C 30 V E63216							
Electrical properties								
Test voltage								
Wire - Wire	1.5 kV							
Wire - Shield	0.8 kV							
Conductor resistance								
0.14 mm²	≤134 Ω/km							
0.34 mm²	>55 Ω/km							
Insulation resistance	>200 MΩ/km							
Ambient conditions								
Temperature								
Moving	-10 to 50°C							
Static	-20 to 80°C							
Mechanical properties								
Dimensions								
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m	25 m
Diameter	5.8 mm ±0.2 mm							
Bend radius								
Single bend	≥20 mm							
Moving	≥50 mm							
Drag chain data								
Acceleration	<60 m/s²							
Flex cycles [1)]	≥3,000,000							
Velocity	≤4 m/s							
Weight	0.045 kg/m							

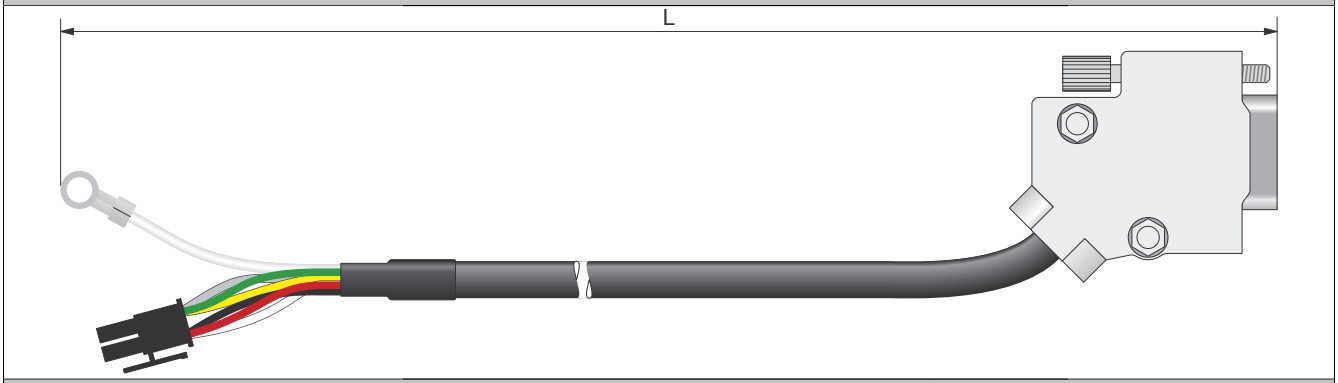
Table 91: 80CM01003.25-01, 80CM02003.25-01, 80CM03003.25-01, 80CM05003.25-01, 80CM10003.25-01, 80CM15003.25-01, 80CM20003.25-01, 80CM25003.25-01 - Technical data

1) At an ambient temperature of 20°C and bend radius of 65 mm.

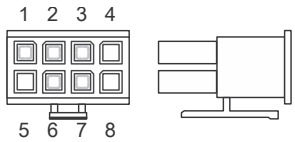
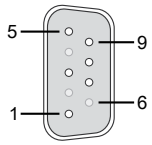
Wiring

Pinout

Dimensions

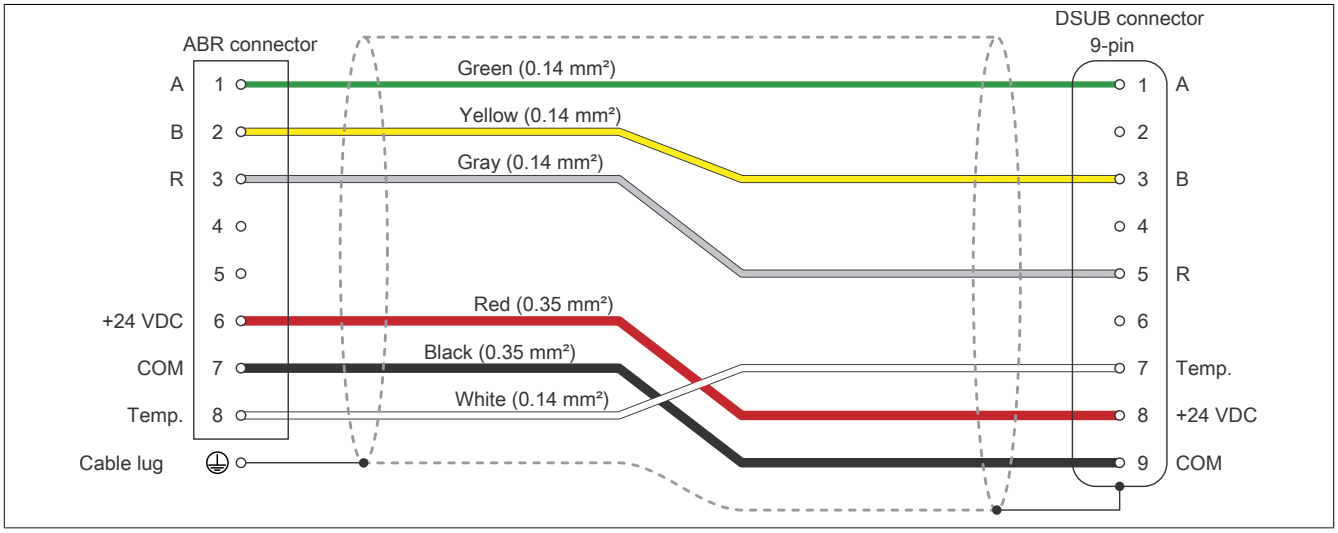


Pinout

8-pin terminal block	Pin	Description		Pin	DSUB male 9-pin connector (6 pins used)
	1	A	A	1	
	2	B	B	3	
	3	R	R	5	
	4	-	NC		
	5	-	NC		
	6	+24 VDC	Encoder power supply +24 V	8	
	7	COM	Encoder power supply 0 V	9	
	8	Temp	Temperature	7	
	Wire colors / wiring, see cable diagram.				
Cable lug	**Pin**	**Description**		**Pin**	
	-	PE wire / Shield		-	

Cable lengths (L)	
Model number	**Length [m]**
80CM**01**003.25-01	1
80CM**02**003.25-01	2
80CM**03**003.25-01	3
80CM**05**003.25-01	5
80CM**10**003.25-01	10
80CM**15**003.25-01	15
80CM**20**003.25-01	20
80CM**25**003.25-01	25

Cable diagram



3.5.3.4.2.2 80CMxx004.25-01 - SSI absolute value encoder cable

Order data

Order number	Short description	Figure
	SSI encoder cables	
80CM01004.25-01	SSI encoder cable, length 1 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM02004.25-01	SSI encoder cable, length 2 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM03004.25-01	SSI encoder cable, length 3 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM05004.25-01	SSI encoder cable, length 5 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM10004.25-01	SSI encoder cable, length 10 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM15004.25-01	SSI encoder cable, length 15 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM20004.25-01	SSI encoder cable, length 20 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	

Table 92: 80CM01004.25-01, 80CM02004.25-01, 80CM03004.25-01, 80CM05004.25-01, 80CM10004.25-01, 80CM15004.25-01, 80CM20004.25-01 - Order data

Technical data

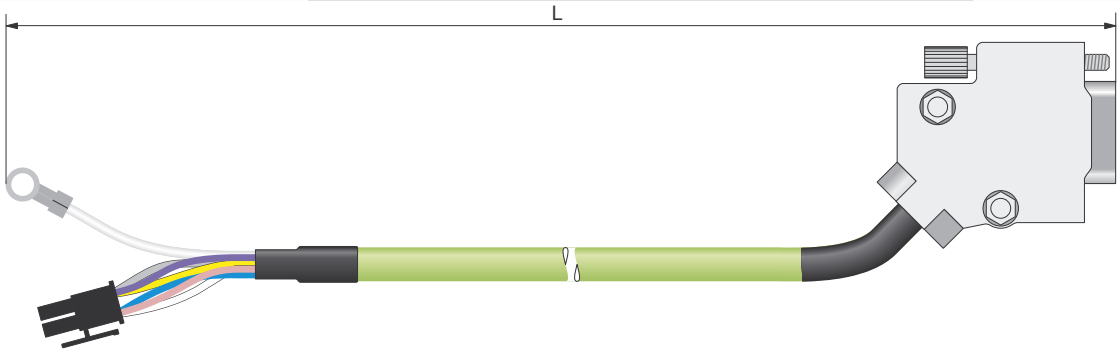
Order number	80CM01004.25-01	80CM02004.25-01	80CM03004.25-01	80CM05004.25-01	80CM10004.25-01	80CM15004.25-01	80CM20004.25-01
General information							
Cable cross section	1x 4x 0.14 mm² + 4x 0.34 mm²						
Durability	Oil resistance per VDE 0472 Part 803 test type B						
Certification	UL AWM Style 20963, 80°C, 30 V, E63216						
Cable construction							
Supply lines							
Quantity	4						
Wire insulation	Special thermoplastic material						
Wire colors	White/Green, brown/green, blue, white						
Design	Tinned copper stranded wire						
Cross section	0.34 mm²						
Shield	No						
Stranding	No						
Signal lines							
Quantity	4						
Wire insulation	Special thermoplastic material						
Wire colors	Yellow, gray, pink, violet						
Design	Tinned copper stranded wire						
Cross section	0.14 mm²						
Shield	No						
Stranding	All 4 wires together						
Cable stranding	With terminating foil shield						
Complete shielding	Copper/Tin braiding						
Outer jacket							
Material	PUR						
Color	Green						
Labeling	Heidenhain UR AWM style 20963 80°C 30 V E63216						
Electrical characteristics							
Test voltage							
Wire/Wire	0.5 kV						
Wire/Shield	0.5 kV						
Conductor resistance							
Supply lines	≤55 Ω/km						
Signal lines	≤134 Ω/km						
Insulation resistance	>200 MΩ/km						
Environmental conditions							
Temperature							
Moving	-10 to 80°C						
Static	-40 to 80°C						
Mechanical properties							
Dimensions							
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m
Diameter	6 mm ±0.25 mm						
Bend radius							
Single bend	≥20 mm						
Moving	≥75 mm						
Drag chain data							
Acceleration	<60 m/s²						
Flex cycles	≥3,000,000						
Speed	≤4 m/s						
Weight	0.08 kg/m						

Table 93: 80CM01004.25-01, 80CM02004.25-01, 80CM03004.25-01, 80CM05004.25-01, 80CM10004.25-01, 80CM15004.25-01, 80CM20004.25-01 - Technical data

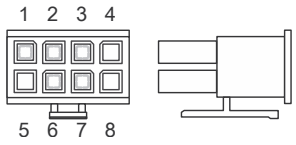
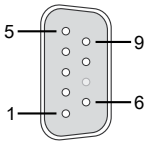
Wiring

Pinout

Dimensions

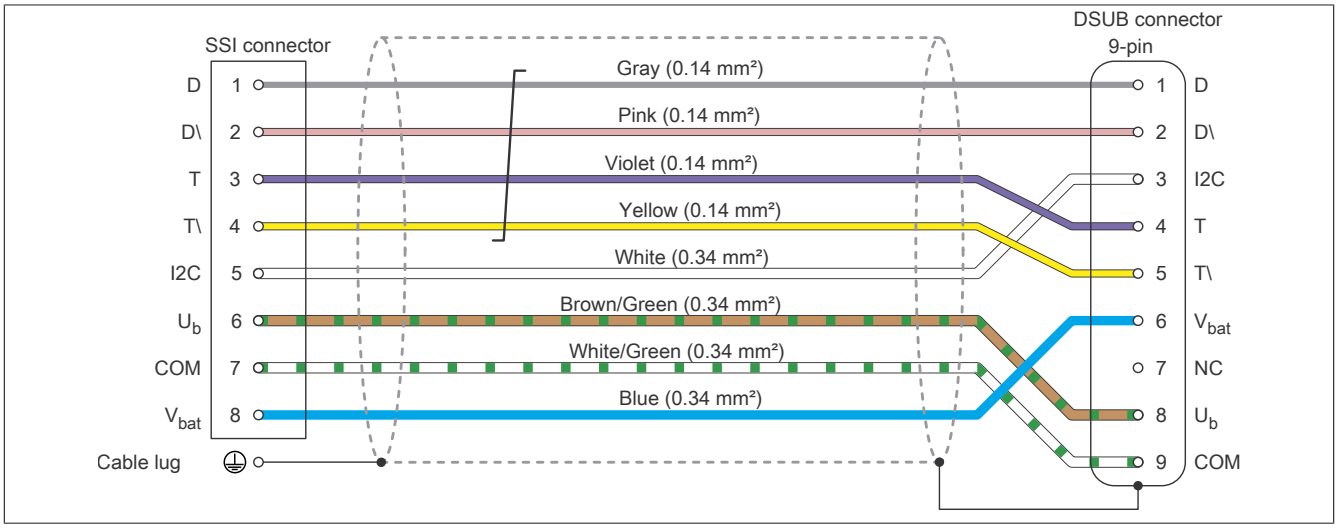


Pinout

8-pin terminal block	Pin	Description		Pin	DSUB male 9-pin connector (8 pins used)
	1	D	Data input	1	
	2	D\	Data input inverted	2	
	3	T	Clock output	4	
	4	T\	Clock output inverted	5	
	5	I2C	I2C	3	
	6	$+U_b$	Encoder power supply +24 V	8	
	7	COM	Encoder power supply 0 V	9	
	8	V_{Bat}	Battery-backed 3 V	6	
	Wire colors / wiring, see cable diagram.				
Cable lug	**Pin**	**Description**		**Pin**	
	-	Shield		-	

Cable lengths (L)	
Model number	**Length [m]**
80CM**01**004.25-01	1
80CM**02**004.25-01	2
80CM**03**004.25-01	3
80CM**05**004.25-01	5
80CM**10**004.25-01	10
80CM**15**004.25-01	15
80CM**20**004.25-01	20

Cable diagram



3.5.3.4.2.3 80CMxx005.65-01 - HIPERFACE encoder cable

Order data

Order number	Short description	Figure
	Hiperface encoder cables	
80CM01005.65-01	HIPERFACE encoder cable, length 1 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM02005.65-01	HIPERFACE encoder cable, length 2 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM03005.65-01	HIPERFACE encoder cable, length 3 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM05005.65-01	HIPERFACE encoder cable, length 5 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM10005.65-01	HIPERFACE encoder cable, length 10 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM15005.65-01	HIPERFACE encoder cable, length 15 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	
80CM20005.65-01	HIPERFACE encoder cable, length 20 m, 5x 2x 0.14 mm², 2x 0.5 mm², springtec connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	

Table 94: 80CM01005.65-01, 80CM02005.65-01, 80CM03005.65-01, 80CM05005.65-01, 80CM10005.65-01, 80CM15005.65-01, 80CM20005.65-01 - Order data

Technical data

Order number	80CM01005.65-01	80CM02005.65-01	80CM03005.65-01	80CM05005.65-01	80CM10005.65-01	80CM15005.65-01	80CM20005.65-01
General information							
Cable cross section	5x 2x 0.14 mm² + 1x 2x 0.50 mm²						
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils						
Certification	UL AWM Style 20963, 80°C, 30 V, E63216 and CSA AWM I/II A/B, 90°C, 30 V, FT1 LL46064						
Cable construction							
Supply lines							
Quantity	2						
Wire insulation	Special thermoplastic material						
Wire colors	White/Green, white/red						
Design	Tinned copper stranded wire						
Cross section	0.5 mm²						
Shield	No						
Stranding	White/Red with white/green and filler elements						
Signal lines							
Quantity	10						
Wire insulation	Special thermoplastic material						
Wire colors	Blue, brown, yellow, gray, green, pink, red, black, violet, white						
Design	Tinned copper stranded wire						
Cross section	0.14 mm²						
Shield	No						
Stranding	Green with brown, gray with yellow, white with violet, black with red, pink with blue						
Cable stranding	With terminating foil shield						
Complete shielding	Copper braiding, optical coverage > 85% and foil shield						
Outer jacket							
Material	PUR						
Color	RAL 6018						
Labeling	B&R 10x0,14+2x0,50 FLEX UL AWM STYLE 20963 80°C 30 V E63216 CSA AWM I/II A/B 90°C 30 V FT1 LL46064						
Electrical characteristics							
Test voltage							
Wire/Wire	1 kV						
Wire/Shield	0.8 kV						
Conductor resistance							
Supply lines	≤40 Ω/km						
Signal lines	≤140 ohm/km						
Insulation resistance	>200 MΩ/km						
Environmental conditions							
Temperature							
Moving	-10 to 80°C						
Static	-40 to 90°C						
Mechanical properties							
Dimensions							
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m
Diameter	7.85 mm ±0.2 mm						
Bend radius							
Single bend	≥24 mm						
Moving	≥60 mm						
Drag chain data							
Acceleration	<60 m/s²						
Flex cycles [1)]	≥3,000,000						
Speed	≤4 m/s						
Weight	0.08 kg/m						

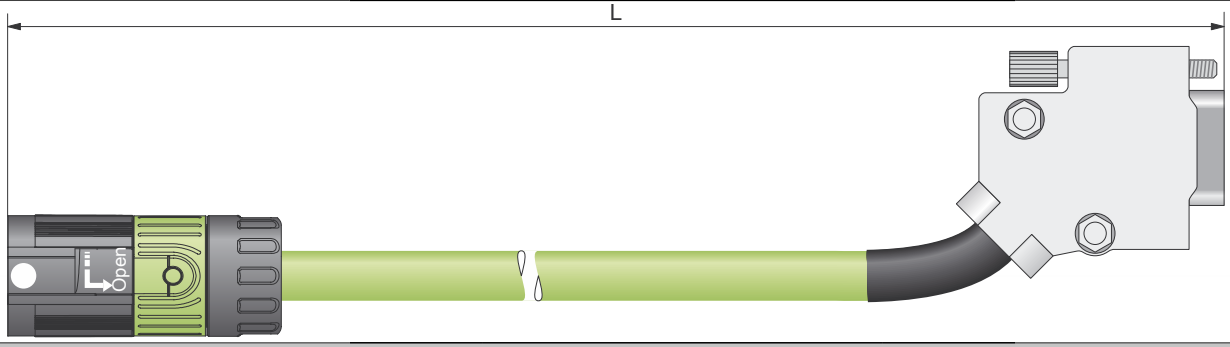
Table 95: 80CM01005.65-01, 80CM02005.65-01, 80CM03005.65-01, 80CM05005.65-01, 80CM10005.65-01, 80CM15005.65-01, 80CM20005.65-01 - Technical data

1) At an ambient temperature of 20°C and bend radius of 65 mm.

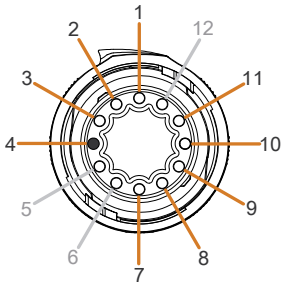
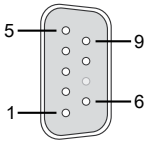
Wiring

Pinout

Dimensions

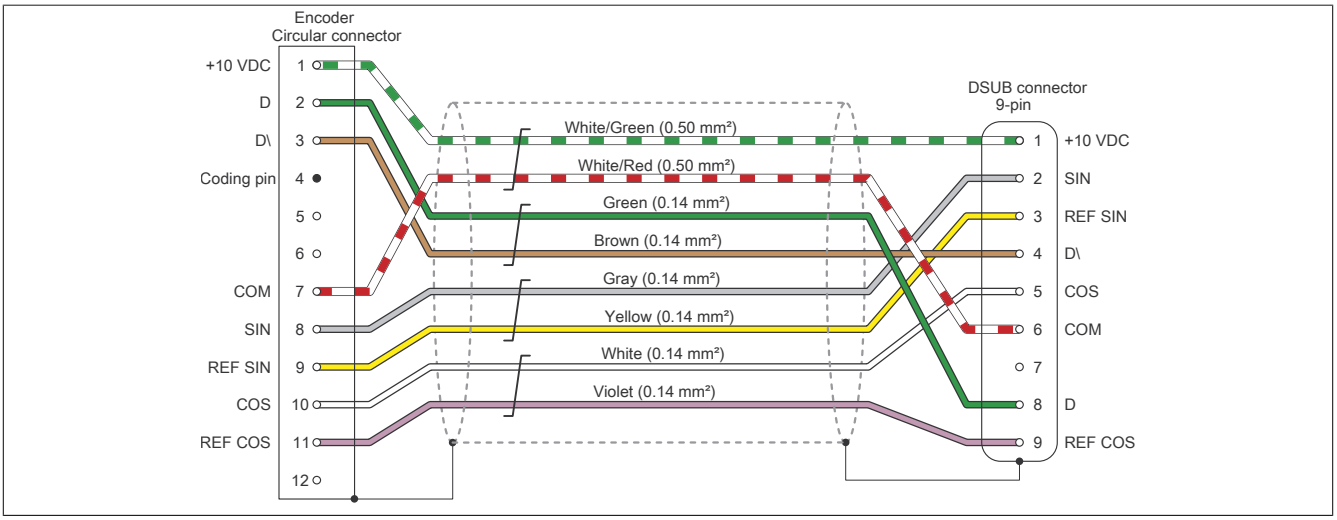


Pinout

12-pin female circular connector	Pin	Description		Pin	DSUB male 9-pin connector (8 pins used)
	1	+10 VDC	Encoder power supply	1	
	2	D	Data input	8	
	3	D\	Data input inverted	4	
	4	Used for coding purposes and to prevent improper connections.		-	
	7	COM	Encoder power supply 0 V	6	
	8	SIN	Channel SIN	2	
	9	REF SIN	REF SIN channel	3	
	10	COS	Channel COS	5	
	11	REF COS	REF COS channel	9	
	Wire colors / wiring, see cable diagram. Each shield connected to housing on connector side				

Cable lengths (L)	
Model number	**Length [m]**
80CM**01**005.65-01	1
80CM**02**005.65-01	2
80CM**03**005.65-01	3
80CM**05**005.65-01	5
80CM**10**005.65-01	10
80CM**15**005.65-01	15
80CM**20**005.65-01	20

Cable diagram



3.5.3.4.3 Hybrid cable

3.5.3.4.3.1 80CMxx013.21-01 - Hybrid cables

Order data

Order number	Short description	Figure
	Hybrid cables	
80CM01013.21-01	Hybrid cable, length 1 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM02013.21-01	Hybrid cable, length 2 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM03013.21-01	Hybrid cable, length 3 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM05013.21-01	Hybrid cable, length 5 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM10013.21-01	Hybrid cable, length 10 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	
80CM15013.21-01	Hybrid cable, length 15 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motors with IP20 incremental encoder, 4-pin and 8-pin connectors on the motor side, can be used in cable drag chains, UL listed	

Table 96: 80CM01013.21-01, 80CM02013.21-01, 80CM03013.21-01, 80CM05013.21-01, 80CM10013.21-01, 80CM15013.21-01 - Order data

Technical data

Order number	80CM01013.21-01	80CM02013.21-01	80CM03013.21-01	80CM05013.21-01	80CM10013.21-01	80CM15013.21-01
General information						
Cable cross section	4x 0.5 mm² + 2x 0.35 mm² + 3x 0.14 mm²					
Certification	UL AWM style 20963, 80°C, 30 V, E63216 and CSA AWM I/II A/B, 90°C, 30 V, FT2 LL46064					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	Special thermoplastic material					
Wire colors	Black, gray, brown, blue					
Variant	Tinned copper stranded wire					
Cross section	0.5 mm²					
Supply lines						
Quantity	2					
Wire insulation	Special thermoplastic material					
Wire colors	Red, black					
Variant	Tinned copper stranded wire					
Cross section	0.35 mm²					
Stranding	Yes					
Signal line						
Quantity	3					
Wire insulation	Special thermoplastic material					
Wire colors	Gray, yellow, green					
Variant	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	Yes					
Stranding	Yes					
Cable stranding	Yes					
Cable shield	Tinned copper wire braiding, optical coverage ≥85%					
Outer jacket						
Material	PUR					
Labeling	B&R 4x0.50+1x(2x0.35+3x0.14 C) FLEX UL AWM STYLE 20963 80°C 30 V E63216 CSA AWM I/II A/B 90°C 30 V FT2 LL46064					
Electrical properties						
Test voltage						
Wire - Wire	1.0 kV					
Wire - Shield	0.5 kV					
Conductor resistance						
0.14 mm²	≤134 Ω/km					
0.35 mm²	≤55 Ω/km					
0.50 mm²	≤39 Ω/km					
Insulation resistance	>200 MΩ/km					
Ambient conditions						
Temperature						
Moving	-10 to 50°C					
Static	-20 to 80°C					
Mechanical properties						
Dimensions						
Length	1 m	2 m	3 m	5 m	10 m	15 m
Diameter	7.9 mm ±0.25 mm					
Bend radius						
Single bend	≥20 mm					
Moving	≥50 mm					
Drag chain data						
Acceleration	<60 m/s²					
Flex cycles [1]	≥3,000,000					
Velocity	≤4 m/s					
Weight	0.085 kg/m					

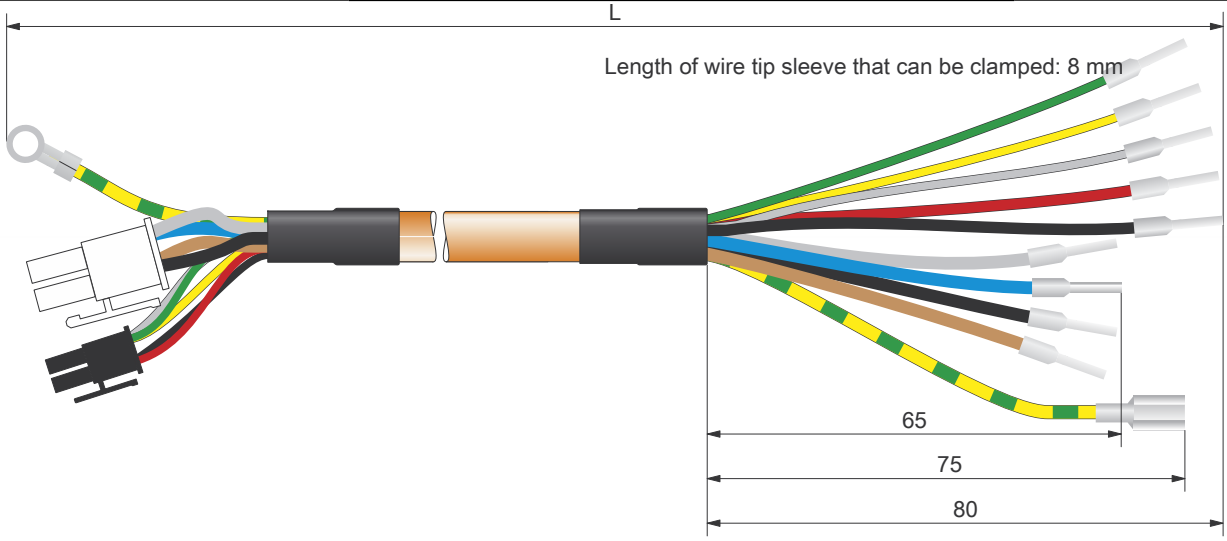
Table 97: 80CM01013.21-01, 80CM02013.21-01, 80CM03013.21-01, 80CM05013.21-01, 80CM10013.21-01, 80CM15013.21-01 - Technical data

1) At an ambient temperature of 20°C and bend radius of 65 mm.

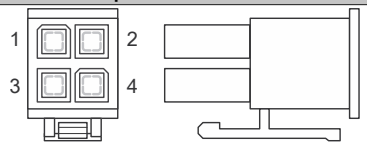
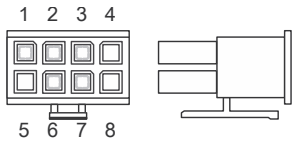
Wiring

Pinout

Dimensions



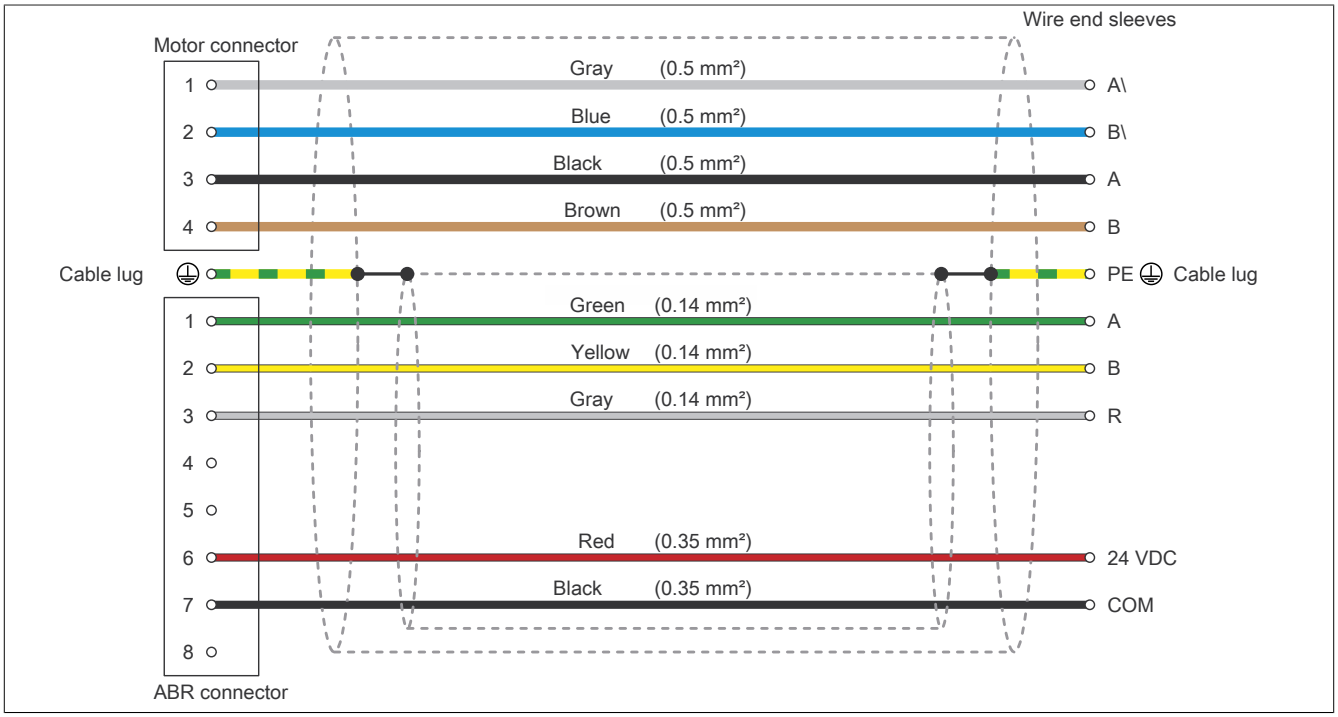
Pinout

4-pin terminal block	Pin	Description	Wire colors	Open-ended
	1	A\	Gray	For custom wiring Connection to drive system
	2	B\	Blue	
	3	A	Black	
	4	B	Brown	
8-pin terminal block	**Pin**	**Description**	**Wire colors**	
	1	A	Green	
	2	B	Yellow	
	3	R	Gray	
	4	NC	-	
	5	NC	-	
	6	24 VDC	Red	
	7	COM	Black	
	8	NC	-	
Cable lug	**Pin**	**Description**	**Wire colors**	**Cable lug**
	-	PE wire / Shield	Yellow / green	

Cable lengths (L)

Model number	Length [m]
80CM**01**013.21-01	1
80CM**02**013.21-01	2
80CM**03**013.21-01	3
80CM**05**013.21-01	5
80CM**10**013.21-01	10

Cable diagram



3.5.3.5 Cables for inverter modules

3.5.3.5.1 Motor cable

3.5.3.5.1.1 Can be used in cable drag chains

8BCMxxxx.1034C-0 - 0.75 mm² motor cables with female springtec connector

Order data

Order number	Short description	Figure
	Motor cables	
8BCM0002.1034C-0	Motor cable, length 2 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	
8BCM0005.1034C-0	Motor cable, 5 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in drag chains, UL/CSA listed	
8BCM0007.1034C-0	Motor cable, length 7 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	
8BCM0010.1034C-0	Motor cable, length 10 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	
8BCM0015.1034C-0	Motor cable, length 15 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	
8BCM0020.1034C-0	Motor cable, length 20 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	
8BCM0025.1034C-0	Motor cable, length 25 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, can be used in cable drag chains, UL/CSA listed	

Table 98: 8BCM0002.1034C-0, 8BCM0005.1034C-0, 8BCM0007.1034C-0, 8BCM0010.1034C-0, 8BCM0015.1034C-0, 8BCM0020.1034C-0, 8BCM0025.1034C-0 - Order data

Information:

Other cable lengths and raw cables are available from B&R upon request.

Technical data

Order number	8BCM0002.1034C-0	8BCM0005.1034C-0	8BCM0007.1034C-0	8BCM0010.1034C-0	8BCM0015.1034C-0	8BCM0020.1034C-0	8BCM0025.1034C-0
General information							
Cable cross section	4x 0.75 mm² + 2x 2x 0.34 mm²						
Durability	Oil resistance per HD 22.10 appendix A, DIN EN 60811-404 [1]						
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]						
Certifications							
CE	Yes						
UL	cULus E225616 Power conversion equipment						
Cable construction							
Power lines							
Quantity	4						
Wire insulation	PP						
Wire colors	Black, brown, blue, yellow/green						
Variant	Tinned copper stranded wire						
Cross section	0.75 mm²						
Shield	No						
Stranding	No						
Signal line							
Quantity	4						
Wire insulation	PP						
Wire colors	White, white/red, white/blue, white/green						
Variant	Tinned copper stranded wire						
Cross section	0.34 mm²						
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage > 85% and foil shield						
Stranding	White with white/red and white/blue with white/green						
Cable stranding	With filler elements and foil shield						
Cable shield	Tinned copper braiding, optical coverage > 85% and foil shield						
Outer jacket							
Material	PUR						
Color	Orange, similar to RAL 2003 flat						
Labeling	B&R 4 G 0.75 + 2 x (2x0.34)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 production order number [1]						
Connector							
Type	8-pin female springtec motor connector						
Mating cycles	<500						
Contacts	8 (4 power and 4 signal contacts)						
Degree of protection per EN 60529	IP66/67 when connected						
Electrical properties [1]							
Operating voltage	Max. 1000 V AC (UL)						
Test voltage							
Wire/Wire	4 kV						
Wire/Shield	4 kV						
Conductor resistance							
Power lines	≤26.7 Ω/km						
Signal line	≤56 Ω/km						
Insulation resistance	≥500 MΩ*km						
Current-carrying capacity per DIN VDE 0298 part 4, table 11							
Wall mounting	13 A						
Installed in conduit or cable duct	11.5 A						
Installed in cable tray	13.5 A						
Ambient conditions [1]							
Temperature							
Moving	-20°C to +80°C						
Static	-20°C to +90°C						
Mechanical properties [1]							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	10.1 mm ± 0.3 mm						
Bend radius							
Single bend	>32 mm						
Moving	>78 mm						
Drag chain data							
Acceleration	Max. 50 m/s² (depends on the length of the travel path)						
Flex cycles [2]	≤5,000,000						
Velocity	Max. 300 m/min						
Weight	0.18 kg	0.45 kg	0.62 kg	0.89 kg	1.34 kg	1.78 kg	2.23 kg

Table 99: 8BCM0002.1034C-0, 8BCM0005.1034C-0, 8BCM0007.1034C-0, 8BCM0010.1034C-0, 8BCM0015.1034C-0, 8BCM0020.1034C-0, 8BCM0025.1034C-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 125 mm.

3.5.3.5.1.2 Cannot be used in cable drag chains

8BCMxxxx.3034C-0 - 0.75 mm² motor cables with female springtec connector

Order data

Order number	Short description	Figure
	Motor cables	
8BCM0002.3034C-0	Motor cable, length 2 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	
8BCM0005.3034C-0	Motor cable, length 5 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	
8BCM0007.3034C-0	Motor cable, length 7 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	
8BCM0010.3034C-0	Motor cable, length 10 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	
8BCM0015.3034C-0	Motor cable, length 15 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	
8BCM0020.3034C-0	Motor cable, length 20 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	
8BCM0025.3034C-0	Motor cable, length 25 m, 4x 0.75 mm² + 2x 2x 0.35 mm², 8-pin female springtec motor connector, UL/CSA listed	

Table 100: 8BCM0002.3034C-0, 8BCM0005.3034C-0, 8BCM0007.3034C-0, 8BCM0010.3034C-0, 8BCM0015.3034C-0, 8BCM0020.3034C-0, 8BCM0025.3034C-0 - Order data

Information:

Other cable lengths and raw cables are available from B&R upon request.

Technical data

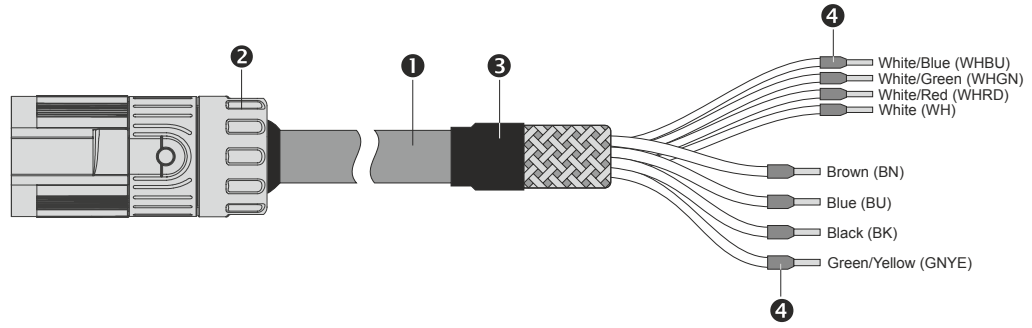
Order number	8BCM0002.3034C-0	8BCM0005.3034C-0	8BCM0007.3034C-0	8BCM0010.3034C-0	8BCM0015.3034C-0	8BCM0020.3034C-0	8BCM0025.3034C-0
General information							
Cable cross section	4x 0.75 mm² + 2x 2x 0.34 mm²						
Durability	Oil resistance TM5 per VDE 0281 Part 1 / HD21.1 Flame resistance per IEC 60332-1-2 / UL 2556 (VW-1) / CSA C22.2 No. 210.2 (FT-1) [1]						
Certification	UL Style 2570 80°C 1000 V VW-1 E130266 and cUL AWM I/II A/B 80°C 1000 V FT-1 [1]						
Certifications							
CE	Yes						
UL	cULus E225616 Power conversion equipment						
Cable construction							
Power lines							
Quantity	4						
Wire insulation	PP						
Wire colors	Black, brown, blue, yellow/green						
Variant	Tinned copper stranded wire						
Cross section	0.75 mm²						
Shield	No						
Stranding	No						
Signal line							
Quantity	4						
Wire insulation	PP						
Wire colors	White, white/red, white/blue, white/green						
Variant	Tinned copper stranded wire						
Cross section	0.34 mm²						
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage > 85% and foil shield						
Stranding	White with white/red and white/blue with white/green						
Cable stranding	With filler elements and foil shield						
Cable shield	Tinned copper braiding, optical coverage > 85% and foil shield						
Outer jacket							
Material	PVC						
Color	Orange, similar to RAL 2003 flat						
Labeling	B&R 4x0.75+2x2x0.34 XX/YYYY E130266 cURus AWM STYLE 2570 I/II A/B 80°C 1000 V FT-1 [1][2]						
Connector							
Type	8-pin female springtec motor connector						
Mating cycles	<500						
Contacts	8 (4 power and 4 signal contacts)						
Degree of protection per EN 60529	IP66/67 when connected						
Electrical properties [1]							
Test voltage							
Wire/Wire	4 kV						
Wire/Shield	3 kV						
Conductor resistance							
Power lines	≤58.3 Ω/km						
Signal line	≤26.7 Ω/km						
Insulation resistance	≥100 MΩ*km						
Current-carrying capacity per DIN VDE 0298 part 4, table 11							
Wall mounting	9.8 A						
Installed in conduit or cable duct	8.5 A						
Installed in cable tray	10.4 A						
Ambient conditions [1]							
Temperature							
Moving	-20°C to +80°C						
Static	-20°C to +90°C						
Mechanical properties [1]							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	10.6 mm ± 0.4 mm						
Bend radius							
Single bend	>55 mm						
Moving	≥165 mm						
Weight	0.2 kg	0.5 kg	0.6 kg	0.9 kg	1.3 kg	1.8 kg	2.2 kg

Table 101: 8BCM0002.3034C-0, 8BCM0005.3034C-0, 8BCM0007.3034C-0, 8BCM0010.3034C-0, 8BCM0015.3034C-0, 8BCM0020.3034C-0, 8BCM0025.3034C-0 - Technical data

1) Values refer to the raw cable being used.
2) XX ... Week of manufacture, YYYY ... Year of manufacture

3.5.3.5.1.3 Wiring

Cable construction



Pos.	Description	Note
1	Motor cable	4x 0.75 mm² + 2x 2x 034 mm²
2	8-pin female motor connector	Dimensions: ø 19 x 42 mm
3	Heat shrink tubing	
4	Wire end sleeves	

Table 102: 0.75 mm² motor cables - Cable construction

Pinout

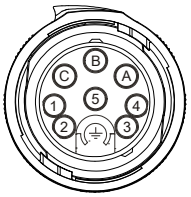
Connector	Pin	Description	Function
	A	U	Motor connection U
	B	V	Motor connection V
	C	W	Motor connection W
	D	PE	Protective ground conductor
	1	T+	Temperature +
	2	T-	Temperature -
	3	B+	Brake +
	4	B-	Brake -
	5	---	---

Table 103: 0.75 mm² motor cables - Pinout

Cable diagram

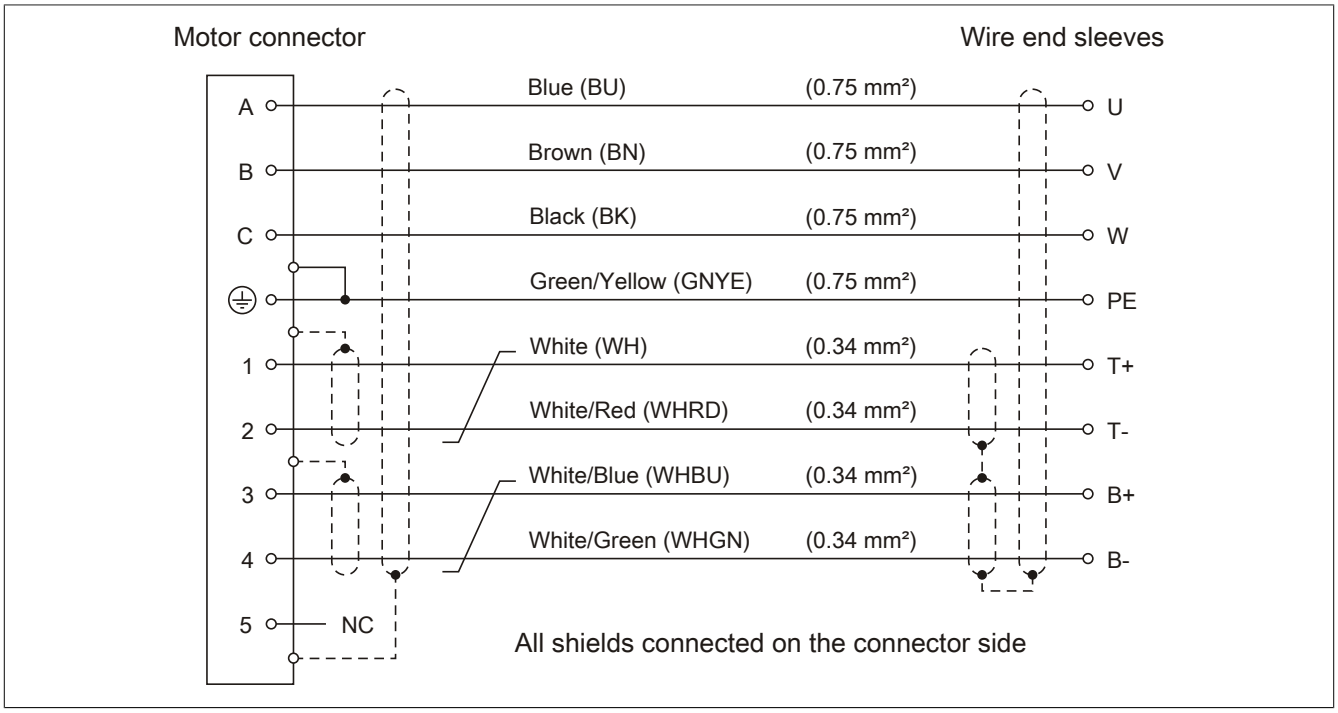


Figure 14: 0.75 mm² motor cables - Cable diagram

3.5.3.5.2 Resolver cables

3.5.3.5.2.1 Can be used in cable drag chains

8BCRxxxx.1121A-0 - Resolver cables with female springtec connector

Order data

Order number	Short description	Figure
	Resolver cables	
8BCR0002.1121A-0	Resolver cable, length 2 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCR0005.1121A-0	Resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCR0007.1121A-0	Resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCR0010.1121A-0	Resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCR0015.1121A-0	Resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCR0020.1121A-0	Resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCR0025.1121A-0	Resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec coupling, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	

Table 104: 8BCR0002.1121A-0, 8BCR0005.1121A-0, 8BCR0007.1121A-0, 8BCR0010.1121A-0, 8BCR0015.1121A-0, 8BCR0020.1121A-0, 8BCR0025.1121A-0 - Order data

Information:

Other cable lengths and raw cables are available from B&R upon request.

Technical data

Order number	8BCR0002. 1121A-0	8BCR0005. 1121A-0	8BCR0007. 1121A-0	8BCR0010. 1121A-0	8BCR0015. 1121A-0	8BCR0020. 1121A-0	8BCR0025. 1121A-0
General information							
Cable cross section	3x 2x 24 19 AWG						
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]						
Certification	UL AWM Style 20671, 90°C, 30 V, E63216 and CSA AWM, 90°C, 30 V, I/II A/B FT1 LL46064 [1]						
Certifications							
CE	Yes						
UL	cULus E225616 Power conversion equipment						
Cable construction							
Signal line							
Quantity	6						
Wire insulation	Special thermoplastic material						
Wire colors	White/Brown, green/yellow, gray/pink						
Variant	Tinned copper stranded wire						
Cross section	24 AWG / 19 AWG						
Shield	No						
Stranding	White with brown, green with yellow, gray with pink						
Cable stranding	The 3 pairs together covered by foil shield						
Cable shield	Copper braiding, optical coverage ≥ 90% and foil shield						
Outer jacket							
Material	PUR						
Color	Green, similar to RAL 6018 flat						
Labeling	B&R 3x2x24 AWG FLEX UL AWM STYLE 20671 90°C 30 V E63216 CSA AWM 90°C 30 V I/II A/B FT1 LL46064 [1]						
Connector							
Type	12-pin female springtec resolver connector						
Mating cycles	<500						
Contacts	12						
Additional connectors	9-pin male DSUB servo connector Mating cycles: <200 Contacts: 9 Degree of protection per EN 60529: IP20 when connected						
Degree of protection per EN 60529	IP66/67 when connected						
Electrical properties [1]							
Operating voltage	≤30 V_{eff}						
Test voltage							
Wire/Wire	1.5 kV						
Wire/Shield	0.8 kV						
Conductor resistance							
Signal line	≤86 Ω/km						
Insulation resistance	>200 MΩ*km						
Ambient conditions [1]							
Temperature							
Moving	-20°C to +80°C						
Static	-20°C to +80°C						
Mechanical properties [1]							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.5 mm ± 0.2 mm						
Bend radius							
Single bend	≥20 mm						
Moving	≥50 mm						
Drag chain data							
Acceleration	≤6 g						
Flex cycles [2]	≥3,000,000						
Velocity	≤4 m/s						
Weight	0.14 kg	0.35 kg	0.49 kg	0.7 kg	1.05 kg	1.4 kg	1.75 kg

Table 105: 8BCR0002.1121A-0, 8BCR0005.1121A-0, 8BCR0007.1121A-0, 8BCR0010.1121A-0, 8BCR0015.1121A-0, 8BCR0020.1121A-0, 8BCR0025.1121A-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

3.5.3.5.2.2 Cannot be used in cable drag chains

8BCRxxxx.3121A-0 - Resolver cables with female springtec connector

Order data

Order number	Short description	Figure
	Resolver cables	
8BCR0002.3121A-0	Resolver cable, length 2 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0005.3121A-0	Resolver cable, length 5 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0007.3121A-0	Resolver cable, length 7 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0010.3121A-0	Resolver cable, length 10 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0015.3121A-0	Resolver cable, length 15 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0020.3121A-0	Resolver cable, length 20 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0025.3121A-0	Resolver cable, length 25 m, 3x 2x 0.22, 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	

Table 106: 8BCR0002.3121A-0, 8BCR0005.3121A-0, 8BCR0007.3121A-0, 8BCR0010.3121A-0, 8BCR0015.3121A-0, 8BCR0020.3121A-0, 8BCR0025.3121A-0 - Order data

Information:

Other cable lengths and raw cables are available from B&R upon request.

Technical data

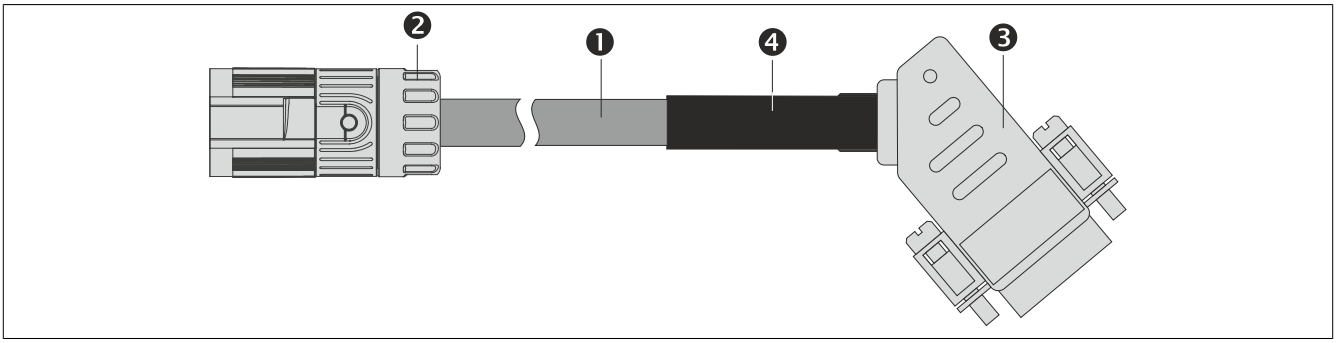
Order number	8BCR0002.3121A-0	8BCR0005.3121A-0	8BCR0007.3121A-0	8BCR0010.3121A-0	8BCR0015.3121A-0	8BCR0020.3121A-0	8BCR0025.3121A-0
General information							
Cable cross section	3x 2x 0.22 GN						
Durability	Oil resistance per DIN VDE 0281-1 (TM5) (HD 21.1 / DIN EN 60811-1-1/2-1), flame resistance per IEC 60332-1-2 [1]						
Certification	E130266 cRUus AWM style 2637 90°C 30 V and CSA AWM I/II A/B 90°C 30 V, FT1 [1]						
Certifications							
CE	Yes						
UL	cULus E225616 Power conversion equipment						
Cable construction							
Signal line							
Quantity	6						
Wire insulation	PVC						
Wire colors	White/Brown, green/yellow, gray/pink						
Variant	Tinned copper stranded wire						
Cross section	0.22 mm						
Shield	No						
Stranding	White with brown, green with yellow, gray with pink						
Cable stranding	The 3 pairs together covered by foil shield						
Cable shield	Copper braiding, optical coverage ≥ 90% and foil shield						
Outer jacket							
Material	PVC						
Color	Green						
Labeling	B&R 3x2x0.22 * E130266 cURus AWM STYLE 2637 * AWM I/II A/B 90°C 30 V FT1 * <Batch number> [1]						
Connector							
Type	12-pin female springtec resolver connector						
Mating cycles	<500						
Contacts	12						
Additional connectors	9-pin male DSUB servo connector Mating cycles: <200 Contacts: 9 Degree of protection per EN 60529: IP20 when connected						
Degree of protection per EN 60529	IP66/67 when connected						
Electrical properties [1]							
Test voltage							
Wire/Wire	1.5 kV						
Wire/Shield	0.8 kV						
Conductor resistance							
Signal line	≤86 Ω/km						
Insulation resistance	≥20 MΩ*km						
Ambient conditions [1]							
Temperature							
Moving	-20°C to +90°C						
Static	-20°C to +90°C						
Mechanical properties [1]							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.3 mm ± 0.2 mm						
Bend radius							
Single bend	≥26 mm						
Moving	≥52 mm						
Weight	0.1 kg	0.3 kg	0.4 kg	0.6 kg	0.9 kg	1.1 kg	1.4 kg

Table 107: 8BCR0002.3121A-0, 8BCR0005.3121A-0, 8BCR0007.3121A-0, 8BCR0010.3121A-0, 8BCR0015.3121A-0, 8BCR0020.3121A-0, 8BCR0025.3121A-0 - Technical data

1) Values refer to the raw cable being used.

3.5.3.5.2.3 Wiring

Cable construction



Pos.	Description	Note
1	Encoder line	3x 2x 24 AWG/19
2	12-pin female resolver connector	
3	Heat shrink tubing	
4	DSUB housing 45°, metal-plated, 9-pin male servo connector	

Table 108: Resolver cables - Cable construction

Pinout

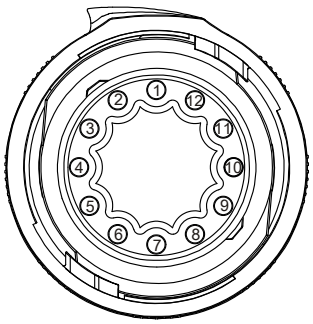
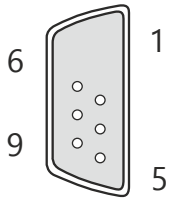
Connector	Pin	Description	Function	Pin	Connector
	1	---	Coding contact	---	
	2	---	---	---	
	3	---	---	---	
	4	---	---	---	
	5	---	---	---	
	6	R1	Reference output inverted	9	
	7	---	---	---	
	8	S4	Sine input +	3	
	9	S2	Sine input -	7	
	10	S3	Cosine input +	8	
	11	S1	Cosine input -	4	
	12	R2	Reference output	5	

Table 109: Resolver cables - Pinout

Cable diagram

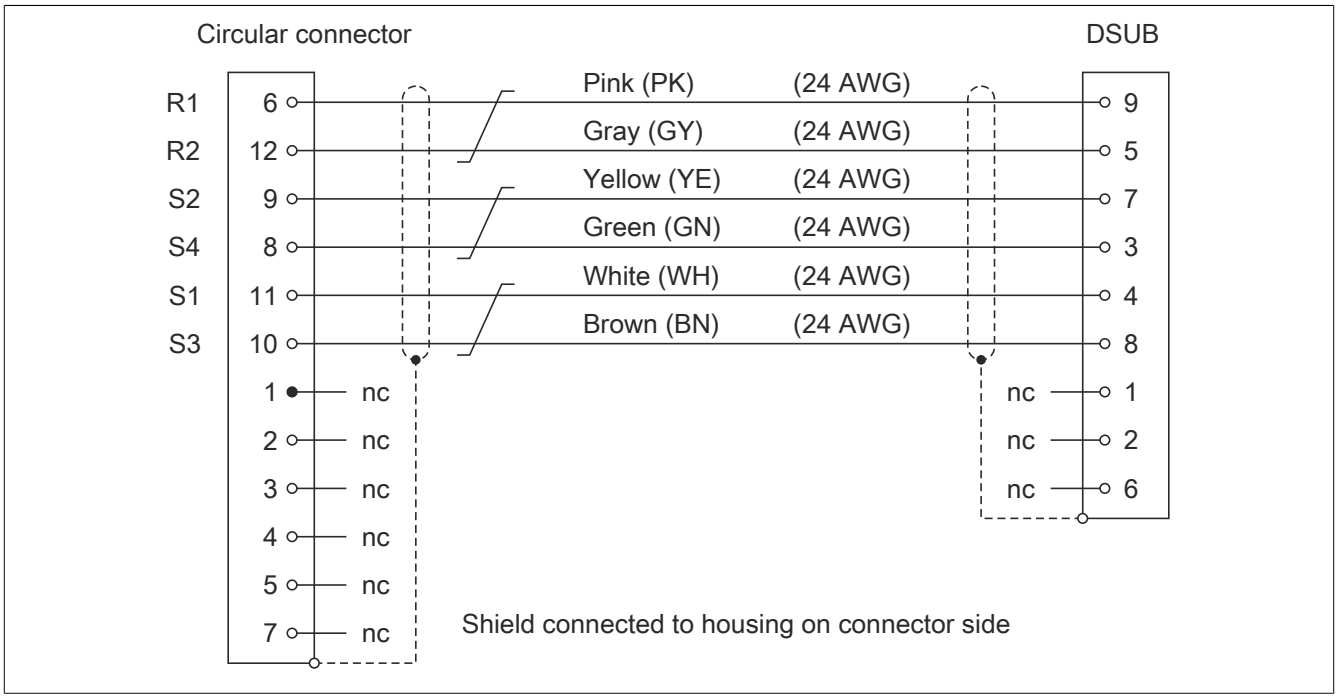


Figure 15: Resolver cables - Cable diagram

3.5.3.5.3 EnDat 2.2 cables

3.5.3.5.3.1 8BCFxxxx.1221B-0 - EnDat 2.2 cables

Order data

Order number	Short description	Figure
	EnDat 2.2 cables	
8BCF0002.1221B-0	EnDat 2.2 cable, length 2 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0005.1221B-0	EnDat 2.2 cable, length 5 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0007.1221B-0	EnDat 2.2 cable, length 7 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0010.1221B-0	EnDat 2.2 cable, length 10 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0015.1221B-0	EnDat 2.2 cable, length 15 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0020.1221B-0	EnDat 2.2 cable, length 20 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0025.1221B-0	EnDat 2.2 cable, length 25 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	

Table 110: 8BCF0002.1221B-0, 8BCF0005.1221B-0, 8BCF0007.1221B-0, 8BCF0010.1221B-0, 8BCF0015.1221B-0, 8BCF0020.1221B-0, 8BCF0025.1221B-0 - Order data

Information:

Other cable lengths and raw cables are available from B&R upon request.

Technical data

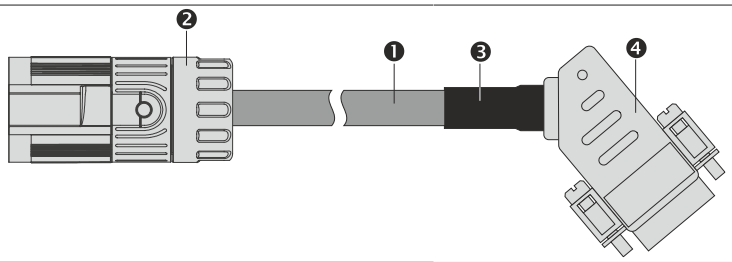
Order number	8BCF0002. 1221B-0	8BCF0005. 1221B-0	8BCF0007. 1221B-0	8BCF0010. 1221B-0	8BCF0015. 1221B-0	8BCF0020. 1221B-0	8BCF0025. 1221B-0
General information							
Cable cross section	4x 0.14 mm² + 4x 0.35 mm²						
Durability	Oil resistance per DIN EN 50363-10-2 (VDE 0207-363-10-2) as well as standard cleaning agents and hydraulic oil [1]						
Certification	UL AWM Style 20963, 80°C, 30 V, E63216 [1]						
Certifications							
CE	Yes						
UL	cULus E225616 Power conversion equipment						
Cable construction							
Supply lines							
Quantity	4						
Wire insulation	Special thermoplastic material						
Wire colors	White/Green, brown/green, blue, white						
Variant	Tinned copper stranded wire						
Cross section	0.35 mm²						
Shield	No						
Stranding	No						
Signal line							
Quantity	4						
Wire insulation	Polyolefin foam						
Wire colors	Yellow, gray, pink, violet						
Variant	Tinned copper stranded wire						
Cross section	0.14 mm²						
Shield	No						
Stranding	All 4 wires together						
Cable stranding	With terminating foil shield						
Cable shield	Copper/Tin braiding, optical coverage ≥85%						
Outer jacket							
Material	PUR						
Color	Green flat						
Labeling	B&R 4x0,14 + 4x0,35 FLEX (UL) AWM STYLE 20963 80°C 30 V E63216 [1]						
Connector							
Type	EnDat 12-pin female springtec connector						
Mating cycles	<500						
Contacts	12						
Additional connectors	9-pin male DSUB servo connector Mating cycles: <200 Contacts: 9 Degree of protection per EN 60529: IP20 when connected						
Degree of protection per EN 60529	IP66/67 when connected						
Electrical properties [1]							
Operating voltage	≤30 V						
Test voltage							
Wire/Wire	1 kV						
Wire/Shield	0.5 kV						
Conductor resistance							
Supply lines	≤55 Ω/km						
Signal line	≤134 Ω/km						
Insulation resistance	>200 MΩ*km						
Ambient conditions [1]							
Temperature							
Moving	-20°C to +80°C						
Static	-20°C to +80°C						
Mechanical properties [1]							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6 mm ± 0.2 mm						
Bend radius							
Single bend	≥19 mm						
Moving	≥47 mm						
Drag chain data							
Acceleration	≤6 g						
Flex cycles [2]	≥3,000,000						
Velocity	≤4 m/s						
Weight	0.1 kg	0.3 kg	0.41 kg	0.6 kg	0.9 kg	1.2 kg	1.5 kg

Table 111: 8BCF0002.1221B-0, 8BCF0005.1221B-0, 8BCF0007.1221B-0, 8BCF0010.1221B-0, 8BCF0015.1221B-0, 8BCF0020.1221B-0, 8BCF0025.1221B-0 - Technical data

1) Values refer to the raw cable being used.
2) Valid at an ambient temperature of 20°C and bend radius of 78 mm.

Wiring

Construction



Pos.	Description	Note
1	Encoder cable	4x 0.14 mm² + 4x 0.35 mm²
2	Circular connector, 12-pin female	
3	Heat shrink tubing	
4	DSUB housing 45°, metal-plated, 9-pin connector	

Table 112: 8BCF EnDat 2.2 cables - Construction

Pinout

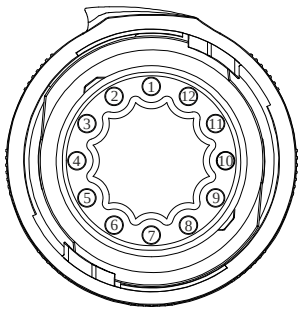
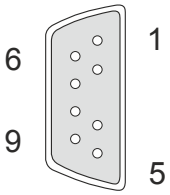
Circular connector	Pin	Description	Function	Pin	DSUB connector
	1	+12 V out	Encoder power supply +12 V	1	
	2	D	Data input	4	
	3	D\	Data inverted	8	
	4	T	Clock output	5	
	5	T\	Clock output inverted	9	
	6	Batt COM	Battery backup 0 V	7	
	7	COM	Encoder power supply 0 V	6	
	8	---	Coding contact		
	9	---			
	10	---			
	11	---			
	12	Vbatt	Battery backup power supply	2	

Table 113: 8BCF EnDat 2.2 cables - Pinout

Cable diagram

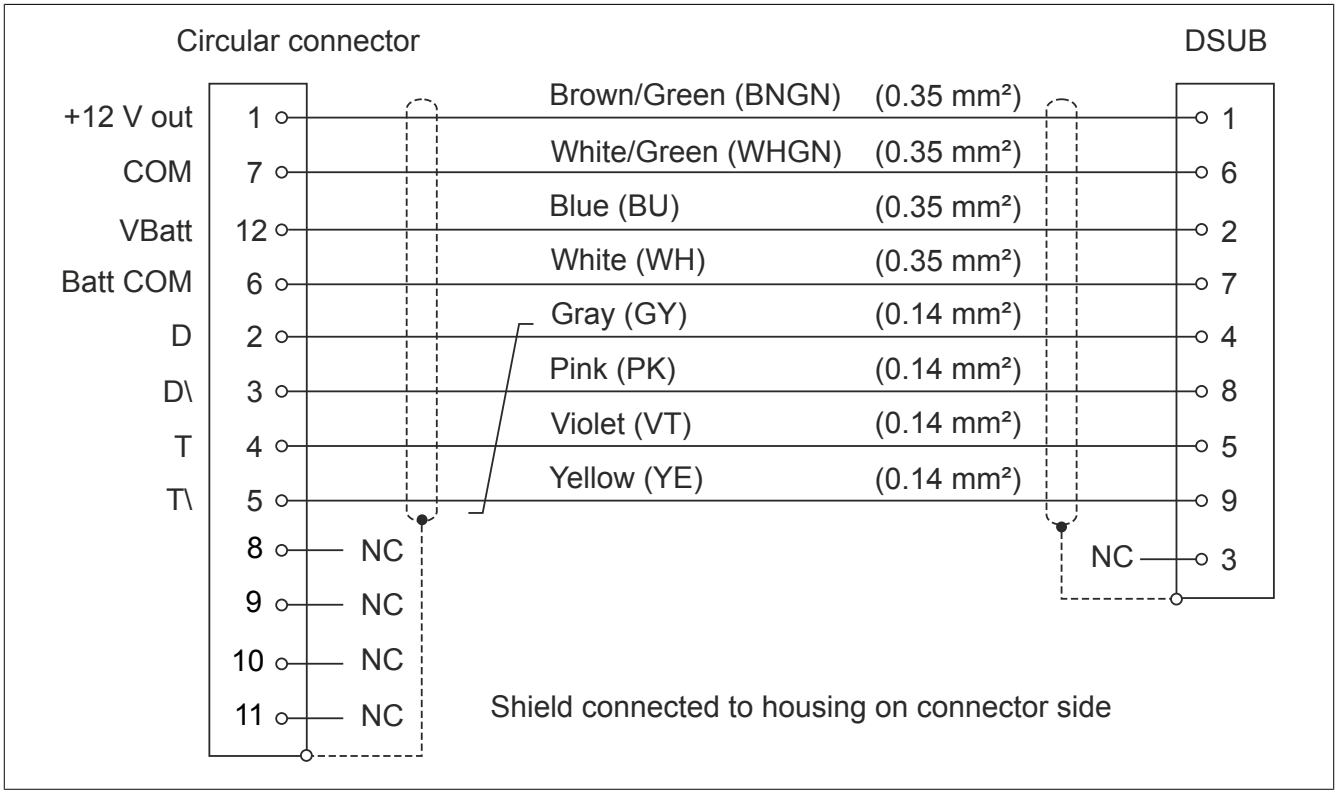


Figure 16: 8BCF EnDat 2.2 cables - Cable diagram

3.5.3.5.4 LinMot hybrid cable

3.5.3.5.4.1 80CMxx016.77-01 - LinMot hybrid cable

Order data



Order number	Short description
	LinMot hybrid cable
80CM01016.77-01	ACOPOSmicro LinMot hybrid cable, length 1 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed
80CM02016.77-01	ACOPOSmicro LinMot hybrid cable, length 2 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed
80CM03016.77-01	ACOPOSmicro LinMot hybrid cable, length 3 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed
80CM05016.77-01	ACOPOSmicro LinMot hybrid cable, length 5 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed
80CM10016.77-01	ACOPOSmicro LinMot hybrid cable, length 10 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed
80CM15016.77-01	ACOPOSmicro LinMot hybrid cable, length 15 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed
80CM20016.77-01	ACOPOSmicro LinMot hybrid cable, length 20 m, 4x 0.5 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M17 connector the on motor side, can be used in cable drag chains, UL/CSA listed

Table 114: 80CM01016.77-01, 80CM02016.77-01, 80CM03016.77-01, 80CM05016.77-01, 80CM10016.77-01, 80CM15016.77-01, 80CM20016.77-01 - Order data

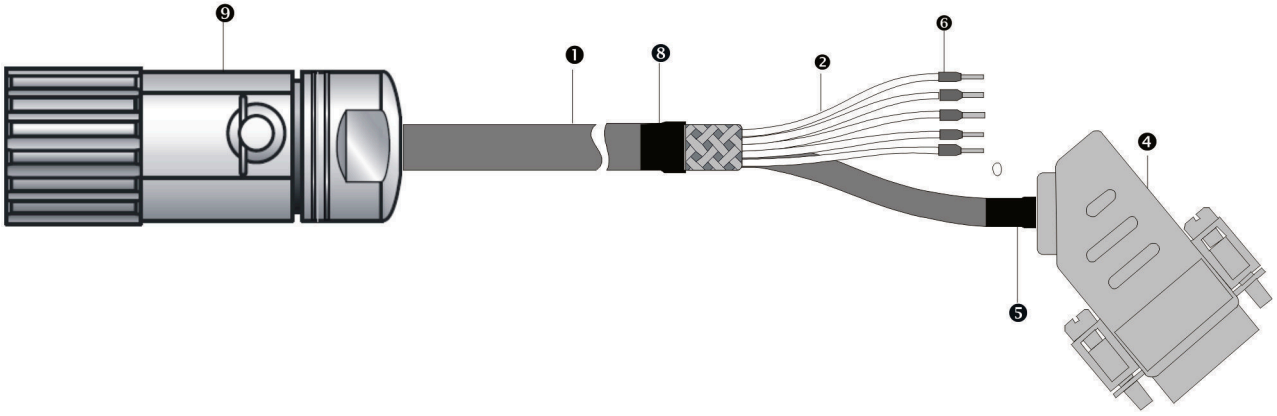
Technical data

Order number	80CM01016.77-01	80CM02016.77-01	80CM03016.77-01	80CM05016.77-01	80CM10016.77-01	80CM15016.77-01	80CM20016.77-01
General information							
Cable cross section	4x 0.14 mm² + 4x 0.5 mm²						
Cable construction							
Power lines							
Quantity	8						
Wire insulation	TPE						
Wire colors	0.14 mm²: White, black, green, yellow; 0.5 mm²: Red, pink, blue, gray						
Variant	0.14 mm² tinned copper braid						
Cross section	0.14 mm² and 0.5 mm²						
Shield	Tinned copper braid						
Stranding	Wires braided in layers						
Cable stranding	Via inner element (4x 0.14 mm²) C wires 0.5 mm² optimally braided in layers						
Cable shield	Tinned copper braid						
Outer jacket							
Material	PUR						
Color	Jet black						
Labeling	Linear motor cable KS05						
Electrical properties							
Test voltage							
Wire/Wire	2000 V						
Wire/Shield	1200 V						
Mechanical properties							
Dimensions							
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m
Diameter	9.5 mm						
Bend radius							
Single bend	5x wire diameter						
Moving	10x wire diameter						
Can be used in cable drag chains	Yes						

Table 115: 80CM01016.77-01, 80CM02016.77-01, 80CM03016.77-01, 80CM05016.77-01, 80CM10016.77-01, 80CM15016.77-01, 80CM20016.77-01 - Technical data

Wiring

Pinout



Position	Quantity	Description
1	1	Motor line (Cable diameter: 9.5 mm) (4x 0.5 mm²) (4x 0.14 mm²)
2	1	Cable shield covered with heat shrink tubing: Color: Yellow/Green
4	1	DSUB
5	1	Heat shrink tubing
6	5	Wire end sleeve
8	1	Heat shrink tubing
9	1	9-pin connection

Table 116: Components

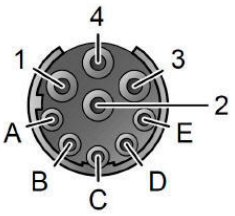
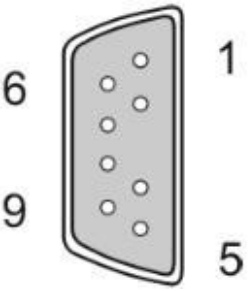
Connection	Pin	Description	Color	Function	Pin	Connection
	1	Ph1+	Red	Motor connection Ph1+		
	2	Ph1-	Pink	Motor connection Ph1-		
	3	Ph2+	Blue	Motor connection Ph2+		
	4	Ph2-	Gray	Motor connection Ph2-		
	A	+5 VDC	White	Encoder power supply 5 V	1	
	B	AGND	Inner shield	Encoder power supply 0 V	6	
	C	+Sin	Yellow	Sine	2	
	D	+Cos	Green	Cosine	5	
	E	Temperature	Black	TEMP	8	
		Jacket	-	External shield		

Table 117: Pinout

Cable diagram

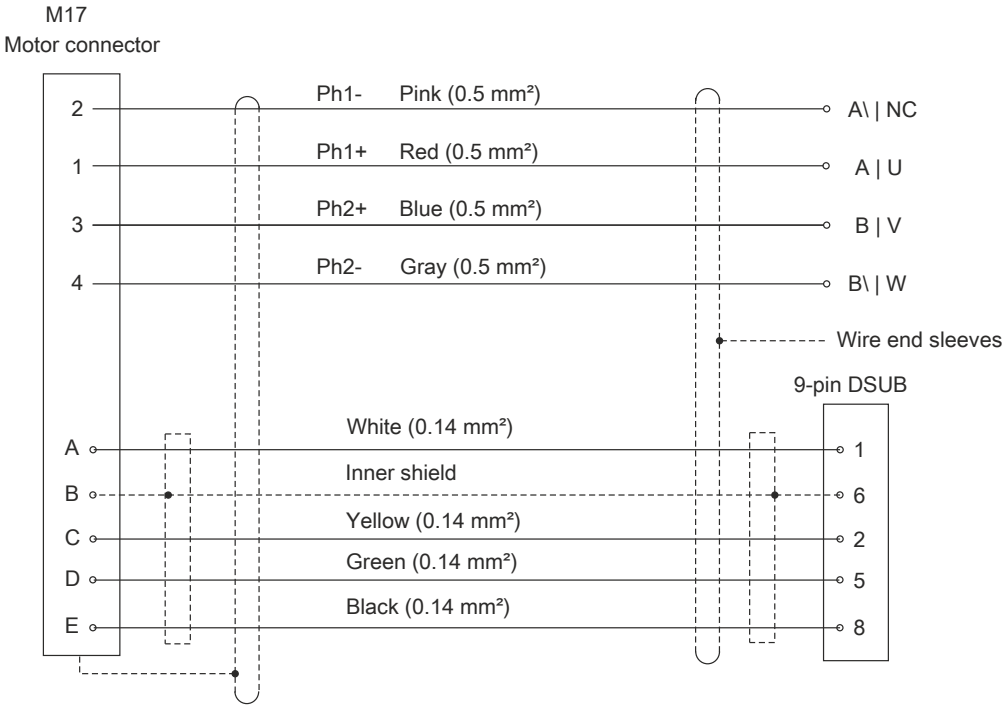


Table 118: Cable diagram

3.5.3.5.4.2 80CMxx016.87-01 - LinMot hybrid cable

Order data



Order number	Short description
	LinMot hybrid cable
80CM01016.87-01	ACOPOSmicro LinMot hybrid cable, length 1 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed
80CM02016.87-01	ACOPOSmicro LinMot hybrid cable, length 2 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed
80CM03016.87-01	ACOPOSmicro LinMot hybrid cable, length 3 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed
80CM05016.87-01	ACOPOSmicro LinMot hybrid cable, length 5 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed
80CM10016.87-01	ACOPOSmicro LinMot hybrid cable, length 10 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed
80CM15016.87-01	ACOPOSmicro LinMot hybrid cable, length 15 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed
80CM20016.87-01	ACOPOSmicro LinMot hybrid cable, length 20 m, 4x 1 mm² + 4x 0.14 mm², 9-pin male DSUB connector on the servo side, 9-pin female Intercontec M23 connector on the motor side, can be used in cable drag chains, UL/CSA listed

Table 119: 80CM01016.87-01, 80CM02016.87-01, 80CM03016.87-01, 80CM05016.87-01, 80CM10016.87-01, 80CM15016.87-01, 80CM20016.87-01 - Order data

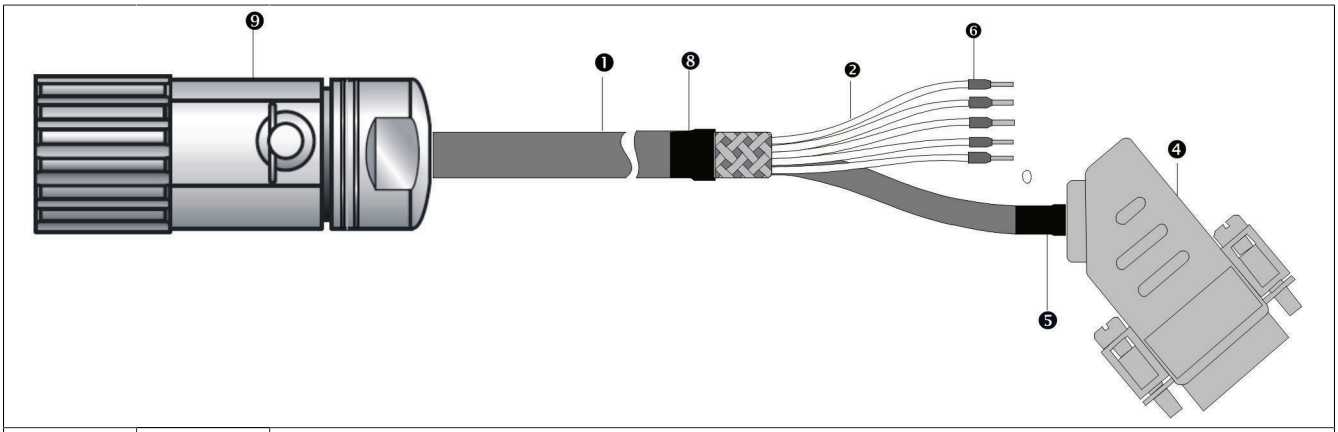
Technical data

Order number	80CM01016.87-01	80CM02016.87-01	80CM03016.87-01	80CM05016.87-01	80CM10016.87-01	80CM15016.87-01	80CM20016.87-01
General information							
Cable cross section	4x 0.14 mm² + 4x 1 mm²						
Cable construction							
Power lines							
Quantity	8						
Wire insulation	TPE						
Wire colors	0.14 mm²: white, black, green, yellow; 1 mm²: red, pink, blue, gray						
Variant	0.14 mm² tinned copper braid						
Cross section	0.14 mm² and 1 mm²						
Shield	Tinned copper braid						
Stranding	Wires braided in layers						
Cable stranding	Via inner element (4x 0.14 mm²) C wires 1 mm² optimally braided in layers						
Cable shield	Tinned copper braid						
Outer jacket							
Material	PUR						
Color	Jet black						
Labeling	Linear motor cable KS010						
Electrical properties							
Test voltage							
Wire/Wire	2000 V						
Wire/Shield	1200 V						
Mechanical properties							
Dimensions							
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m
Diameter	10.8 mm						
Bend radius							
Single bend	5x wire diameter						
Moving	10x wire diameter						
Can be used in cable drag chains	Yes						

Table 120: 80CM01016.87-01, 80CM02016.87-01, 80CM03016.87-01, 80CM05016.87-01, 80CM10016.87-01, 80CM15016.87-01, 80CM20016.87-01 - Technical data

Wiring

Pinout



Position	Quantity	Description
1	1	Motor line (Cable diameter: 10.8 mm) (4x 1 mm²) (4x 0.14 mm²)
2	1	Cable shield covered with heat shrink tubing: Color: Yellow/Green
4	1	DSUB
5	1	Heat shrink tubing
6	5	Wire end sleeve
8	1	Heat shrink tubing
9	1	9-pin connection

Table 121: Components

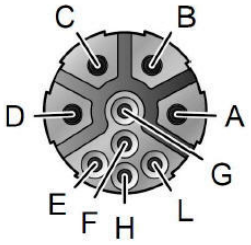
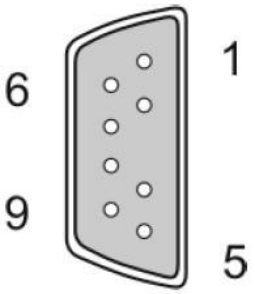
Connection	Pin	Description	Color	Function	Pin	Connection
	A	Phase1+	Red	Motor connection Ph1+		
	B	Phase1-	Pink	Motor connection Ph1-		
	C	Phase2+	Blue	Motor connection Ph2+		
	D	Phase2-	Gray	Motor connection Ph2-		
	E	+5 VDC	White	Encoder power supply 5 V	1	
	F	AGND	Inner shield	Encoder power supply 0 V	6	
	G	Sin+	Yellow	Sine input+	2	
	H	Cos+	Green	Cosine input-	5	
	L	Temperature	Black	TEMP	8	
		Jacket	-	External shield		

Table 122: Pinout

Cable diagram

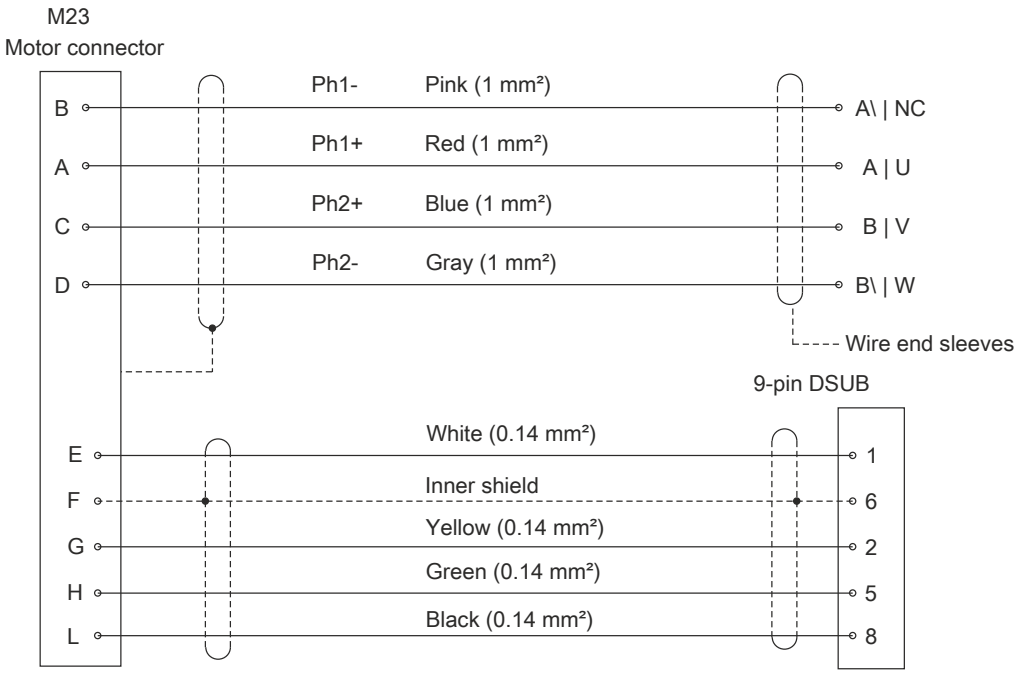


Table 123: Cable diagram

3.5.3.5.5 Hybrid cable

3.5.3.5.5.1 8BCM00X5.1B48E-0 - SSI hybrid cable

Order data

Order number	Short description	Figure
	Accessories	
8BCM00X5.1B48E-0	8WS/ACOPOSmicro hybrid motor cable, length 0.5 m, ((2x(2x26AWG) + 2x24AWG)C + 3x16AWG)C, female 12+3-pin Itec hybrid motor connector, can be used in cable drag chains	

Table 124: 8BCM00X5.1B48E-0 - Order data

Technical data

Order number	8BCM00X5.1B48E-0
General information	
Cable cross section	((2x(2x26AWG) + 2x24AWG)C + 3x16AWG)C
Durability	Oil resistance per EN 60811-404
Certification	UL AWM Style 20233, 80°C, 300V
Cable construction	
Power lines	
Quantity	3
Wire insulation	TPE
Wire colors	Red, black, white
Design	Copper stranded wire
Cross section	1.31 mm²
Shield	No
Stranding	No
Signal lines	
Quantity	6
Wire insulation	TPE
Wire colors	Green, pink, yellow, gray, red, blue
Design	Copper stranded wire
Cross section	4x 0.128 mm², 2x 0.205 mm²
Shield	Tinned copper braiding, optical coverage > 85% and foil shield
Stranding	2 pairs + 2 conductors with filler elements and foil shield
Cable stranding	1 element + 3 conductors with filler elements and foil shield
Complete shielding	Tinned copper braiding, optical coverage > 85% and foil shield
Outer jacket	
Material	PUR
Color	Black
Labeling	8BCM00X5.1B48E-0 Rev.C0 L = 500 mm 5015519-00-0 01/18 W www.br-automation.com B&R, 5142 Eggelsberg, Austria
Connector	
Type	12+3-pin female series 915 hybrid motor connector
Connection cycles	<500
Contacts	15
Additional connectors	9-pin male DSUB connector Mating cycles: <500 Contact: 9 Degree of protection per EN 60529: IP20 when connected
Degree of protection per EN 60529	IP66/67 when connected
Electrical characteristics	
Test voltage	
Wire/Wire	2 kV
Wire/Shield	1.5 kV
Conductor resistance	
Power lines	≤87 Ω/km
Signal lines	≤137 Ω/km
Insulation resistance	>200 MΩ/km
Environmental conditions	
Temperature	
Moving	-20 to 80°C
Static	-40 to 80°C
Mechanical properties	
Dimensions	
Length	0.5 m
Diameter	(8.7 ± 0.3) mm

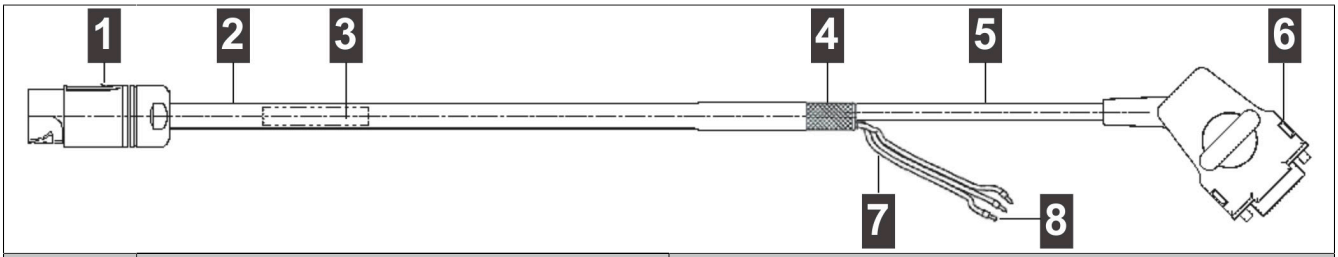
Table 125: 8BCM00X5.1B48E-0 - Technical data

Order number	8BCM00X5.1B48E-0
Bend radius	
Single bend	≥3x diameter
Moving	≥10x diameter
Drag chain data	
Acceleration	2 m/s²
Flex cycles	1,000,000
Speed	3 m/s
Weight	0.63 kg

Table 125: 8BCM00X5.1B48E-0 - Technical data

Wiring

Cable construction

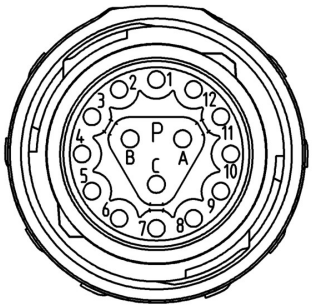
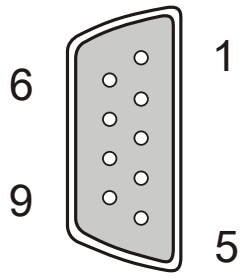


Position	Description	Note
1	Connection side X1 Intercontec motor coupling, 12+3-pin	With female contacts (uncontacted slots are equipped with empty pins)
2	Hybrid line	(500 + 10 mm)
3	Line identification	-
4	Braided shield	(30 + 10 mm)
5	Line section of encoder connection	(160 + 10 mm)
6	Connection side X2 Angled DSUB connector, 9-pin	With male contacts (uncontacted slots are equipped with empty pins)
7	Line section of motor power supply	(50 - 10 mm)
8	3x wire end sleeves	For free wiring, connection to the drive system

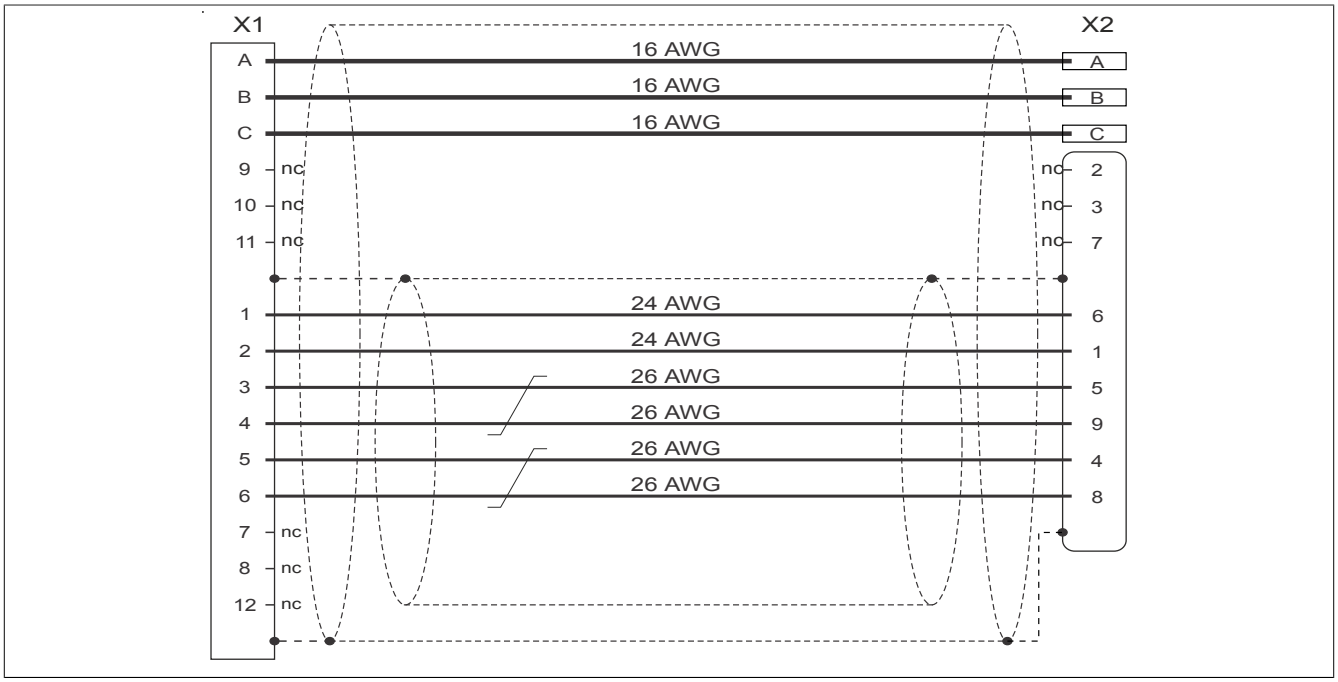
Information:

At least the last 300 mm on connection side X2 (output controller side) must be laid statically!

Pinout

Connection X1 (motor)	Pin	Description	Color	Function	Pin	Connection X2 (drive)
	A	Mot.Ph.U	Red	Motor connection U	A	Wire end sleeves
	B	Mot.Ph.V	White	Motor connection V	B	
	C	Mot.Ph.W	Black	Motor connection W	C	
	9	n.c.	-	Not connected	2	
	10	n.c.	-	Not connected	3	
	11	n.c.	-	Not connected	7	
	1	GND	-	Encoder power supply GND	6	
	2	U+ / 5 V	-	Encoder power supply 5 V	1	
	3	T	-	Clock output	5	
	4	T\	-	Clock output inverted	9	
	5	D	-	Data	4	
	6	D\	-	Data inverted	8	
	7	n.c.	-	Not connected	-	
	8	n.c.	-	Not connected	-	
	12	n.c.	-	Not connected	-	

Cable diagram



3.5.3.5.5.2 8CHxxx.1A-1 - Hybrid cable

Order data

Order number	Short description	Figure
	1.5 mm² hybrid motor cable	
8CH003.1A-1	ACOPOSmicro hybrid motor cable, length 3 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	
8CH005.1A-1	ACOPOSmicro hybrid motor cable, length 5 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	
8CH007.1A-1	ACOPOSmicro hybrid motor cable, length 7 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	
8CH010.1A-1	ACOPOSmicro hybrid motor cable, length 10 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	
8CH015.1A-1	ACOPOSmicro hybrid motor cable, length 15 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	
8CH020.1A-1	ACOPOSmicro hybrid motor cable, length 20 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	
8CH025.1A-1	ACOPOSmicro hybrid motor cable, length 25 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.24 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains, UL/CSA listed	

Table 126: 8CH003.1A-1, 8CH005.1A-1, 8CH007.1A-1, 8CH010.1A-1, 8CH015.1A-1, 8CH020.1A-1, 8CH025.1A-1 - Order data

Technical data

Order number	8CH003.1A-1	8CH005.1A-1	8CH007.1A-1	8CH010.1A-1	8CH015.1A-1	8CH020.1A-1	8CH025.1A-1
General information							
Cable cross section	4x 1.5 mm² + 2x 0.75 mm² + (2x 1x 0.24 mm² + 2x 2x 0.15 mm²)						
Durability	Oil resistance per EN 60811-2-1 [1)]						
Certification	UL AWM Style 21223, 80°C, 1000 V and CSA C22.2 No. 210 I/II A/B FT1 [1)]						
Certifications							
CE	Yes						
UL	cULus E225616 Power conversion equipment						
Cable construction							
Power lines							
Quantity	4						
Wire insulation	PP						
Wire colors	Black, brown, blue, yellow/green						
Design	Copper stranded wire						
Cross section	1.5 mm²						
Shield	No						
Stranding	No						
Supply lines							
Quantity	2						
Wire insulation	PP						
Wire colors	White/Blue, white/green						
Design	Tinned copper stranded wire						
Cross section	0.75 mm²						
Shield	No						
Stranding	No						
Signal lines							
Quantity	6						
Wire insulation	PP						
Wire colors	Brown/Green, white/green, gray/pink, yellow/violet						
Design	2x copper stranded wire, 4x tinned copper stranded wire						
Cross section	2x 0.24 mm², 4x 0.15 mm²						
Shield	Tinned copper braiding, optical coverage > 85% and foil shield						
Stranding	Brown/Green with white/green, pink with gray and yellow with violet						
Cable stranding	With filler elements and foil shield						

Table 127: 8CH003.1A-1, 8CH005.1A-1, 8CH007.1A-1, 8CH010.1A-1, 8CH015.1A-1, 8CH020.1A-1, 8CH025.1A-1 - Technical data

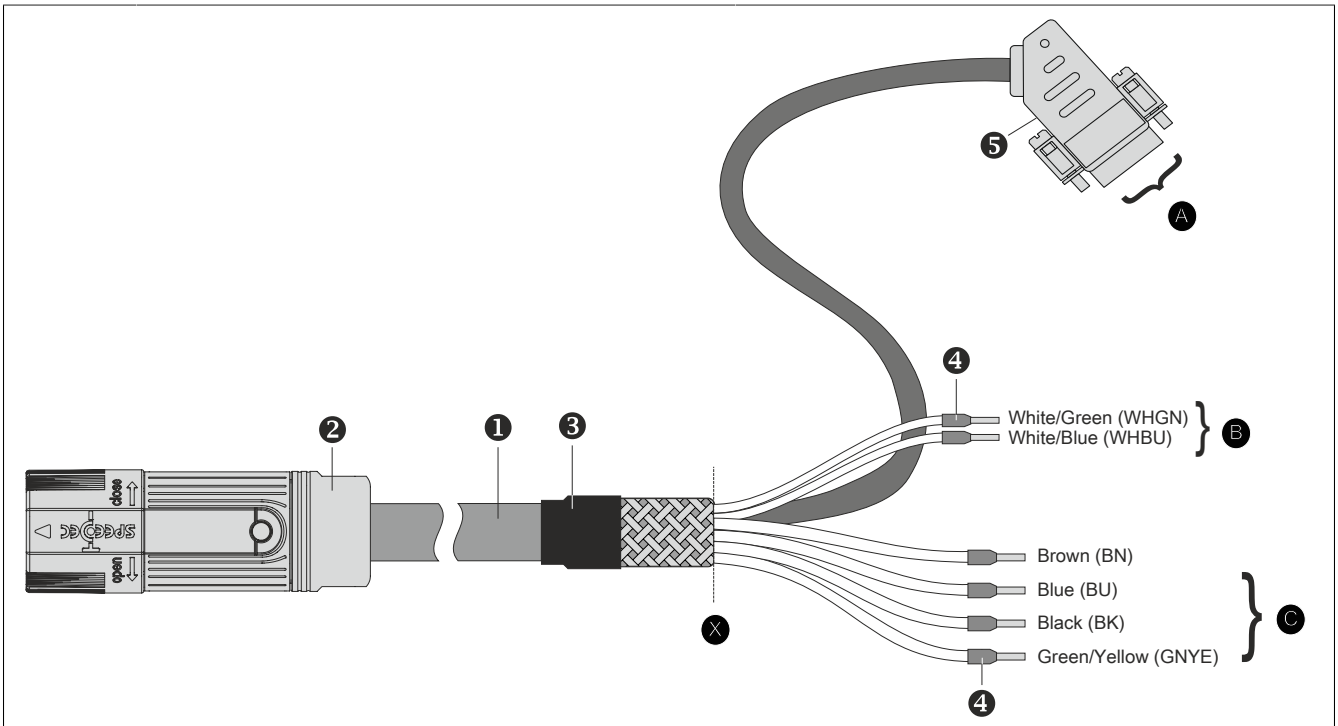
Order number	8CH003.1A-1	8CH005.1A-1	8CH007.1A-1	8CH010.1A-1	8CH015.1A-1	8CH020.1A-1	8CH025.1A-1
Complete shielding	Tinned copper braiding, optical coverage > 85% and foil shield						
Outer jacket							
Material	PUR						
Color	Orange, similar to RAL 2003 flat						
Labeling	B&R 4x1.5 + 2x0.75 + (2x2x26AWG + 2x1x24AWG) * E130266 * cRUus AWM STYLE 21223 * AWM I/II A/B 80°C 1000 V FT1 [1]						
Connector							
Type	13-pin female speedtec hybrid motor connector						
Connection cycles	<500						
Contacts	13						
Additional connectors	9-pin male DSUB connector Mating cycles: >50 Contacts: 9 Degree of protection per EN 60529: IP20 when connected						
Degree of protection per EN 60529	IP67 when connected						
Electrical characteristics [1]							
Test voltage							
Wire/Wire	4 kV						
Wire/Shield	4 kV						
Conductor resistance							
Power lines	≤13.3 Ω/km						
Supply lines	≤26 Ω/km						
Signal lines	0.24 mm²: ≤84 Ω/km, 0.15 mm²: ≤140 Ω/km						
Insulation resistance	≥200 MΩ*km						
Current-carrying capacity per DIN VDE 0298 part 4, table 11							
Wall mounting	20.2 A						
Installed in conduit or cable duct	17.8 A						
Installed in cable tray	20.9 A						
Environmental conditions [1]							
Temperature							
Moving	-20°C to +85°C						
Static	-20°C to +85°C						
Mechanical properties [1]							
Dimensions							
Length	3 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	13 mm ± 0.4 mm						
Bend radius							
Single bend	>54 mm						
Moving	≥100 mm						
Drag chain data							
Acceleration	Max. 50 m/s² (depends on the length of the travel path)						
Flex cycles	≤3,000,000						
Speed	Max. 300 m/min						
Weight	0.7 kg	1.2 kg	1.7 kg	2.4 kg	3.6 kg	4.8 kg	5.9 kg

Table 127: 8CH003.1A-1, 8CH005.1A-1, 8CH007.1A-1, 8CH010.1A-1, 8CH015.1A-1, 8CH020.1A-1, 8CH025.1A-1 - Technical data

1) Values refer to the raw cable being used.

Wiring

Cable construction



Pos.	Description	Note
1	Hybrid cable	For 8CHxxx.1A-1: 4x 1.5 mm² + 2x 0.75 mm² + (2x 0.30 mm² + 2x 2x 0.15 mm²)
2	13-pin female speedtec hybrid motor connector	
3	Heat shrink tubing	
4	Wire end sleeves	
5	DSUB housing	
Custom cable length from point x (for 1.5 mm²)		
A	190 mm	
B	75 mm	
C	65 mm	

Table 128: Hybrid motor cables - Cable construction

Pinout

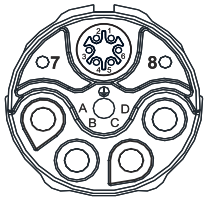
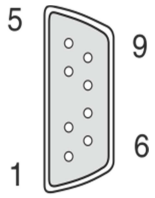
Circular connector	Pin	Description	Function	Pin	DSUB connector
	6	T\	Clock output inverted	9	
	1	U+	Encoder power supply +12 V	1	
	2	COM	Encoder power supply 0 V	6	
	3	D	Data	4	
	4	D\	Data inverted	8	
	5	T	Clock output	5	
	7	B-	Brake 0 V	-	
	8	B+	Brake +24 V	-	
	A	U	Motor connection U	-	
	B	V	Motor connection V	-	
	C	W	Motor connection W	-	
	D	-	-	-	
	⏚	PE	Protective ground conductor	-	

Table 129: Hybrid motor cables - Pinout

Cable diagram

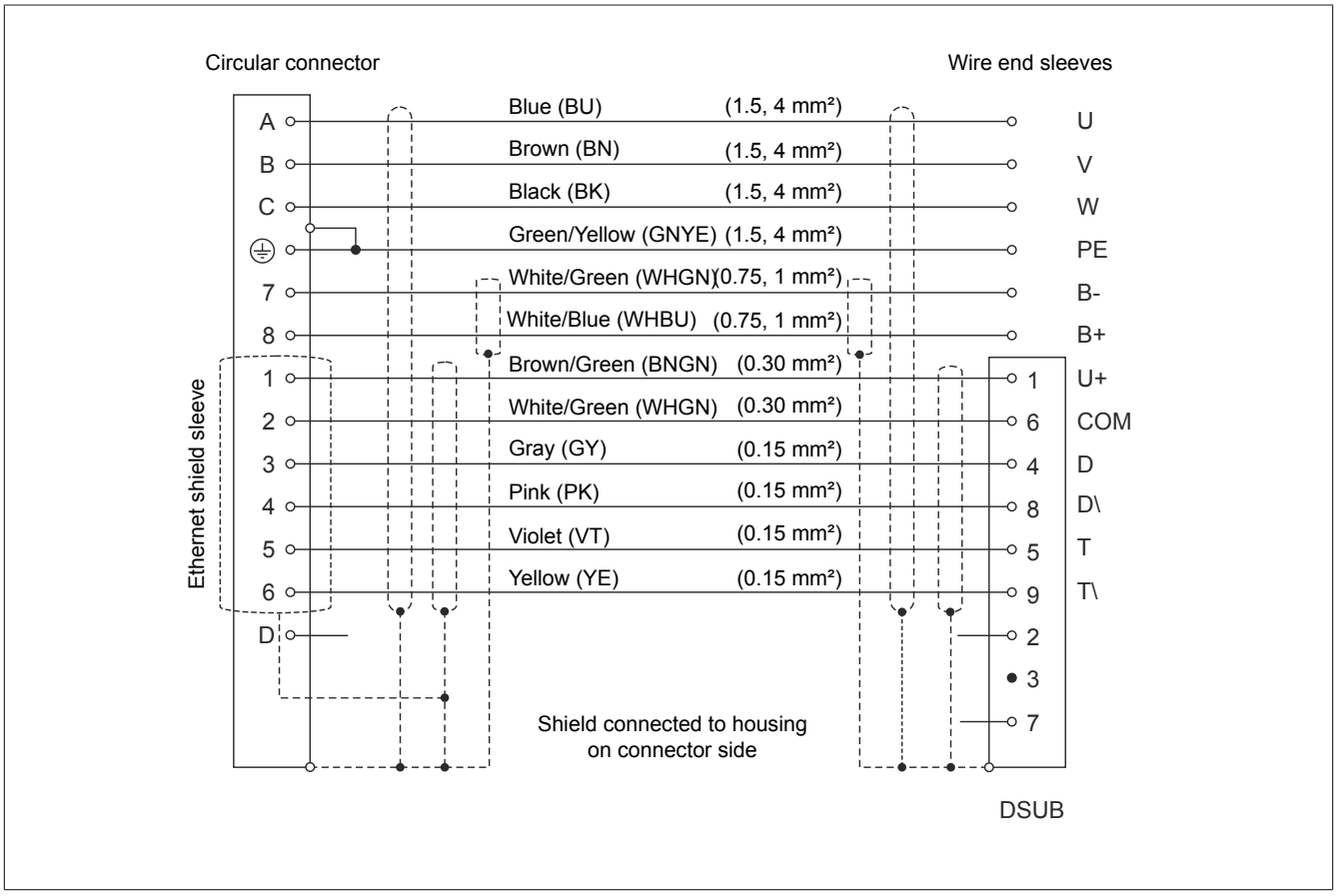


Figure 17: Hybrid motor cables - Cable diagram

3.5.4 Cable extensions

3.5.4.1 Cable extension for motor cable 0.75 mm² with springtec connector

3.5.4.1.1 Order data



Order number	Short description
	Motor cables 0.75 mm² SpringTec connector
8BCM0005.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 5 m, can be used in cable drag chains, UL/CSA listed
8BCM0006.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 6 m, can be used in cable drag chains, UL/CSA listed
8BCM0007.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 7 m, can be used in cable drag chains, UL/CSA listed
8BCM0010.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 10 m, can be used in cable drag chains, UL/CSA listed
8BCM0015.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 15 m, can be used in cable drag chains, UL/CSA listed
8BCM0017.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 17 m, can be used in cable drag chains, UL/CSA listed
8BCM0020.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 20 m, can be used in cable drag chains, UL/CSA listed
8BCM0025.10360-0	Cable extension for 0.75 mm² motor cables with springtec connector, length 25 m, can be used in cable drag chains, UL/CSA listed

Table 130: 8BCM0005.10360-0, 8BCM0006.10360-0, 8BCM0007.10360-0, 8BCM0010.10360-0, 8BCM0015.10360-0, 8BCM0017.10360-0, 8BCM0020.10360-0, 8BCM0025.10360-0 - Order data

3.5.4.1.2 Technical data

Order number	8BCM0005.10360-0	8BCM0006.10360-0	8BCM0007.10360-0	8BCM0010.10360-0	8BCM0015.10360-0	8BCM0017.10360-0	8BCM0020.10360-0	8BCM0025.10360-0
General information								
Cable cross section	4x 0.75 mm² + 2x 2x 0.34 mm²							
Durability	Oil resistance per HD 22.10 appendix A, DIN EN 60811-404 [1]							
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]							
Certifications								
CE	Yes							
UL	cULus E225616 Power conversion equipment							
Cable construction								
Power lines								
Quantity	4							
Wire insulation	PP							
Wire colors	Black, brown, blue, yellow/green							
Variant	Tinned copper stranded wire							
Cross section	0.75 mm²							
Shield	No							
Stranding	No							
Signal line								
Quantity	4							
Wire insulation	PP							
Wire colors	White, white/red, white/blue, white/green							
Variant	Tinned copper stranded wire							
Cross section	0.34 mm²							
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage > 85% and foil shield							
Stranding	White with white/red and white/blue with white/green							
Cable stranding	With filler elements and foil shield							
Cable shield	Tinned copper braiding, optical coverage > 85% and foil shield							
Outer jacket								
Material	TPU							
Color	Orange, similar to RAL 2003 flat							
Labeling	B&R 4 G 0.75 + 2 x (2x0.34)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 production order number [1]							
Connector								
Type	9-pin female springtec circular connector							
Mating cycles	<500							
Contacts	9							

Table 131: 8BCM0005.10360-0, 8BCM0006.10360-0, 8BCM0007.10360-0, 8BCM0010.10360-0, 8BCM0015.10360-0, 8BCM0017.10360-0, 8BCM0020.10360-0, 8BCM0025.10360-0 - Technical data

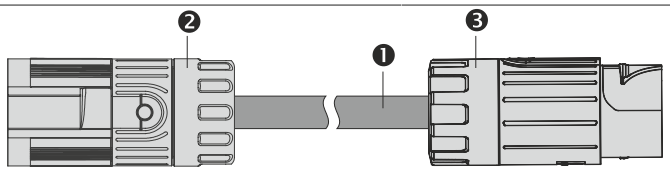
Order number	8BCM0005.10360-0	8BCM0006.10360-0	8BCM0007.10360-0	8BCM0010.10360-0	8BCM0015.10360-0	8BCM0017.10360-0	8BCM0020.10360-0	8BCM0025.10360-0
Additional connectors	9-pin male coupling Mating cycles: <500 Contacts: 9 Degree of protection per EN 60529: IP66/67 when connected							
Degree of protection per EN 60529	IP66/67 when connected							
Electrical properties [1]								
Operating voltage	Max. 1000 V AC (UL)							
Test voltage								
Wire/Wire	4 kV							
Wire/Shield	4 kV							
Conductor resistance								
Power lines	≤26.7 Ω/km							
Signal line	≤56 Ω/km							
Insulation resistance	≥500 MΩ*km							
Current-carrying capacity per DIN VDE 0298 part 4, table 11								
Wall mounting	13 A							
Installed in conduit or cable duct	11.5 A							
Installed in cable tray	13.5 A							
Ambient conditions [1]								
Temperature								
Moving	-20°C to +80°C							
Static	-20°C to +90°C							
Mechanical properties [1]								
Dimensions								
Length	5 m	6 m	7 m	10 m	15 m	17 m	20 m	25 m
Diameter	10.1 mm ± 0.3 mm							
Bend radius								
Single bend	>32 mm							
Moving	>78 mm							
Drag chain data								
Acceleration	Max. 50 m/s² (depends on the length of the travel path)							
Flex cycles [2]	≤5,000,000							
Velocity	Max. 300 m/min							
Weight	0.45 kg	0.53 kg	0.62 kg	0.89 kg	1.34 kg	1.51 kg	1.78 kg	2.23 kg

Table 131: 8BCM0005.10360-0, 8BCM0006.10360-0, 8BCM0007.10360-0, 8BCM0010.10360-0, 8BCM0015.10360-0, 8BCM0017.10360-0, 8BCM0020.10360-0, 8BCM0025.10360-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

3.5.4.1.3 Wiring

3.5.4.1.3.1 Cable construction



Pos	Description	Note
1	Motor line	4x 0.75 mm² + 2x 2x 0.34 mm²
2	9-pin female circular connector	Dimensions: ø 19 x 42 mm
3	9-pin coupling	Dimensions: ø 19 x 41.4 mm

Table 132: Cable extension for 0.75 mm² motor cables - Cable construction

3.5.4.1.3.2 Pinout

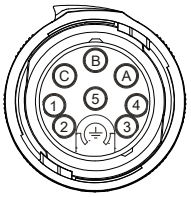
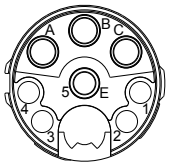
Connector	Pin	Description	Function	Coupling
	A	U	Motor connection U	
	B	V	Motor connection V	
	C	W	Motor connection W	
	⏚	PE	Protective ground conductor	
	1	T+	Temperature +	
	2	T-	Temperature -	
	3	B+	Brake +	
	4	B-	Brake -	
	5	---	---	

Table 133: 0.75 mm² motor cable extension - Pinout

3.5.4.1.3.3 Cable diagram

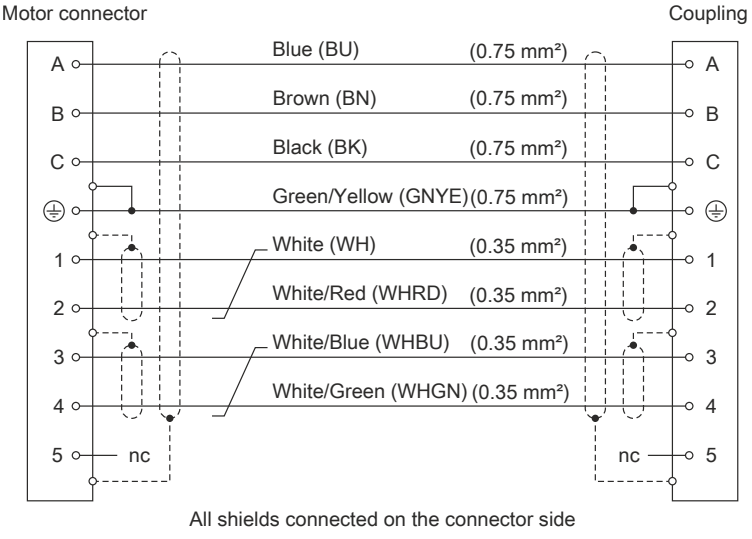


Figure 18: Cable extension for 0.75 mm² motor cables - Cable diagram

3.5.4.2 Cable extension for resolver cable with springtec connector

3.5.4.2.1 Order data



Order number	Short description
	Resolver Cables SpringTec connector
8BCR0005.11230-0	Cable extension for resolver cable with springtec connector, length 5 m, can be used in cable drag chains, UL/CSA listed
8BCR0007.11230-0	Cable extension for resolver cable with springtec connector, length 7 m, can be used in cable drag chains, UL/CSA listed
8BCR0010.11230-0	Cable extension for resolver cable with springtec connector, length 10 m, can be used in cable drag chains, UL/CSA listed
8BCR0015.11230-0	Cable extension for resolver cable with springtec connector, length 15 m, can be used in cable drag chains, UL/CSA listed
8BCR0017.11230-0	Cable extension for resolver cable with springtec connector, length 17 m, can be used in cable drag chains, UL/CSA listed
8BCR0020.11230-0	Cable extension for resolver cable with springtec connector, length 20 m, can be used in cable drag chains, UL/CSA listed
8BCR0025.11230-0	Cable extension for resolver cable with springtec connector, length 25 m, can be used in cable drag chains, UL/CSA listed

Table 134: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0017.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Order data

3.5.4.2.2 Technical data

Order number	8BCR0005.11230-0	8BCR0007.11230-0	8BCR0010.11230-0	8BCR0015.11230-0	8BCR0017.11230-0	8BCR0020.11230-0	8BCR0025.11230-0
General information							
Cable cross section	3x 2x 24 19 AWG						
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]						
Certification	UL AWM Style 20671, 90°C, 30 V, E63216 and CSA AWM, 90°C, 30 V, I/II A/B FT1 LL46064 [1]						
Certifications							
CE	Yes						
UL	cULus E225616 Power conversion equipment						
Cable construction							
Signal line							
Quantity	6						
Wire insulation	Special thermoplastic material						
Wire colors	White/Brown, green/yellow, gray/pink						
Variant	Tinned copper stranded wire						
Cross section	24 AWG / 19 AWG						
Shield	No						
Stranding	White with brown, green with yellow, gray with pink						
Cable stranding	The 3 pairs together covered by foil shield						
Cable shield	Copper braiding, optical coverage ≥ 90% and foil shield						
Outer jacket							
Material	PUR						
Color	Green, similar to RAL 6018 flat						
Labeling	B&R 3x2x24 AWG FLEX UL AWM STYLE 20671 90°C 30 V E63216 CSA AWM 90°C 30 V I/II A/B FT1 LL46064 [1]						
Connector							
Type	12-pin female springtec circular connector						
Mating cycles	<500						
Contacts	12						
Additional connectors	12-pin male coupling Mating cycles: <500 Contacts: 12 Degree of protection per EN 60529: IP66/67 when connected						
Degree of protection per EN 60529	IP66/67 when connected						
Electrical properties [1]							
Operating voltage	≤30 V_{eff}						
Test voltage							
Wire/Wire	1.5 kV						
Wire/Shield	0.8 kV						
Conductor resistance							
Signal line	≤86 Ω/km						
Insulation resistance	>200 MΩ*km						

Table 135: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0017.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Technical data

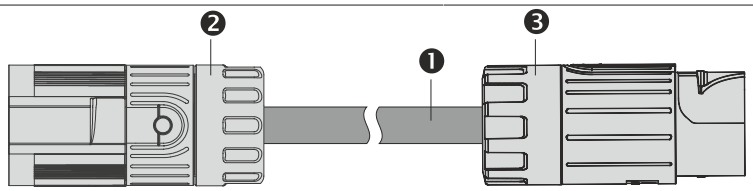
Order number	8BCR0005.11230-0	8BCR0007.11230-0	8BCR0010.11230-0	8BCR0015.11230-0	8BCR0017.11230-0	8BCR0020.11230-0	8BCR0025.11230-0
Ambient conditions [1]							
Temperature							
Moving	-20°C to +80°C						
Static	-20°C to +90°C						
Mechanical properties [1]							
Dimensions							
Length	5 m	7 m	10 m	15 m	17 m	20 m	25 m
Diameter	6.5 mm ± 0.2 mm						
Bend radius							
Single bend	≥20 mm						
Moving	≥50 mm						
Drag chain data							
Acceleration	≤6 g						
Flex cycles [2]	≥3,000,000						
Velocity	≤4 m/s						
Weight	0.4 kg	0.49 kg	0.7 kg	1.1 kg	1.2 kg	1.4 kg	1.8 kg

Table 135: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0017.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

3.5.4.2.3 Wiring

3.5.4.2.3.1 Cable construction



Pos	Description	Note
1	Encoder line	3 x 2 x 24 AWG/19
2	12-pin female circular connector	
3	12-pin male coupling	

Table 136: Cable construction - Cable extension resolver with springtec connector

3.5.4.2.3.2 Pinout

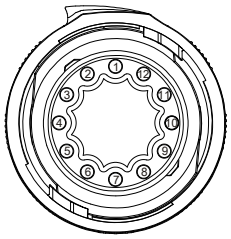
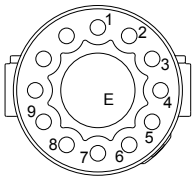
Connector	Pin	Description	Function	Pin	Coupling
	1	---	Coding contact		
	2	---			
	3	---			
	4	---			
	5	---			
	6	R1	Reference output inverted	9	
	7	---			
	8	S4	Sine input +	3	
	9	S2	Sine input -	7	
	10	S3	Cosine input +	8	
	11	S1	Cosine input -	4	
	12	R2	Reference output	5	

Table 137: 12-pin male springtec connector - Pinout

3.5.4.2.3.3 Cable diagram

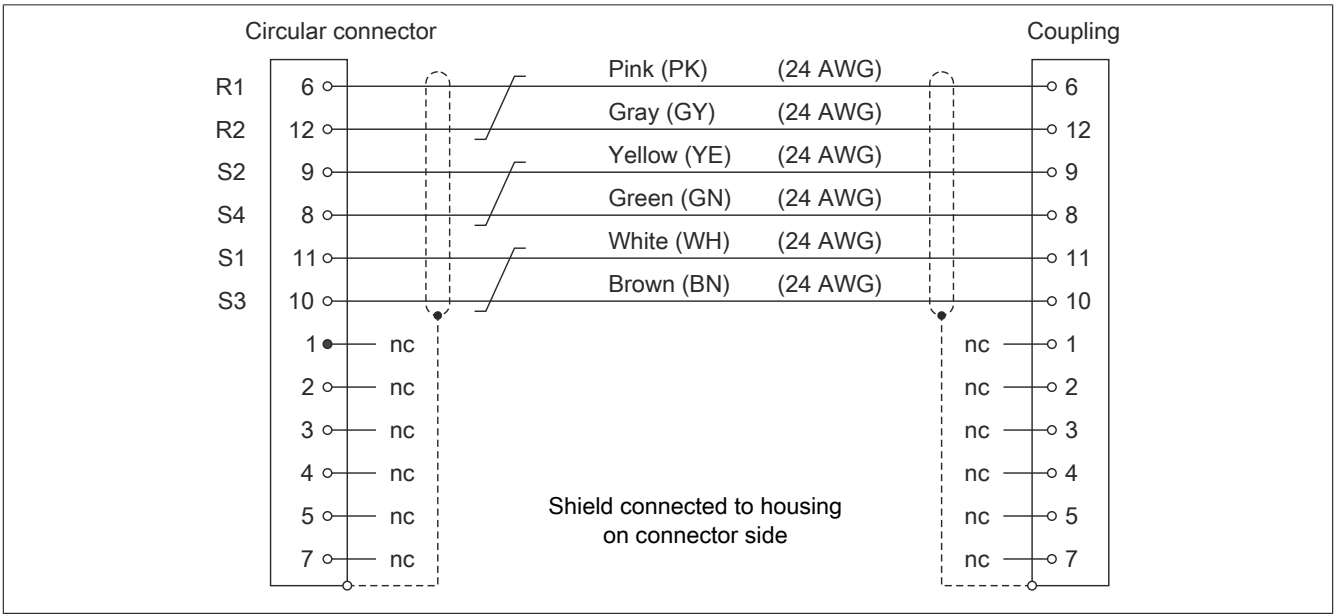


Figure 19: Resolver cable extension with male springtec connector - Cable diagram

3.5.4.3 Cable extension for SSI hybrid cable

3.5.4.3.1 Order data



Order number	Short description
	Accessories
8BCM0003.1B470-0	8WS hybrid motor cable extension, length 3 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG +3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains
8BCM0005.1B470-0	8WS hybrid motor cable extension, length 5 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG +3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains
8BCM0010.1B470-0	8WS hybrid motor cable extension, length 10 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG +3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains
8BCM0015.1B470-0	8WS hybrid motor cable extension, length 15 m, ((3x(2x26AWG)+(2x24AWG))C+3x26AWG +3x16AWG)C, 12+3-pin Itec hybrid motor connector, can be used in cable drag chains

Table 138: 8BCM0003.1B470-0, 8BCM0005.1B470-0, 8BCM0010.1B470-0, 8BCM0015.1B470-0 - Order data

3.5.4.3.2 Technical data

Order number	8BCM0003.1B470-0	8BCM0005.1B470-0	8BCM0010.1B470-0	8BCM0015.1B470-0
General information				
Cable cross section	((3x(2x26AWG)+(2x24AWG))C + 3x26AWG + 3x16AWG)C			
Durability	Oil resistance per EN 60811-404			
Certification	UL AWM style 20233, 80°C, 300 V			
Cable construction				
Power lines				
Quantity	3			
Wire insulation	TPE			
Wire colors	Red, black, white			
Design	Copper stranded wire			
Cross section	1.31 mm²			
Shield	No			
Stranding	No			
Supply lines				
Quantity	3			
Wire insulation	TPE			
Wire colors	Brown, orange, yellow			
Design	Copper stranded wire			
Cross section	0.128 mm²			
Shield	No			
Stranding	No			
Signal lines				
Quantity	8			
Wire insulation	TPE			
Wire colors	Green, pink, yellow, gray, brown, white, red, blue			
Design	Copper stranded wire			
Cross section	6x 0.128 mm², 2x 0.205 mm²			
Shield	Tinned copper braiding, optical coverage >85% and foil shield			
Stranding	4 pairs with filler elements and foil shield			
Cable stranding	1 element + 6 conductors with filler elements and foil shield			
Complete shielding	Tinned copper braiding, optical coverage >85% and fleece shield			
Outer jacket				
Material	PUR			
Color	Black			
Connector				
Type	12+3-pin female hybrid motor connector 915			
Connection cycles	<500			
Contacts	15			
Additional connectors	12+3-pin male series 915 hybrid motor connector			
Degree of protection per EN 60529	IP66/67 when connected			
Electrical characteristics				
Test voltage				
Wire/Wire	2 kV			
Wire/Shield	1.5 kV			
Conductor resistance				
Power lines	≤87 Ω/km			
Signal lines	≤137 Ω/km			
Insulation resistance	>200 MΩ/km			

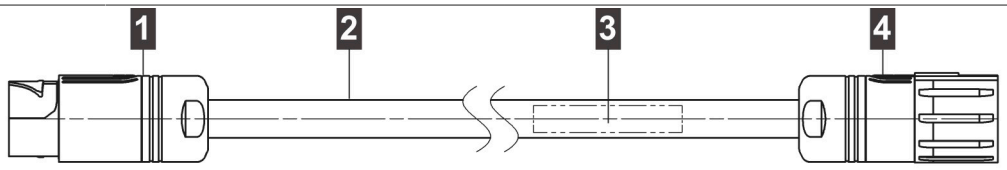
Table 139: 8BCM0003.1B470-0, 8BCM0005.1B470-0, 8BCM0010.1B470-0, 8BCM0015.1B470-0 - Technical data

Order number	8BCM0003.1B470-0	8BCM0005.1B470-0	8BCM0010.1B470-0	8BCM0015.1B470-0
Environmental conditions				
Temperature				
Moving	-20 to 80°C			
Static	-40 to 80°C			
Mechanical properties				
Dimensions				
Length	3 m	5 m	10 m	15 m
Diameter	(9.7 ± 0.3) mm			
Bend radius				
Single bend	≥3x diameter			
Moving	≥10x diameter			
Drag chain data				
Acceleration	2 m/s²			
Flex cycles	1,000,000			
Speed	3 m/s			
Weight	0.51 kg	0.81 kg	1.56 kg	2.31 kg

Table 139: 8BCM0003.1B470-0, 8BCM0005.1B470-0, 8BCM0010.1B470-0, 8BCM0015.1B470-0 - Technical data

3.5.4.3.3 Wiring

3.5.4.3.3.1 Cable construction

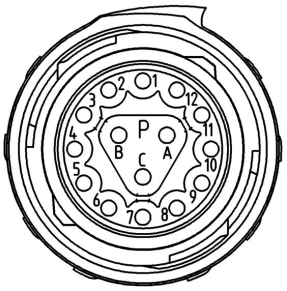
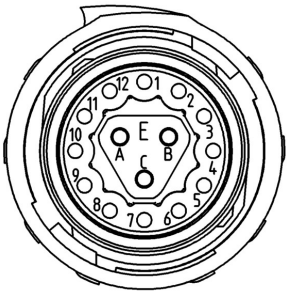


Position	Quantity	Description	Note
1	1	12+3-pin Intercontec coupling	With female contacts (uncontacted slots are equipped with empty pins)
2	1	Hybrid line (5000 + 100 mm)	((3x (2x 26 AWG) + (2x 24 AWG))C + 3x 26 AWG + 3x 16 AWG)C
3	1	Line identification	-
4	1	12+3-pin Intercontec male connector	With male contacts (uncontacted slots are equipped with empty pins)

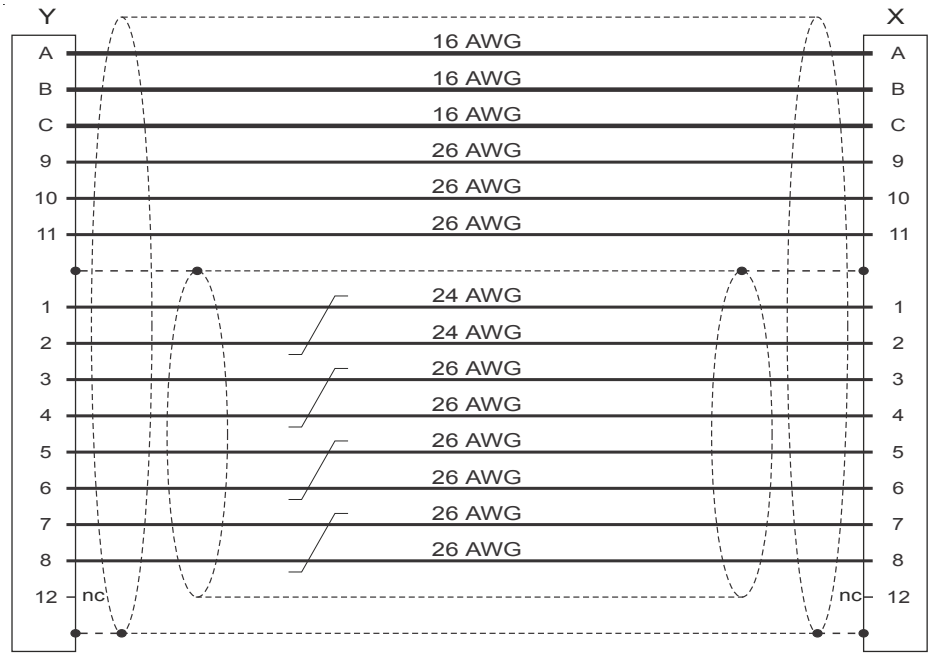
Information:

Relevant standards must be observed during installation!

3.5.4.3.3.2 Pinout

Connection Y (coupling)	Pin	Description	Function	Connection X (male connector)
	A	U	Motor connection U	
	B	V	Motor connection V	
	C	W	Motor connection W	
	9	-	-	
	10	-	-	
	11	-	-	
	1	GND	Encoder power supply GND	
	2	U+ / 5 V	Encoder power supply 5 V	
	3	T	Clock output	
	4	T\	Clock output inverted	
	5	D	Data	
	6	D\	Data inverted	
	7	-	-	
	8	-	-	
	12	n.c.	Not connected	

3.5.4.3.3.3 Cable diagram



3.5.5 Braking resistors

3.5.5.1 Dimensions

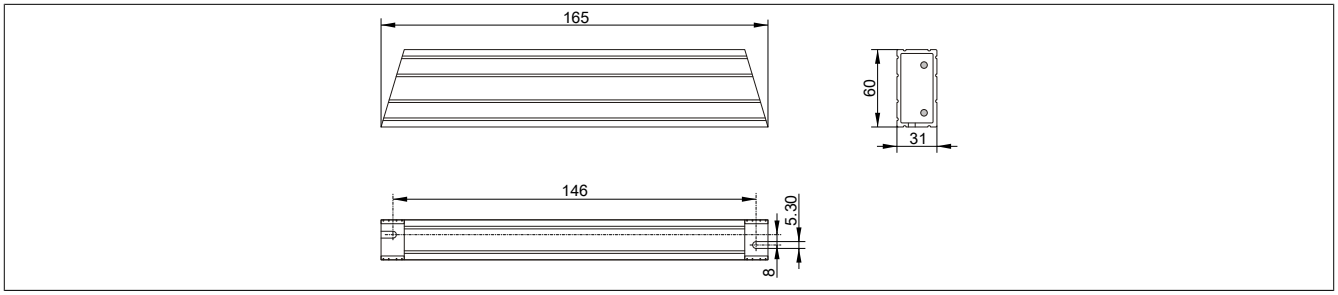


Figure 20: Dimensions

3.5.5.2 80XBR0025.010-11

3.5.5.2.1 Order data

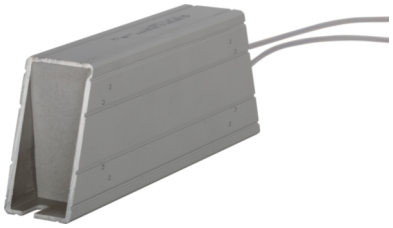
Order number	Short description	Figure
	Braking resistor	
80XBR0025.010-11	Braking resistor for power supply module 80PS080X3.10-01 2.5 Ω 100 W	

Table 140: 80XBR0025.010-11 - Order data

3.5.5.2.2 Technical data

Order number	80XBR0025.010-11
General information	
RoHS-compliant	Yes
Cooling and mounting method	Wall mounting
Certification	
cULus	Yes
Braking resistors	
Continuous power	
Horizontal	100 W
Ohmic resistance	2.5 Ω ±10%
Max. operating voltage	1100 VDC
Isolation voltage type test	3500 VAC
Design	
RB1, RB2	Connecting wires 500 mm long
Temperature model data	
Thermal resistance between braking resistor and the environment	5.075 K/W
Heat capacitance of the filament	5.4 J/K
Max. permitted overtemperature of wire resistor	558°C
Operating conditions	
Permitted mounting orientations	
Horizontal	Yes
EN 60529 protection	IP50
Environmental conditions	
Temperature	
Operation	-40 to 90°C
Relative humidity	
Operation	5 to 95%
Mechanical characteristics	
Dimensions	
Width	165 mm
Height	60 mm
Depth	31 mm
Weight	0.39 kg

Table 141: 80XBR0025.010-11 - Technical data

3.5.5.3 80XBR0055.010-11

3.5.5.3.1 Order data

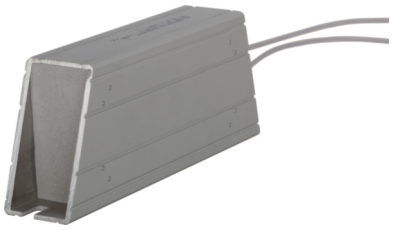
Order number	Short description	Figure
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	

Table 142: 80XBR0055.010-11 - Order data

3.5.5.3.2 Technical data

Order number	80XBR0055.010-11
General information	
RoHS-compliant	Yes
Cooling and mounting method	Wall mounting
Certification	
cULus	Yes
Braking resistors	
Continuous power	
Horizontal	100 W
Ohmic resistance	5.5 Ω ±10%
Max. operating voltage	1100 VDC
Isolation voltage type test	3500 VAC
Design	
RB1, RB2	Connecting wires 500 mm long
Temperature model data	
Thermal resistance between braking resistor and the environment	5.155 K/W
Heat capacitance of the filament	3.8 J/K
Max. permitted overtemperature of wire resistor	567°C
Operating conditions	
Permitted mounting orientations	
Horizontal	Yes
EN 60529 protection	IP50
Environmental conditions	
Temperature	
Operation	-40 to 90°C
Relative humidity	
Operation	5 to 95%
Mechanical characteristics	
Dimensions	
Width	165 mm
Height	60 mm
Depth	31 mm
Weight	0.39 kg

Table 143: 80XBR0055.010-11 - Technical data

3.5.6 Hose clamps

Order data

Order number	Short description	Figure
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	

Table 144: 80XSC0000.00-01, 80XSC0000.00-10 - Order data

3.5.7 Signal connectors

3.5.7.1 Order data

Model number	Short description	Figure
	Thru-bulkhead receptacles	
8BXC004.0000-00	Signal connector, 9-pin, for motor cables with springtec connector, UL/CSA listed	
8BXC005.0000-00	Signal connector, 12-pin, for resolver cables with springtec connector, UL/CSA listed	
8BXC009.0000-00	Signal connector, 12-pin, for encoder cables with springtec connector, UL/CSA listed	

Table 145: 8BXC004.0000-00, 8BXC005.0000-00, 8BXC009.0000-00 - Order data

3.5.7.2 Technical data

Product ID	8BXC004.0000-00	8BXC005.0000-00	8BXC009.0000-00
General information			
Short description	Signal connector, 9-pin, for motor cables with springtec connector, UL/CSA listed	Signal connector, 12-pin, for resolver cables with springtec connector, UL/CSA listed	Signal connector, 12-pin, for encoder cables with springtec connector, UL/CSA listed
Certification	UL / CSA		
Mechanical characteristics			
Dimensions			
Length		51 mm	
Diameter		ø 21 mm	
Weight	56 g	52 g	54 g

Table 146: 8BXC004.0000-00, 8BXC005.0000-00, 8BXC009.0000-00 - Technical data

3.5.8 Backup battery

Order data

Order number	Short description	Figure
	Batteries	
80XB120A2.36-00	1x lithium battery, 1/2 AA 3.6 V	

Table 147: 80XB120A2.36-00 - Order data

3.5.9 Accessories included in delivery

Brief description of accessories delivered with the ACOPOSmicro
Accessory set for EMC-compatible installation of the data cable and the PE connection See "EMC-compatible installation" on page 215 and "Protective ground connection PE" on page 221.
ACOPOSmicro multilingual warning labels. See ACOPOSmicro multilingual warning labels.

3.5.9.1 ACOPOSmicro multilingual warning labels



For information about how to use these stickers, see section 1.2.7.1 "Protection against contact with electrical parts" on page 12 and section 1.2.7.3 "Protection against burns" on page 14.

4 Installation

ACOPOSmicro modules must be installed on a flat surface that is dimensioned correctly. The dimension diagram lists the number and type of mounting screws to be used.

When installing the device, the specifications listed in the technical data for maximum operating temperature and protection level must be met (see "Technical data" on page 23).

Products must be protected against impermissible dirt and contaminants. Products are protected from dirt and contaminants up to pollution degree II as specified in the IEC 60664 standard.

Pollution degree II can usually be achieved in an enclosure with IP54 protection, but operation in condensing relative humidity is NOT permitted.

> **Danger!**
>
> **Pollution levels higher than specified by pollution degree II in standard IEC 60664 can result in dangerous failures. It is extremely important that you ensure a proper operating environment.**

4.1 ACOPOSmicro with cold plate

4.1.1 ACOPOSmicro dimension diagram with cold plate

Installation dimensions are the same for all of the ACOPOSmicro modules described in this manual.

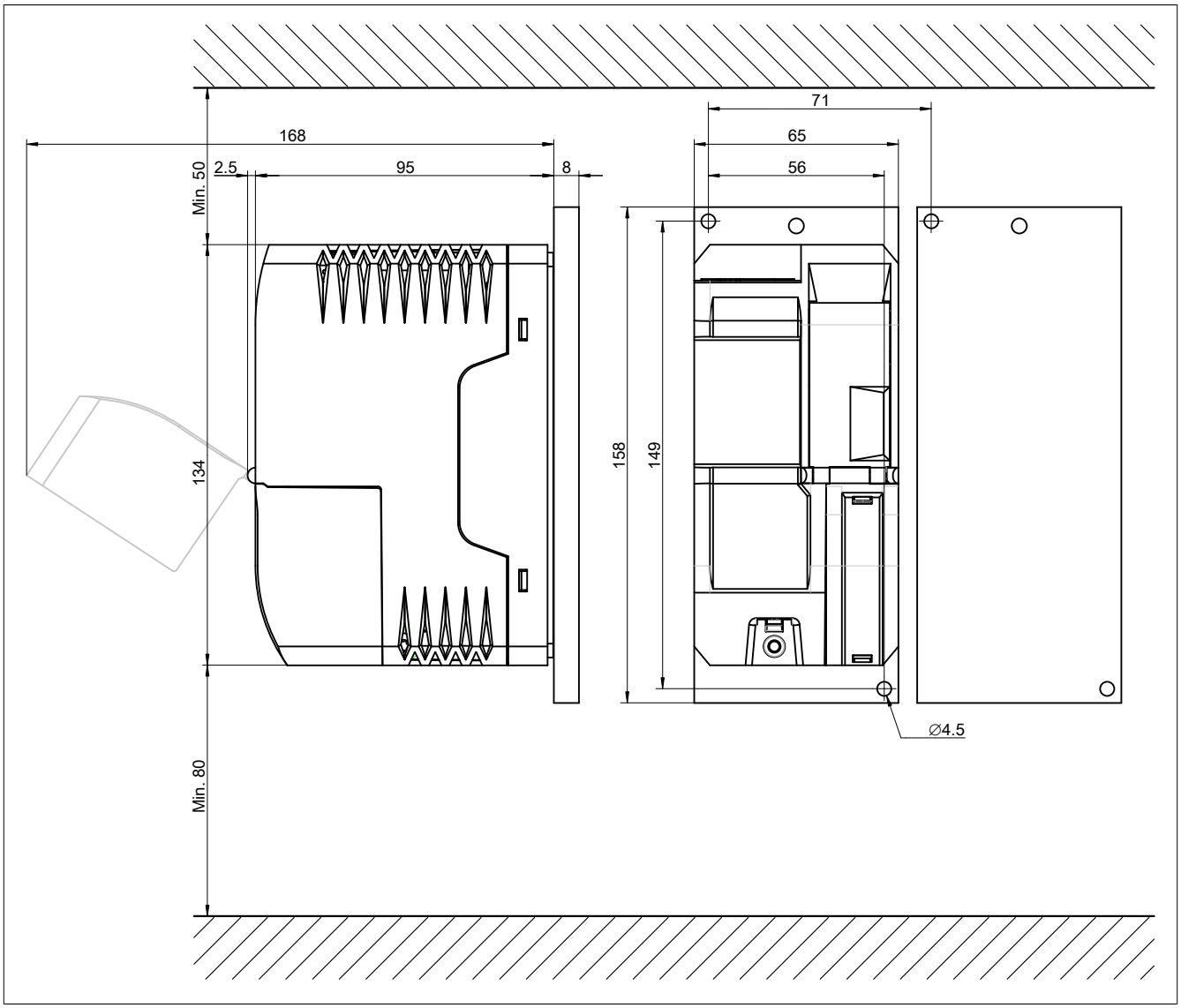


Figure 21: Dimension diagram and installation dimensions for ACOPOSmicro modules with cold plate

The swivel range of the connector covers on the front of the ACOPOSmicro modules must not be impeded during installation in order to avoid any wiring problems.

For sufficient air circulation, a free space must be provided above and below the ACOPOSmicro modules (above min. 50 mm, below min. 80 mm).

ACOPOSmicro modules can be mounted with a minimum space of 6 mm between modules.

4.1.2 Cold plate mounting

The mounting surface for the mounting plate or for the cold plate must provide sufficient stability in addition to being non-flammable, level and free of contaminants.

Heat dissipation paste must be applied between the heat spreader on the ACOPOSmicro and the mounting plate.

The heat spreader must not be scratched during installation in order to avoid degraded heat dissipation to the mounting plate.

For the spacing that is to be observed during the installation and ventilation of ACOPOSmicro modules, see section"ACOPOSmicro dimension diagram with cold plate" on page 205.

Caution!

The heat spreader must cover the entire mounting surface!

Attaching to uneven surfaces can lead to reduced heat dissipation from ACOPOSmicro modules.

4.1.3 Unmounting from the cold plate

If a heat-conducting paste was used to install the ACOPOSmicro on a cold plate, the drive module can be detached from the cold plate using an M6 screw.

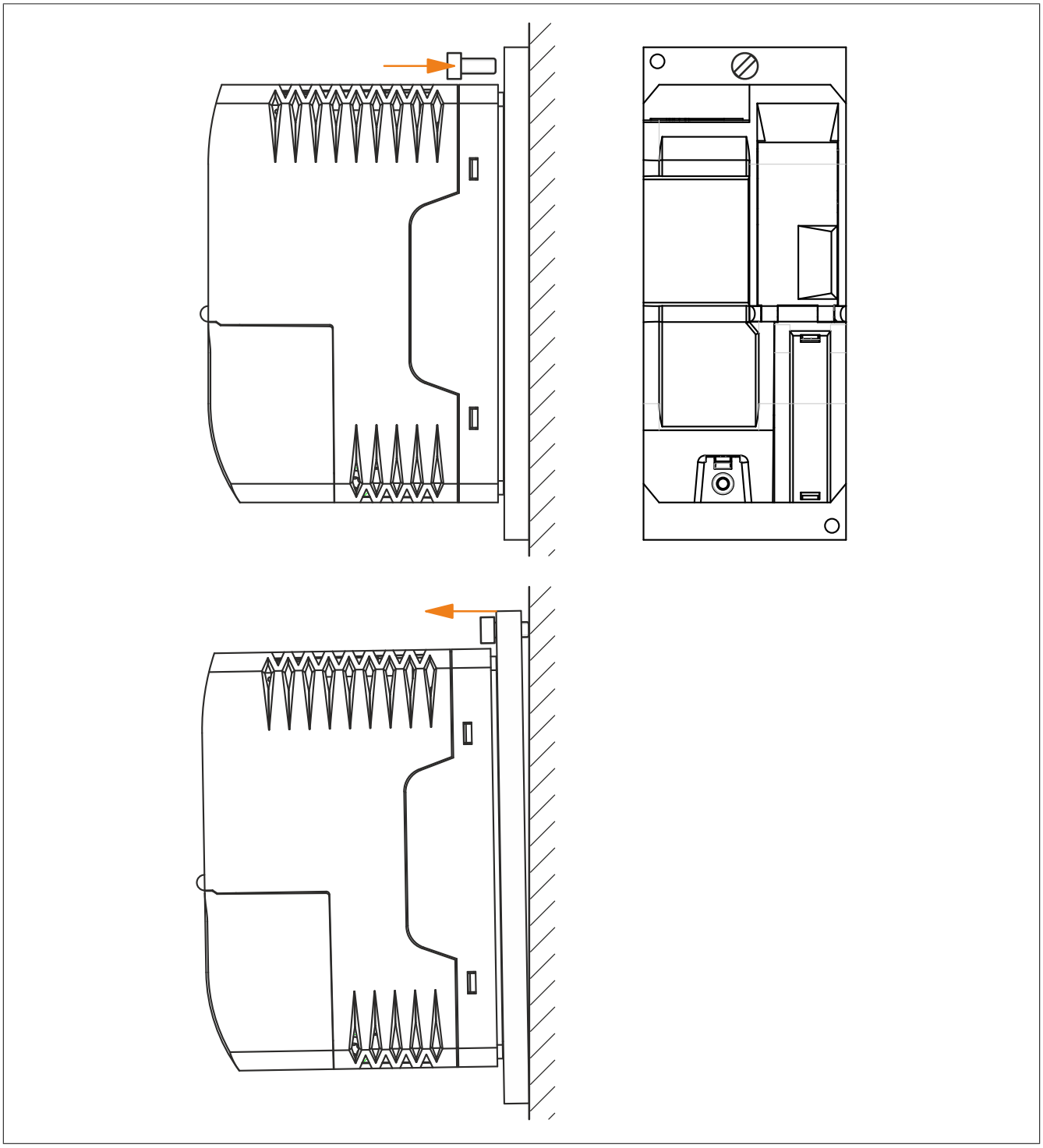


Figure 22: Removing an ACOPOSmicro from the cold plate

4.2 ACOPOSmicro with heat sink

4.2.1 ACOPOSmicro dimension diagram with heat sink

A minimum spacing of 6 mm is required to ensure optimal cooling power.

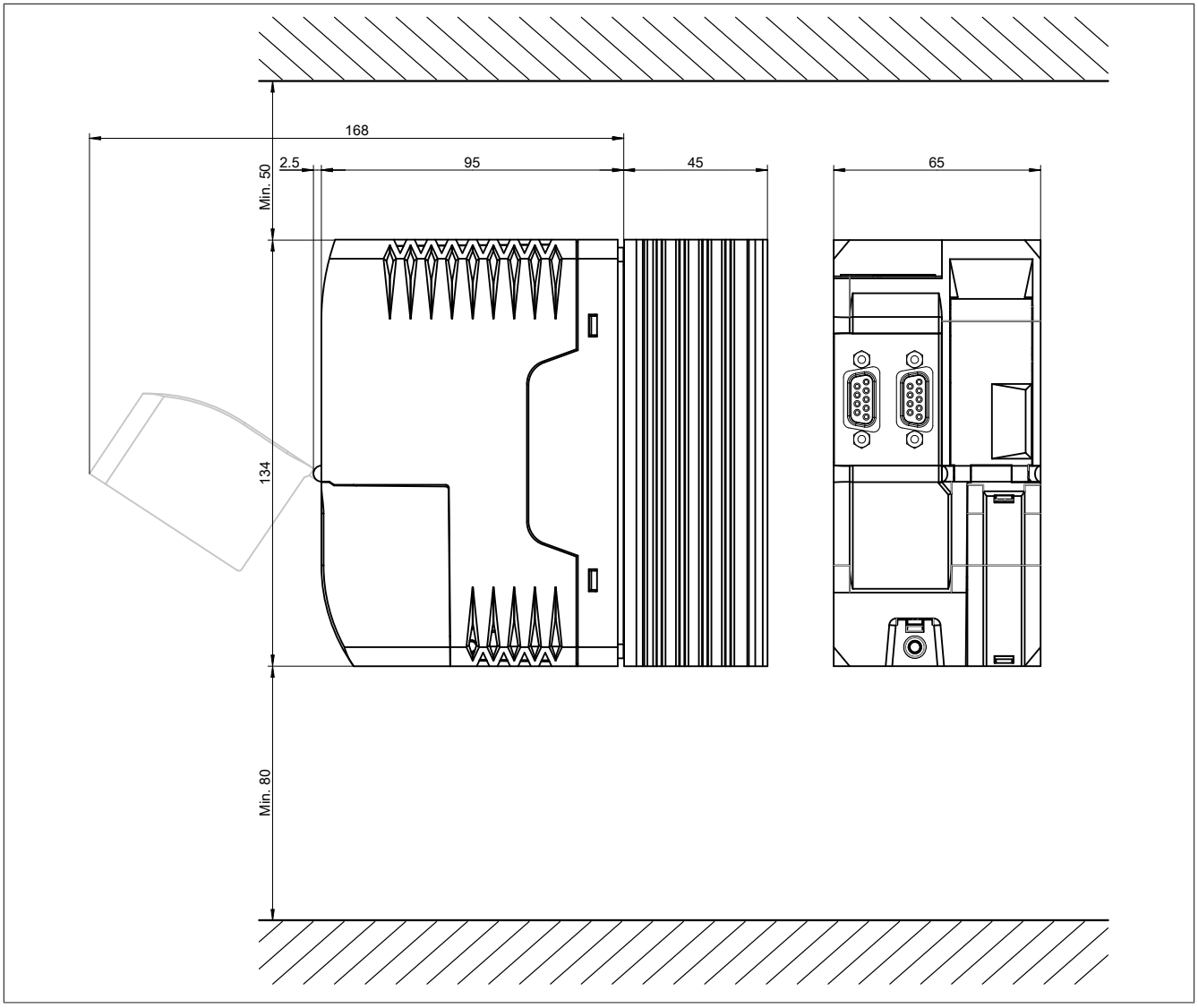


Figure 23: Dimension diagram and installation dimensions for ACOPOSmicro modules with heat sink

4.2.2 Heat sink installation

Property class in accordance with ISO 898-1	M5 8.8
Min. tightening torque	5 Nm
Recommended minimum thread depth of mounting plate (Al)	2*d
Flat washer in accordance with ISO 7089	YES

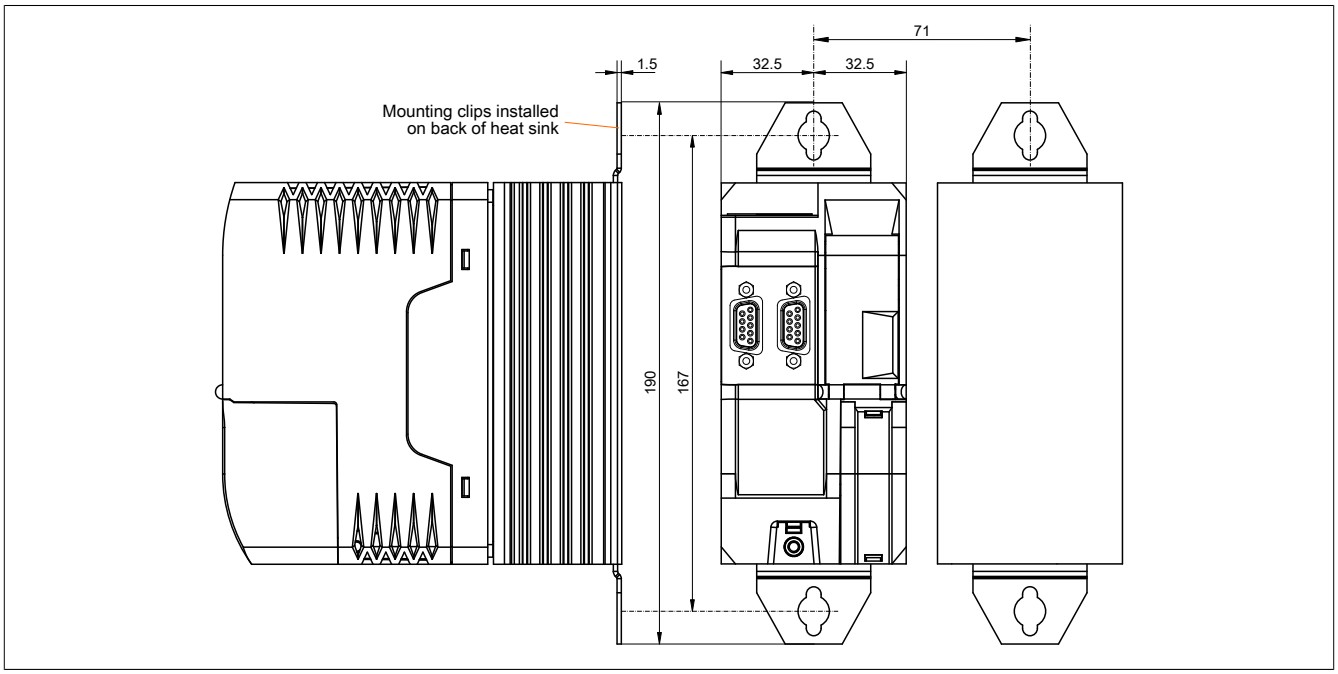


Figure 24: Frontal wall mounting

Side installation is also possible for control cabinets with less depth.

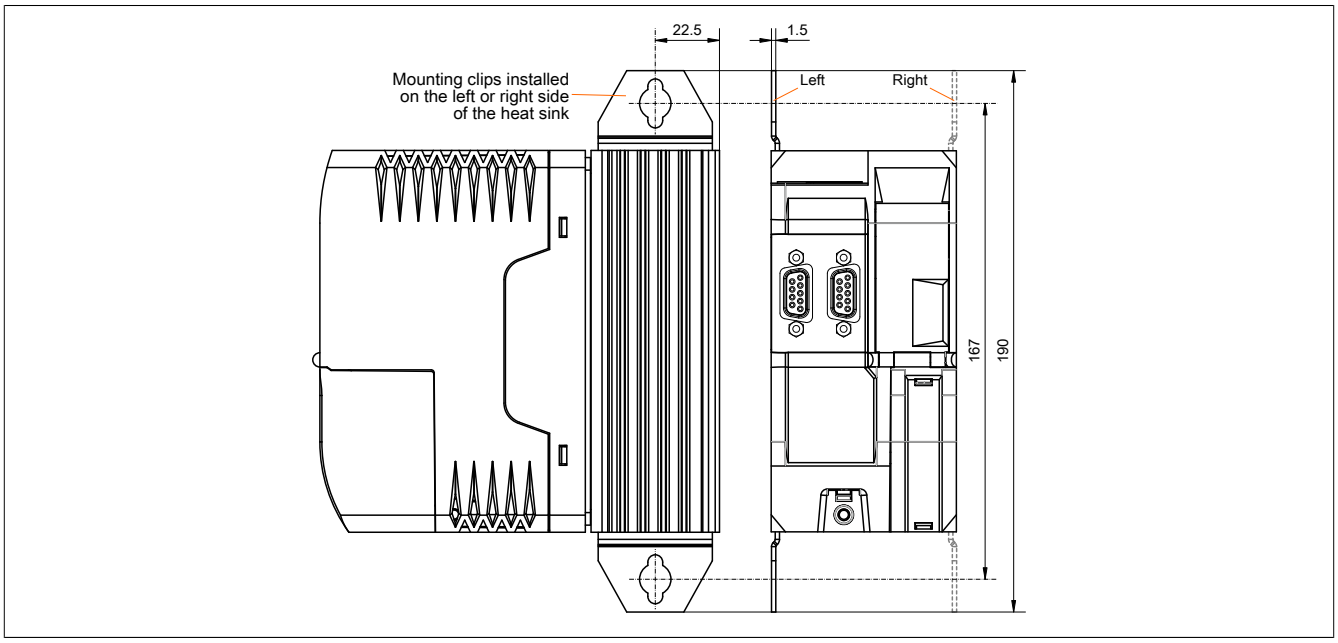
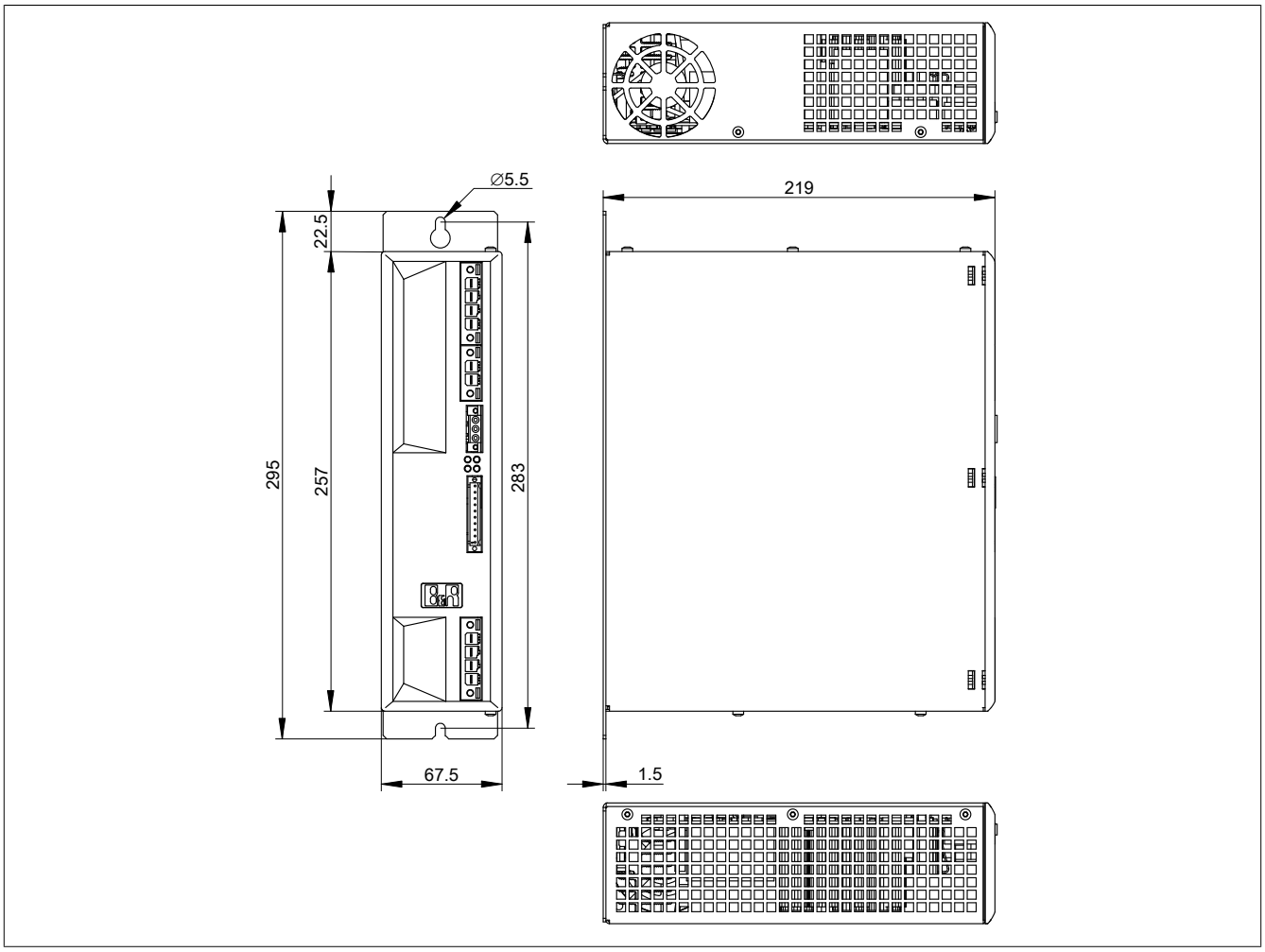


Figure 25: Side wall mounting

4.3 Power supply module

4.3.1 Power supply module - Dimension diagram



The following installation guidelines must be observed for each power supply module in order to ensure sufficient air circulation:

- **At least 5 cm clearance above and below**
- **Vertical installation**

No clearance is required to the left and right of a power supply module.

5 Dimensioning

5.1 Fuse protection

The power supply line should be protected by a circuit breaker or a fuse. In general, dimensioning of the supply line and overcurrent protection depends on the structure of how the power is being supplied (ACOPOSmicro devices can be connected individually or in groups).

Information:

The effective current for the power supply depends on the load but is always less than the motor current. Make sure that the maximum nominal current of 15 A per pin is not exceeded on the power supply terminals of the power unit.

When choosing a suitable fuse, the user must also account for characteristics such as aging effects, temperature derating, overcurrent capacity and the definition of the rated current, which can vary by manufacturer and type. In addition, the fuse that is selected must also be able to handle application-specific characteristics (e.g. overcurrent that occurs in acceleration cycles).

The cross section of the mains power input and the rated current of the used fuse are chosen according to the current-carrying capacity such that the permissible current-carrying capacity of the selected cable cross section (depending on wiring, see table) is greater than or equal to the current load in the mains power input. The rated current of the fuse protection must be less than or equal to the permissible current-carrying capacity of the selected cable cross section (depending on the how it is installed, see table):

$I_{Power\ system}$	≤	I_b	≤	I_Z
Power system	≤	Fuse	≤	Line/cable

	I_Z / I_b ratio according to the type of installation in an ambient air temperature of +40°C per IEC 60204-1			
Wire cross section [mm²]	**B1**	**B2**	**C**	**E**
1.5	13.5 / 13.0	13.1 / 10.0	15.2 / 13.0	16.1 / 16.0
2.5	18.3 / 16.0	16.5 / 16.0	21.0 / 20.0	22.0 / 20.0
4.0	24.0 / 24.0	23.0 / 20.0	28.0 / 25.0	30.0 / 25.0
6.0	32.0 / 32.0	29.0 / 25.0	36.0 / 32.0	37.0 / 32.0

Table 148: Cable cross section of the mains power input depending on the type of wiring

I_Z [A] ... Current-carrying capacity of the cable cross section
I_b [A] ... Rated current of the fuse protection

Type of wiring per IEC 60204-1	
B1	Wires in conduit or cable duct
B2	Cables in conduit or cable duct
C	Cables or wires on walls
E	Cables or wires on open-ended cable tray

Table 149: Type of wiring used for the mains power input

5.2 Power consumption - Stepper motor modules with cold plate

The maximum total dissipated power for an ACOPOSmicro module is calculated from the power consumed by the CPU (see section"CPU power supply" on page 67) and the power unit.

The following diagram illustrates the dissipated power of the power unit for each axis being powered, depending on the power supply voltage and motor current:

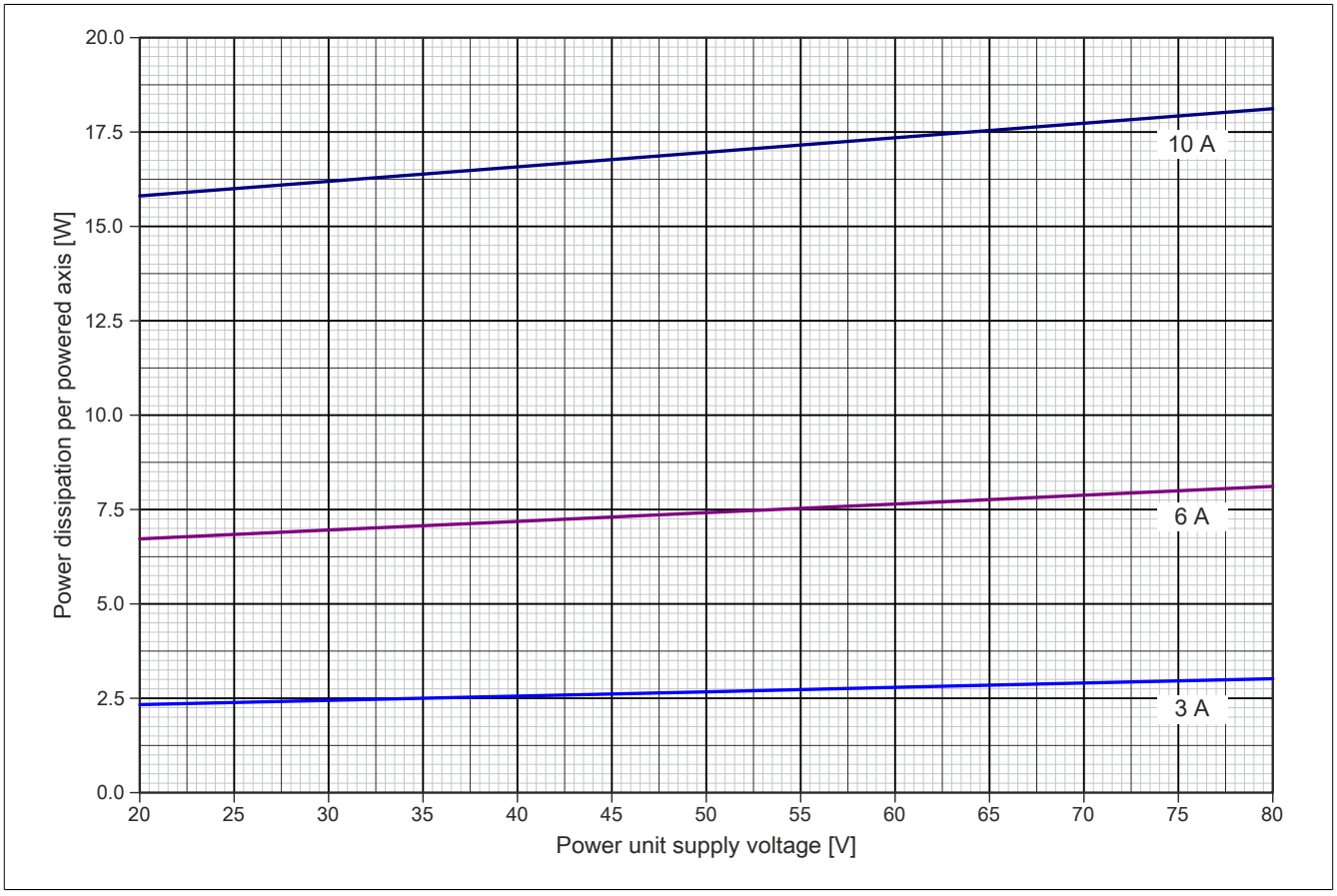


Figure 26: Dimensioning - Dissipated power from the power unit for each powered axis

This diagram can be used to determine the expected maximum power dissipation from the ACOPOSmicro for a wide range of applications.

A majority of the dissipated heat from the power unit is emitted to the ACOPOSmicro's heat spreader.

Example 1:

- ACOPOSmicro 2-channel variant without encoder (80SD100XD.C0XX-01)
- 60 VDC power supply
- 10 A applied to motor 1
- 3 A applied to motor 2

Calculation:

Power consumption for...	Power consumption [W]
CPU (including enable input)	6.00
Power unit when idle	0.50
Motor 1 power unit	17.30
Motor 2 power unit	2.80
Sum	**26.60**

Example 2:

- ACOPOSmicro 1-channel variant with encoder (80SD100XS.C04X-01)
- 60 VDC power supply
- 3 A applied to motor

Calculation:

Power consumption for...	Power consumption [W]
CPU (including enable input)	7.00
Power unit when idle	0.50
Motor power unit	2.80
Sum	**10.3**

Example 3:

- ACOPOSmicro 2-channel variant with encoder (80SD100XD.C044-01)
- 60 VDC power supply
- 10 A applied to motor 1
- 3 A applied to motor 2

Calculation:

Power consumption for...	Power consumption [W]
CPU (including enable input)	8.00
Power unit when idle	0.50
Motor 1 power unit	17.30
Motor 2 power unit	2.80
Sum	**28.6**

5.3 Power consumption - Stepper motor modules with heat sink

5.3.1 Limitation with 10A output current on both stepper motor axes

For general information about the power dissipation, see section "Power consumption - Stepper motor modules with cold plate" on page 212. Additional limitations apply to modules with heat sink.

The heat sink provides sufficient cooling in continuous operation with 9 A per axis at the ambient temperature specified in the technical data.

Operation >9 A:

- The maximum I²t value must be adhered to.
- Air must flow to the heat sink.
- Alternatively, the ambient temperature can be reduced to 40°C.

5.3.2 Example for short-term increase in output power

The maximum cooling capacity of the ACOPOSmicro is determined by I²t.

Determining the output power at ambient temperature (see technical data)	
Max. output current in continuous operation	9 A. per axis
Max. turn-on time at nominal current	4 min. per axis

I²t calculation:

$$I_{Duration}^2 * (t_1 + t_2) \geq I_1^2 * t_1 + I_2^2 * t_2$$

$$t_2 = \frac{(I^2 - I_{Duration}^2) * t_1}{I_{Duration}^2 - I_2^2}$$

I_1 = Partial current 1
I_2 = Partial current 2
$I_{Duration}$ = Permitted continuous current 9 A / axis
t_1 = Turn-on time I_1
t_2 = Turn-on time I_2

Example: Axis 1 and 2 are operated for 4 min. with 10 A, followed by a cycle with 8 A.

I²t can be used to determine the minimum required turn-on time for the reduced current value (cooling time).

I_1 = 10 A, t_1 = 4 min., I_2 = 8 A

$$t_2 = \frac{(I_1^2 - I_{Duration}^2) * t_1}{I_{Duration}^2 - I_2^2}$$

$$t_{8\,A} = \frac{[(10\ A)^2 - (9\ A)^2] * 4\ min.}{(9\ A)^2 - (8\ A)^2}$$

$$t_{8\,A} \geq 4.47\ min$$

5.3.3 Minimum air current during continuous operation >9 A for both axes

Required air current during continuous operation	
m³/hour	ft³/hour
17	10

6 Wiring

The following information applies to all stepper motor and inverter modules as well as the power supply module:

Danger!

Connectors and terminal blocks are not permitted to be disconnected or connected while voltage is applied or during operation.

Warning!

The modules are suitable for power systems that can provide a maximum short-circuit current (SCCR) of 20 kA at maximum 480 V and that are protected with class J fuses.

Notice!

Possible damage to module in the event of short circuit!

The modules are designed for the specified output currents. A short circuit at the motor output to GND of the power supply can therefore damage the module. If short-circuit protection is required, appropriate fuses must be connected externally and upstream for the outputs.

6.1 EMC-compatible installation

6.1.1 General information

In compliance with EMC-compatible installation, the ACOPOSmicro drive system fulfills the following directives:

- EMC directive 89/336/EEC
- Low voltage directive 73/23/EEC

ACOPOSmicro drive systems also meet the requirements for harmonized EMC product standard EN 61800-3:1996 + A11:2000 for industrial areas (second environment).

Additional EMC measures must be implemented by the machine or system manufacturer in the event that the product standard for the machine includes lower limit values or the machine conforms to the basic standard IEC 61000-6-4. Proof of conformity to required limit values must be provided by the manufacturer or distributor of the machine or system in accordance with the guidelines for implementing the EMC directive.

Additional EMC measures are required when operating ACOPOSmicro drive systems in a residential area or when connecting ACOPOSmicro drive systems to a low voltage system that supplies buildings in a residential area (first environment) without an intermediate transformer.

6.1.2 Installation notes

1. The control cabinet or system must be set up in a functional and appropriate manner.
2. To prevent the effects of disturbances, the following lines must be properly shielded:
    - Motor cables
    - Encoder cables
    - Control cables
    - Data cables
3. Inductive switching elements such as contactors or relays must be equipped with corresponding suppressor elements such as varistors, RC elements or damping diodes.
4. All electrical connections must be kept as short as possible.
5. Cable shields must be attached to designated shield plate connection clamps and the connector housing. See also "EMC-compatible connection with shield plate" on page 216.

6. Shielded cables with copper braiding or tinned copper braiding must be used. Twisting the braided shield or extending it with single conductors is not permitted.
7. Unused cable conductors must be grounded on both sides whenever possible.

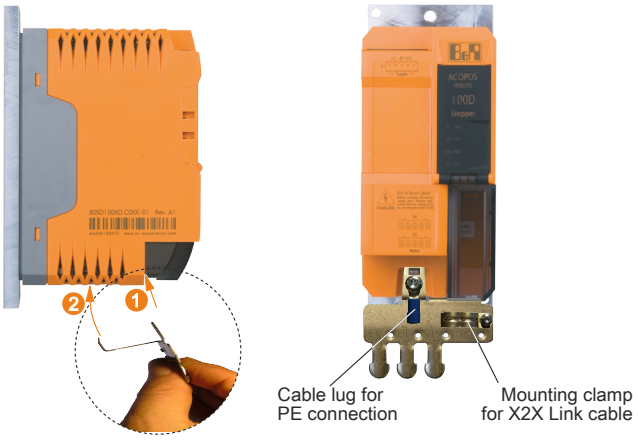
6.1.3 EMC-compatible connection with shield plate

Information:

For EMC-compatible installations, the bus cable and the PE connection must be fastened using the mounting set contained in the accessory set included in delivery.

The cable lug must be installed over the included shield plate!

Connection with old shield plate (B0027575-04)



Connection with new
shield plate (B0027575-06)

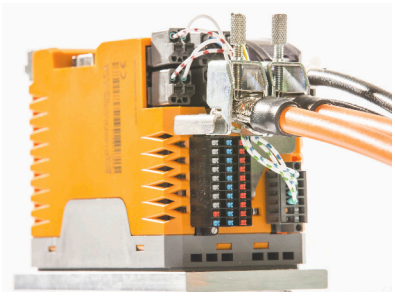


Cables can be fastened to the shield plate using the following:

- Shield connection clamps
- Cable ties
- Hose clamps

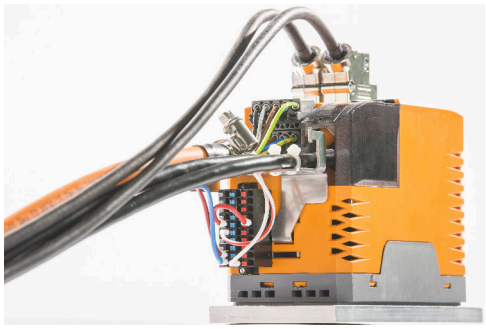
Fasten using shield connection clamps

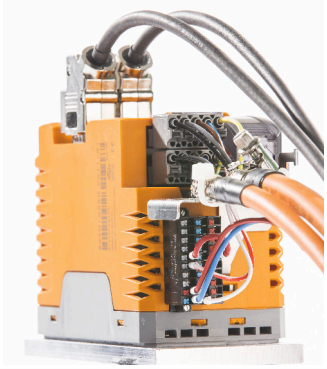
Fasten using shield connection clamps (ordered separately), according to the following wiring example:



Shield connection clamp model number	Cable diameter	Package contents
X20AC0SA08.0010	3 - 8 mm	10 pcs.
X20AC0SA14.0010	3 - 14 mm	10 pcs.

Fasten using cable ties or hose clamps





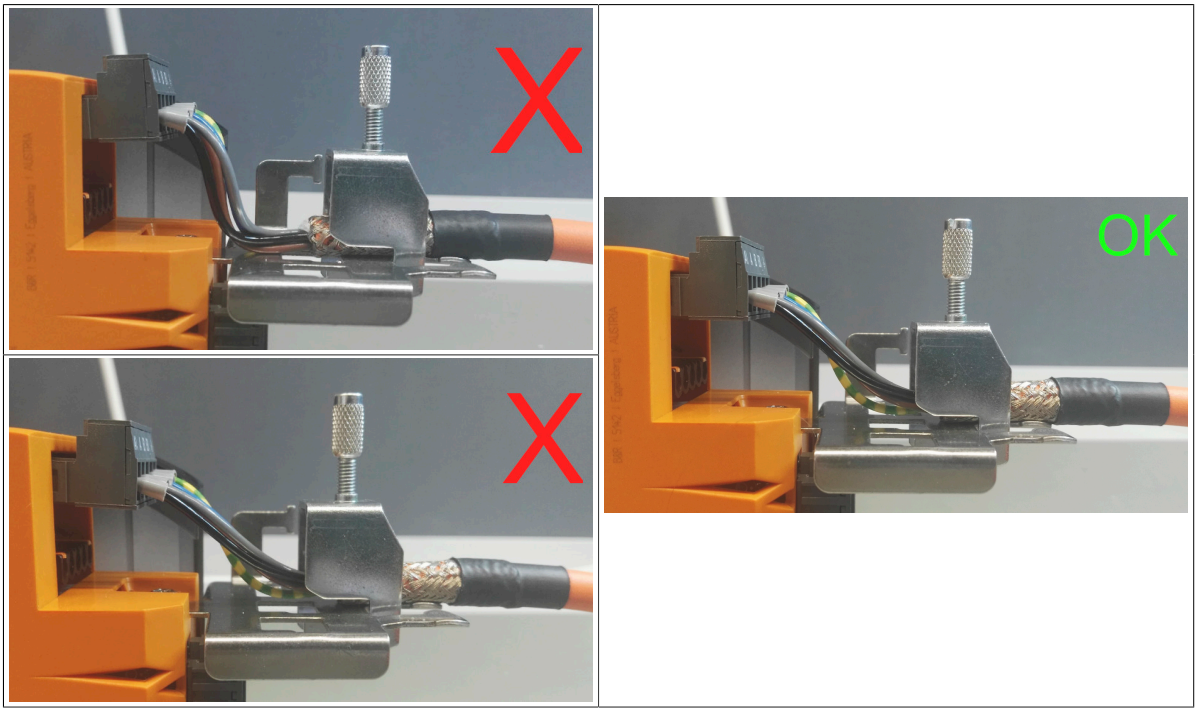
6.1.3.1 Important notes about securing cables

Caution!

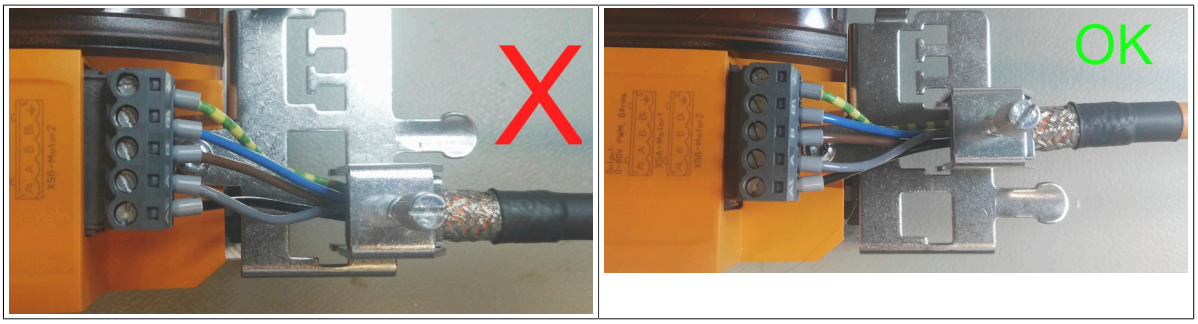
Possible damage to the motor connectors and ACOPOSmicro modules due to not fully connected connectors!
Connectors that are not fully connected can result in excessive heat generation!

For EMC reasons, all connecting conductors of the cables are as short as possible. In order to avoid tension and thus the gradual removal of the motor connector, cables must be secured as far forward as allowed on the shield plate. If necessary, the connection of the shield plate with the cable shield must be readjusted. Please note the following:

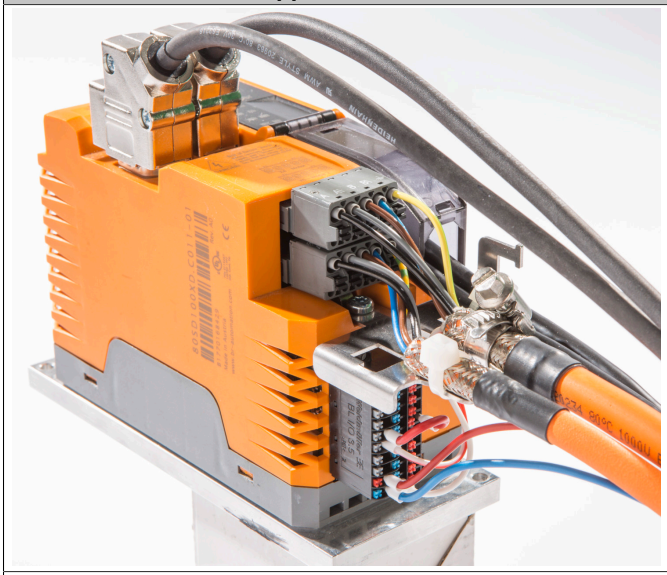
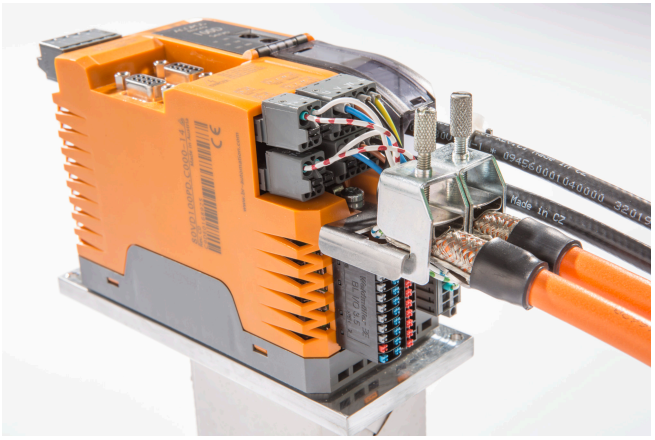
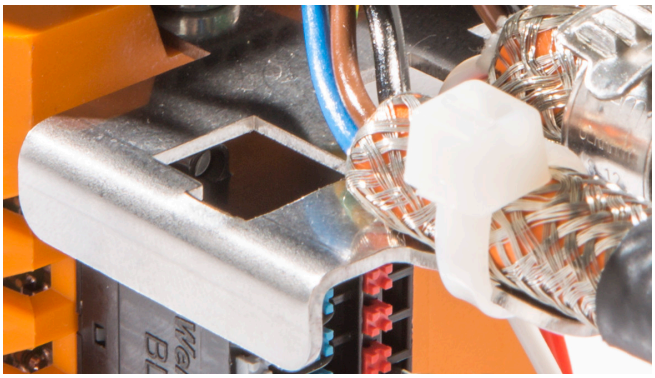
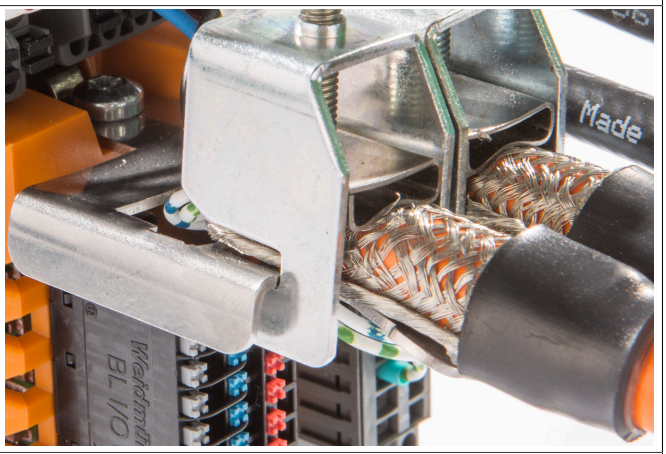
- **Make sure that the fastening is sufficiently tight to prevent the cable from slipping or being pulled out!**
- **Do not secure the cable too far in front so that the short connecting conductors do not bend! When mounting with compressed cable, the plug is pushed upwards.**
  Do not secure the cables too far back to avoid tension on the motor connector! If the cable is mounted too tightly, the motor plug bends downwards.

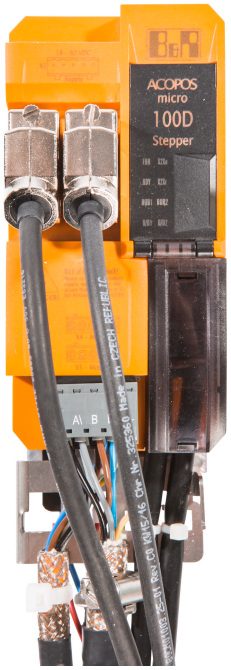
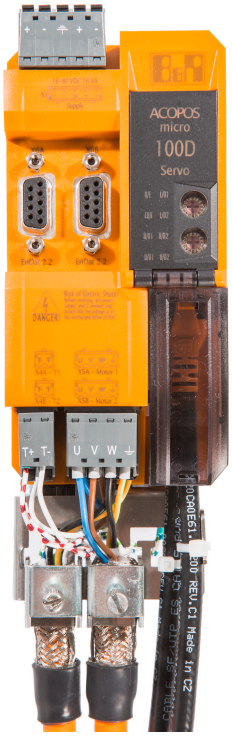
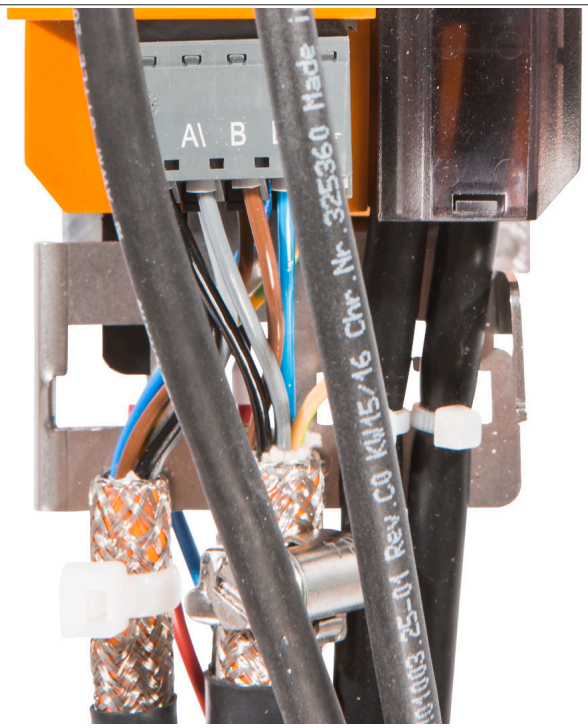
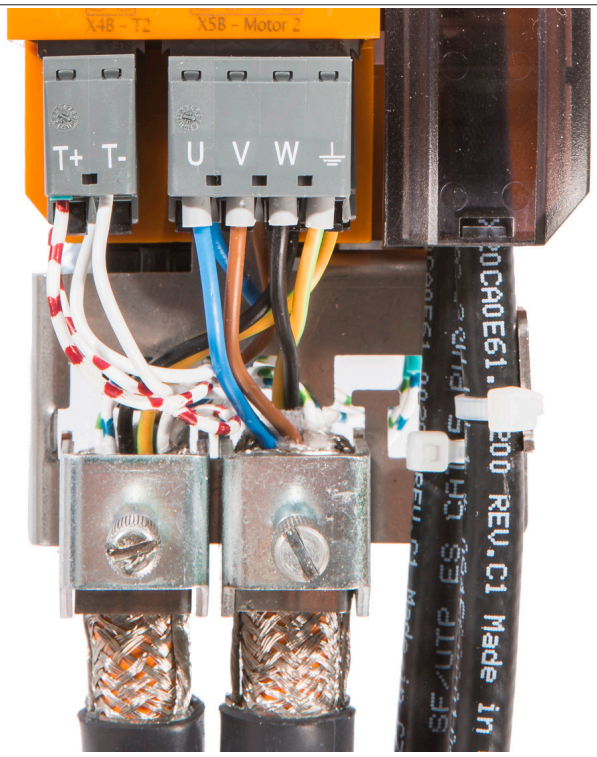


- **The cable from motor axis 1 must be routed on the right shield plate lug, the cable from motor axis 2 must be routed on the left shield plate lug. Otherwise this can lead to a horizontal application of force to the motor plug.**



See the following detail views for correct cable installation:

Stepper modules	Inverter modules
	
	
	

Stepper modules	Inverter modules
	
	

Notice!

Possible electromagnetic interference on motor cables!

In order to avoid interference on motor, encoder and hybrid cables, the complete braided shield of a cable must always rest on the shield plate.

Cable shields must always be attached completely and securely to the shield plate with the appropriate fastenings, so that the end of the exposed shield should line up with the bottom of the shield plate.

6.2 Protective ground connection PE

The wire cross section for the protective ground conductor is based on the selected cross section of the "external line" (DC+ and DC-). In addition to the connection of the first protective ground conductor (X1/PE terminal, see section "X1 - Power supply" on page 229), a second, fixed (immobile) protective ground conductor may also have to be connected to the respective protective ground connection on the ACOPOSmicro (if power supply >42 VDC). This must be done using a suitable M4 cable lug on the respective PE connection.

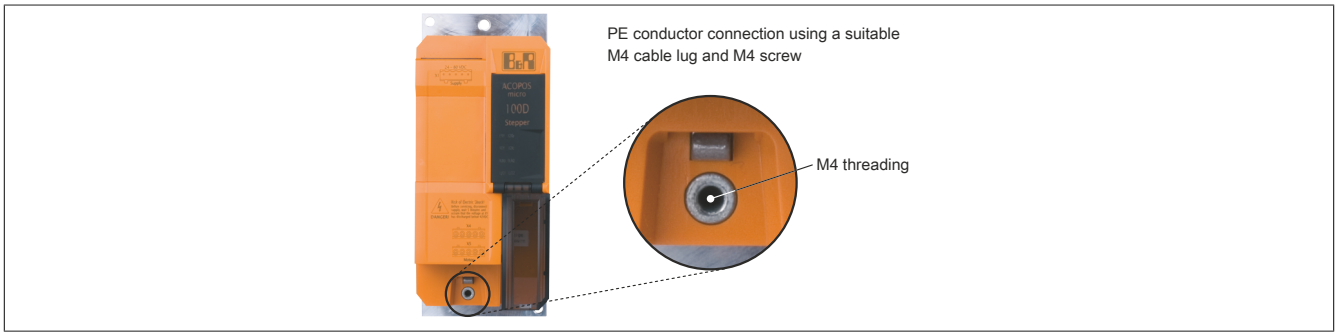


Figure 27: PE conductor connection

Danger!

Before turning on ACOPOSmicro, it is important to ensure that the housing is properly connected to ground potential (PE rail). The ground connection must also be made if the module is only connected for testing purposes or only operated for a short time!

Information:

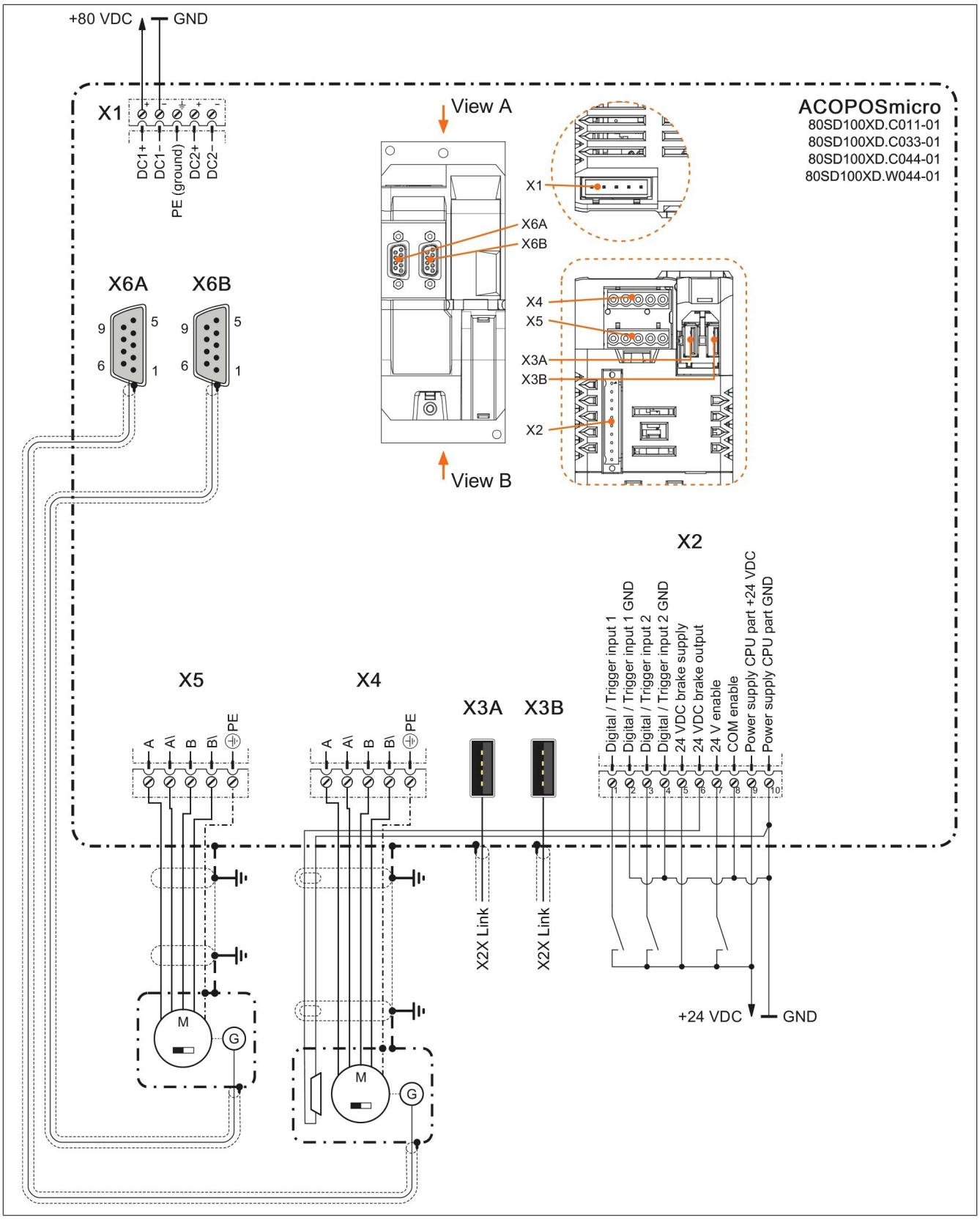
For EMC-compatible installations, the bus cable and the PE connection must be fastened using the mounting set contained in the accessory set included in delivery.

If the included shield plate is used, then the cable lug must be installed over it!

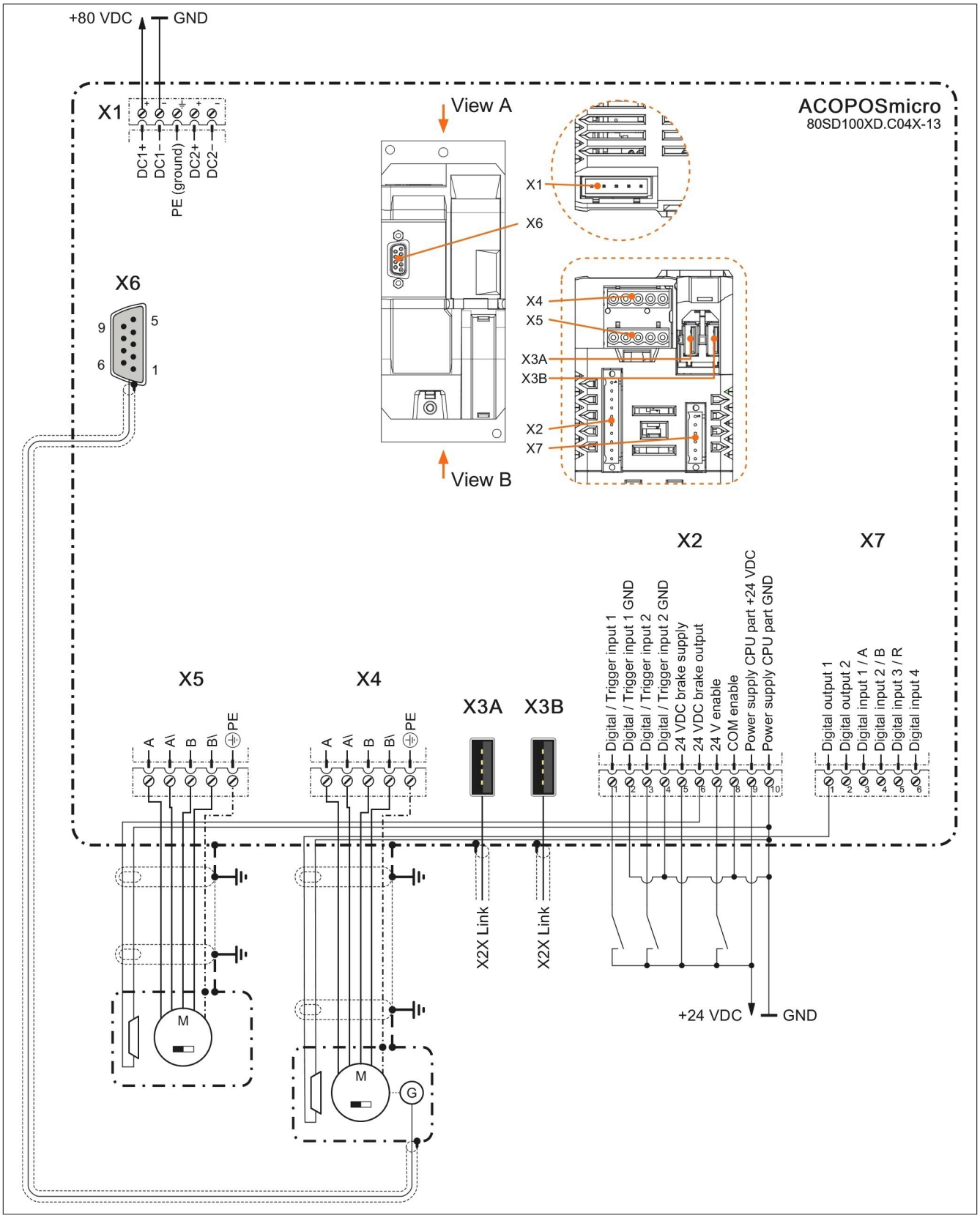
6.3 Stepper motor modules

6.3.1 Pinout overview

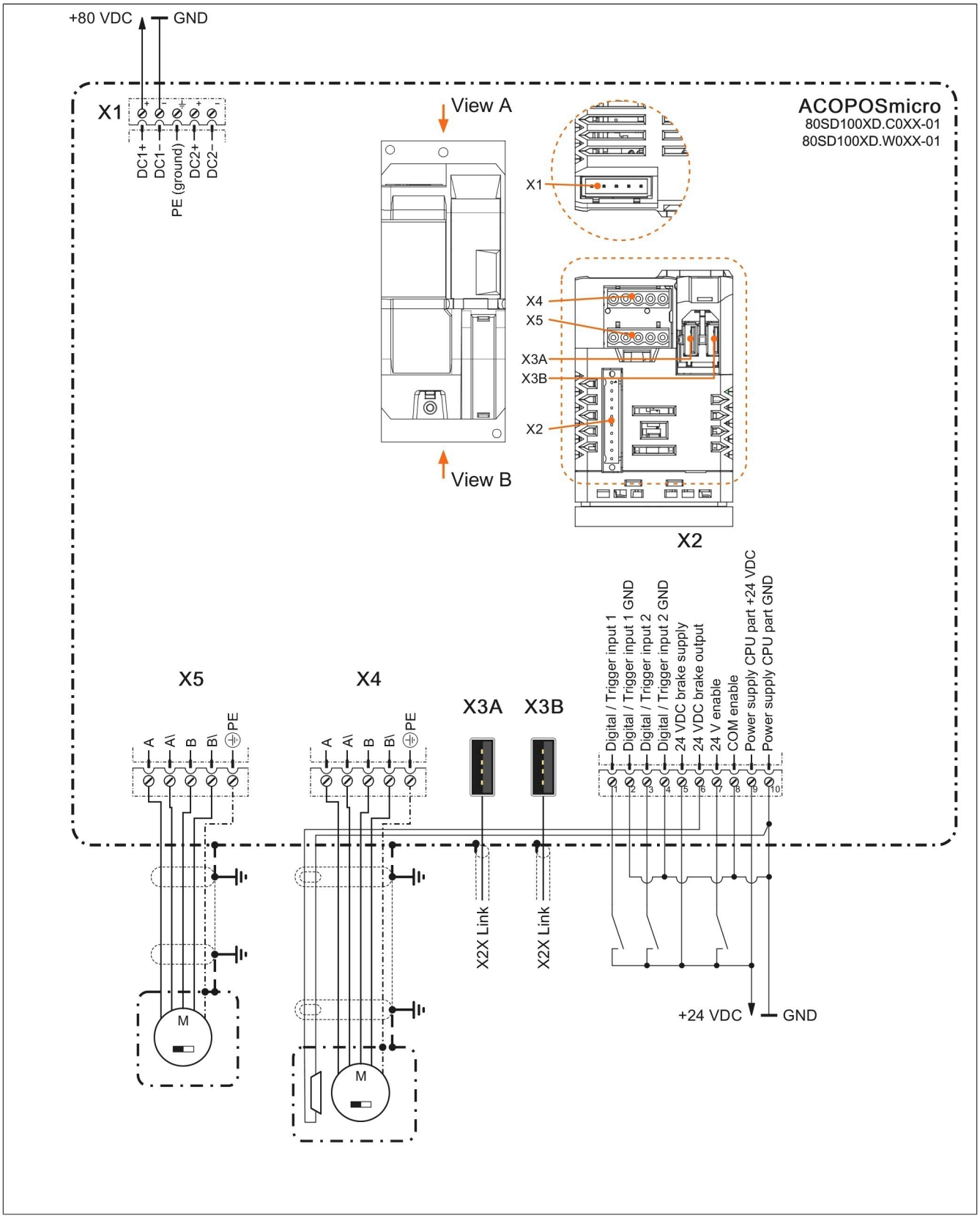
6.3.1.1 80SD100XD.C011-01, 80SD100XD.C033-01, 80SD100XD.C044-01, 80SD100XD.W044-01



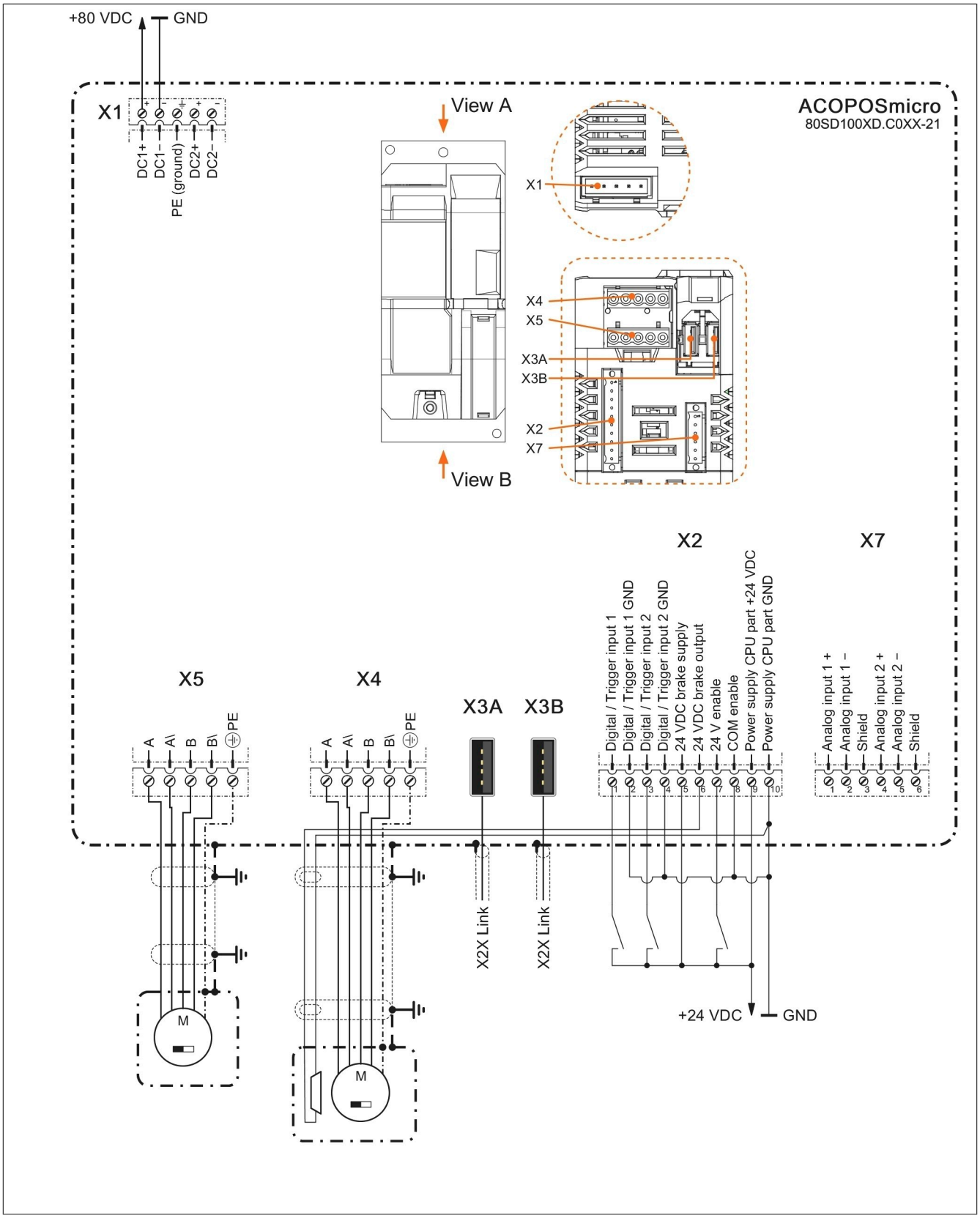
6.3.1.2 80SD100XD.C04X-13



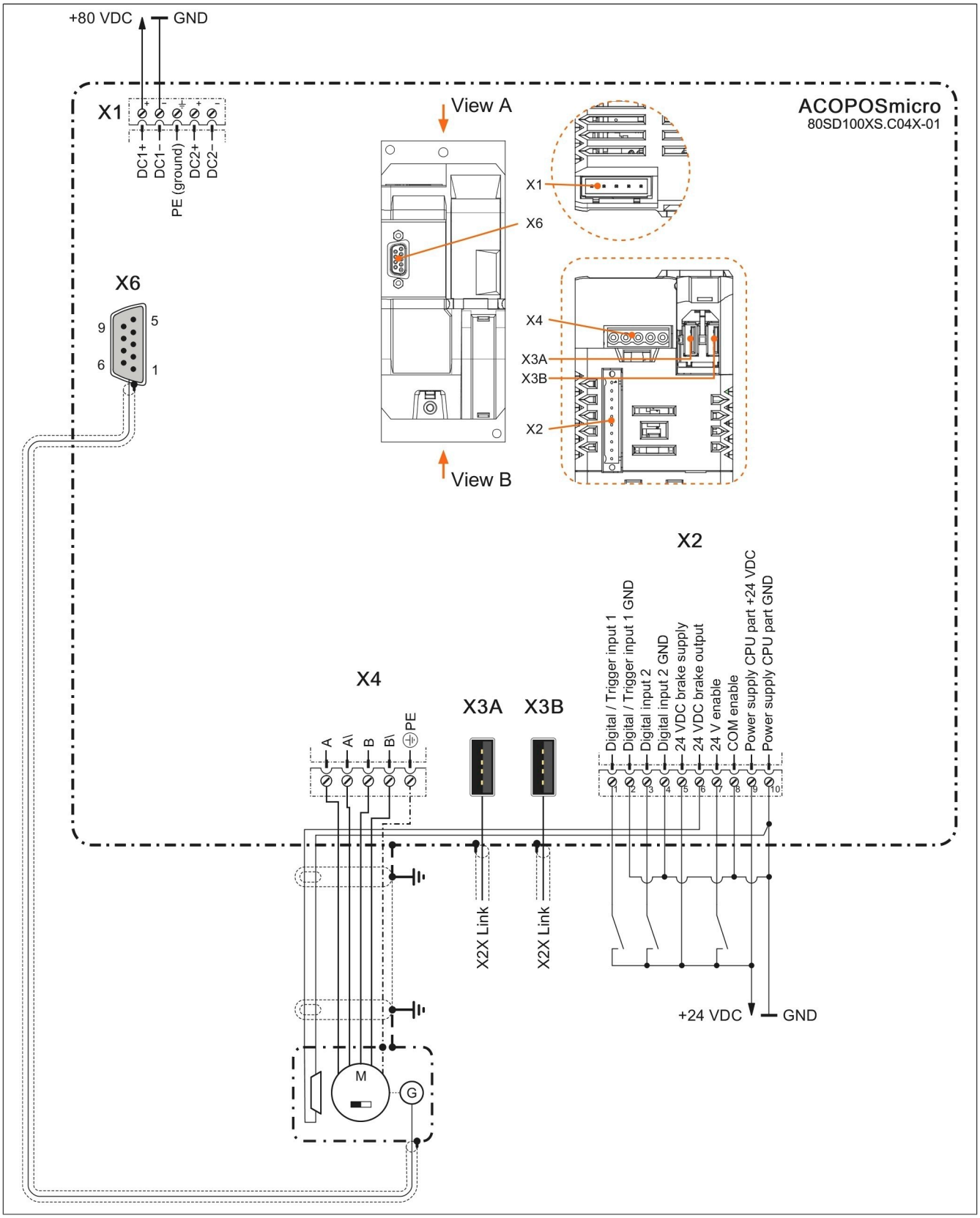
6.3.1.3 80SD100XD.C0XX-01, 80SD100XD.W0XX-01



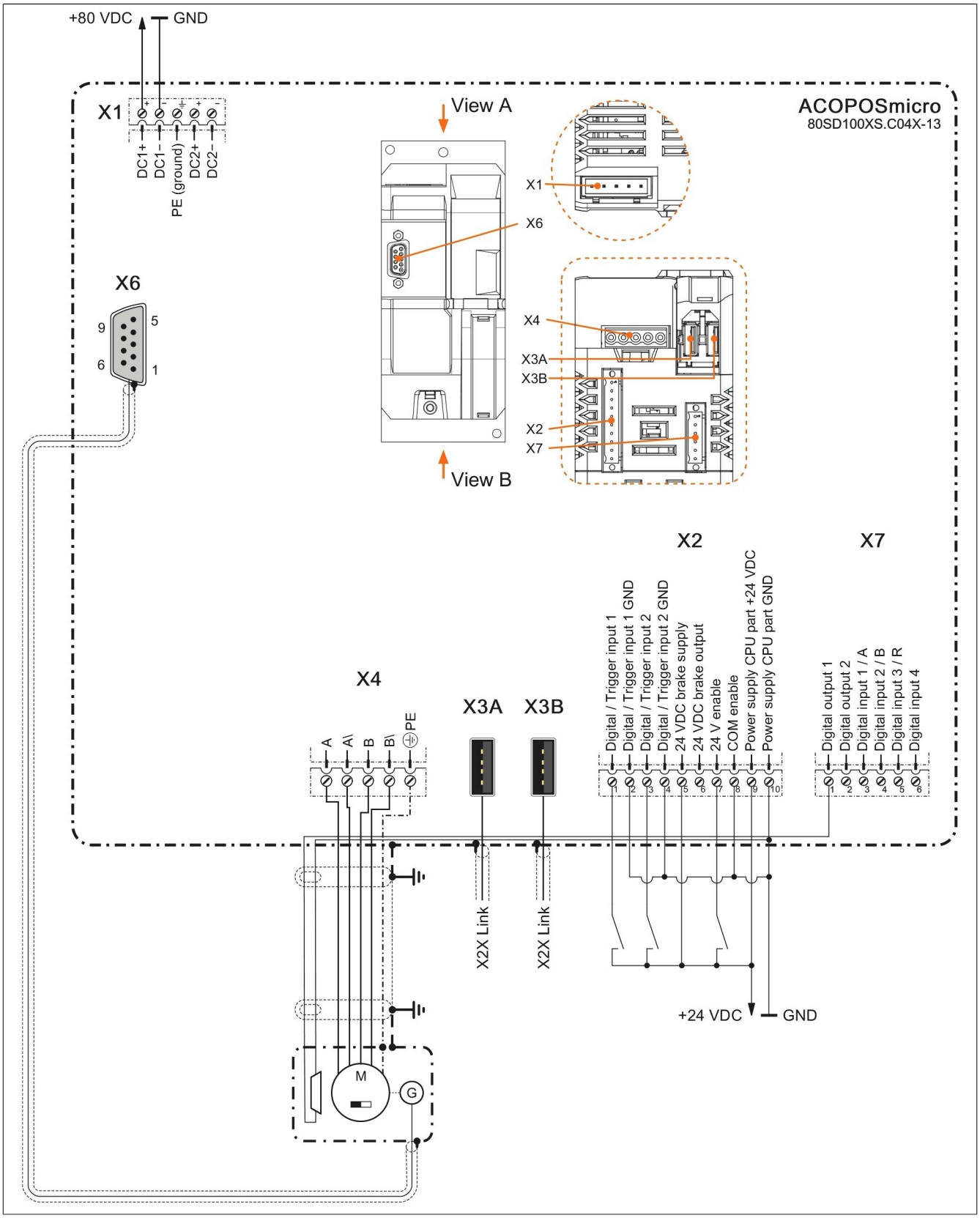
6.3.1.4 80SD100XD.C0XX-21



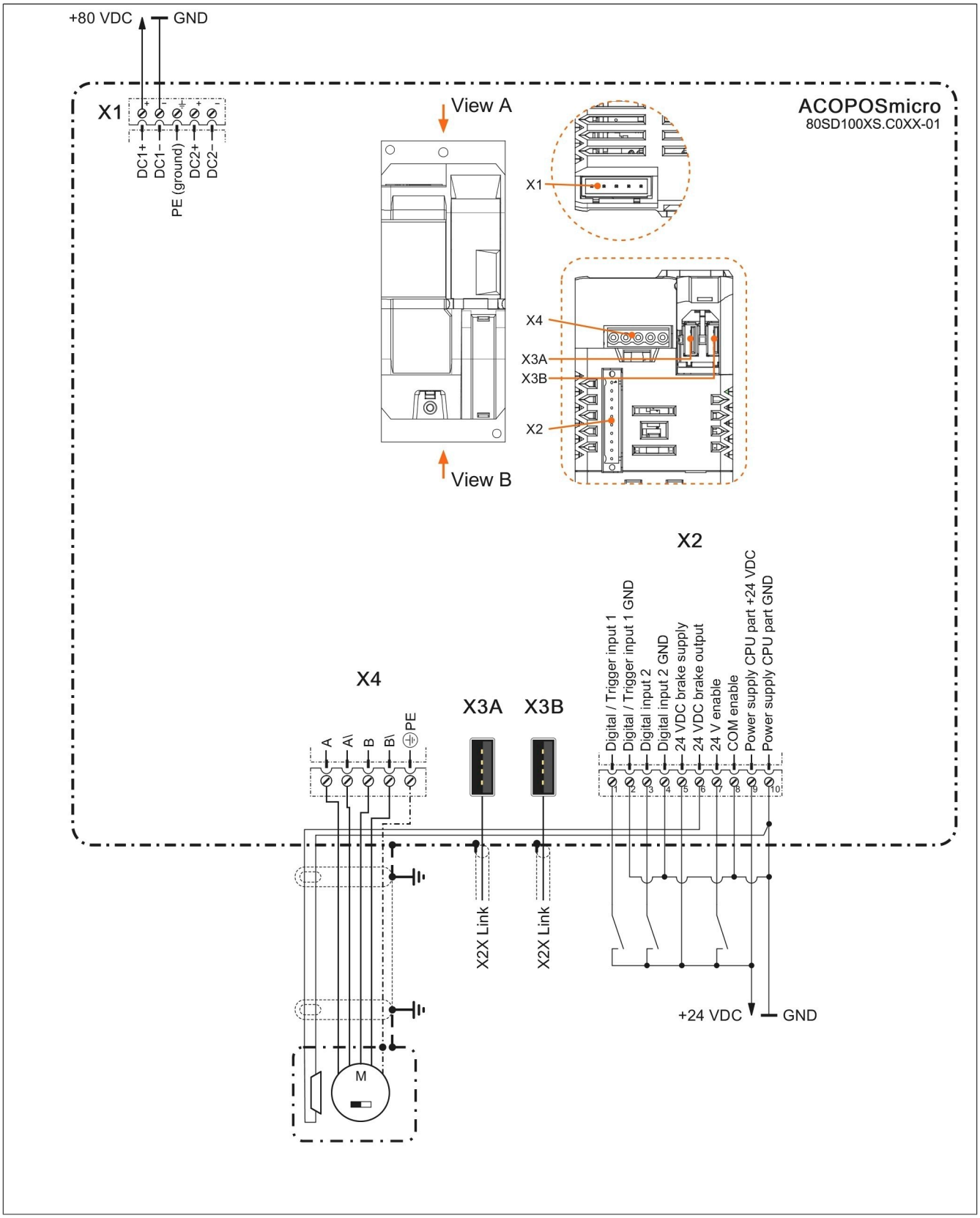
6.3.1.5 80SD100XS.C04X-01



6.3.1.6 80SD100XS.C04X-13



6.3.1.7 80SD100XS.C0XX-01



6.3.2 X1 - Power supply

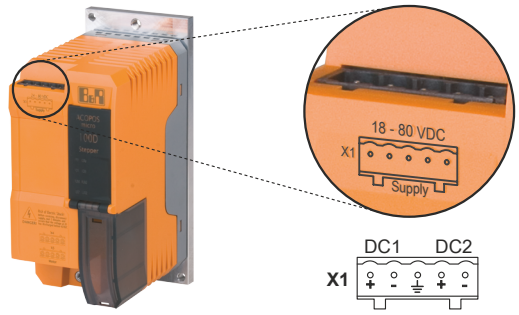
Figure	Pinout	
	Pin	Description
	+	DC1+
	-	DC1-
	⏚	PE (ground)
	+	DC2+
	-	DC2−
	The supply connection for the power unit is made using the 0TB2105.9021 or 0TB2105.9121-01 terminal block. See section "Terminal blocks for the connection of power supply units" on page 128.	

Table 150: X1 connection - Power supply

The DC1-/DC2- and DC1+/DC2+ connections are connected together inside the ACOPOSmicro. As a result, the supply connections can be used as follows:

- DC1 as the supply and DC2 to route the DC voltage
- DC1 and DC2 parallel to the supply at very high loads

For information about safeguarding the supply lines, see section "Fuse protection" on page 211.

Information:

In order to adhere to limit values for "disturbance voltages on the mains connections" of the ACOPOSmicro inverter modules, it is necessary to use the B&R 80PS080X3.10-01 power supply module for the DC bus voltage to X1.

6.3.2.1 X1 - Input circuit diagram for the power supply

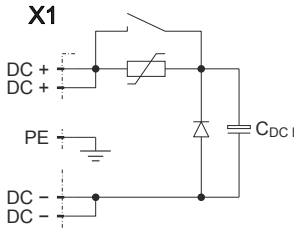


Figure 28: X1 connection - Input circuit diagram for the power supply

6.3.3 X2 - Power supply for the CPU and digital inputs/outputs

Figure	Pinout	
	**Pin**	**Description**
	1	Digital input 1
	2	Digital input 1 GND
	3	Digital input 2
	4	Digital input 2 GND
	5	24 VDC brake supply voltage[1)]
	6	24 VDC brake output[2)]
	7	24 V enable
	8	COM enable
	9	24 VDC CPU power supply
	10	GND CPU power supply
	The power supply connection for the CPU and digital inputs/outputs is made using a terminal block (0TB1110.8010, 0TB1110.8110, 0TB1310.3100, 0TB1310.8100 or 0TB1410.8110-01). See section "Terminal blocks for connecting the I/O and CPU power supplies" on page 125.	

Table 151: X2 connection - Power supply for the CPU and digital inputs/outputs

1) Reference potential: GND for CPU power supply (pin 10)
2) Pin 6 is available as a digital output for device variants with the suffix -14.
Control is performed via ParID OPTIONAL_CTRL_CMD + OPTIONAL_OUT1.
In this case, the brake output is connected to terminal X7.

Digital inputs 1 and 2 can be used as trigger inputs (see "Technical data" on page 23 for the respective drive module).

0TB1110 terminal blocks are single-row terminal blocks. In contrast, the 0TB1310.3100, 0TB1310.8100 and 0TB1410.8110-01 terminal blocks have three rows (3x 10 pins), which makes them particularly well-suited for connecting the inputs/outputs and acting as jumper terminals.

Information:

The red and blue rows of pins on the 0TB1310.3100, 0TB1310.8100 and 0TB1410.8110-01 terminal blocks are connected internally to simplify wiring. The user only has to create two connections so that the GND potential (blue) and the 24 VDC potential (red) can also supply the ACOPOSmicro CPU component on both rows of pins (see the following diagram).

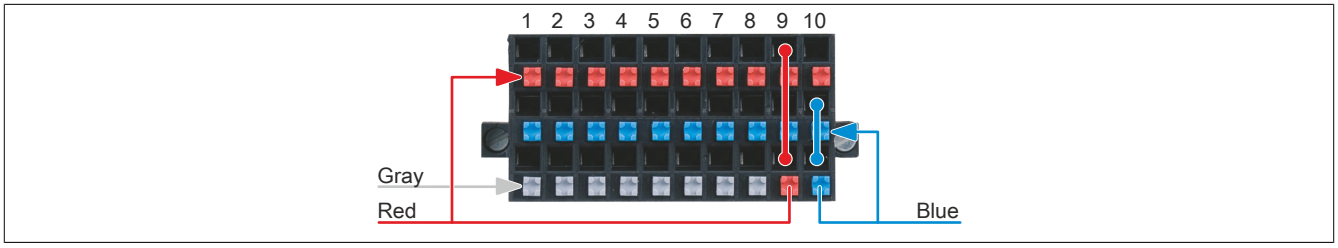


Figure 29: X2 connection - CPU power supply via terminal block 0TB1310.3100

6.3.3.1 X2 - Input/Output circuit diagram

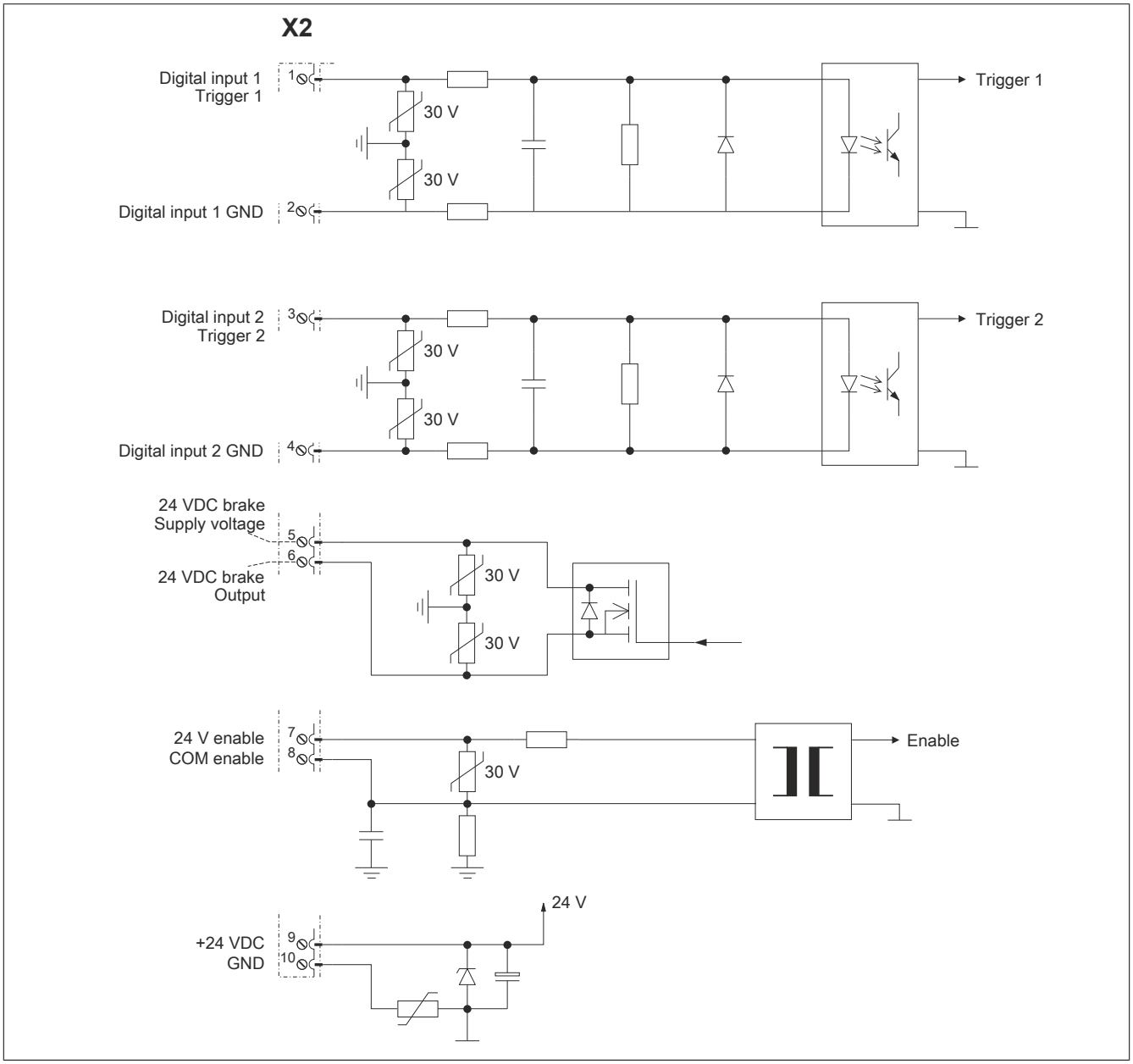


Figure 30: X2 connection - Input/Output circuit diagram

Danger!

The brake controller integrated in the ACOPOSmicro and the holding brake integrated in B&R standard motors fulfill the criteria of Safety Category B per EN 954-1.

Additional measures are necessary to achieve higher safety categories.

6.3.4 X3A/X3B - X2X Link connections

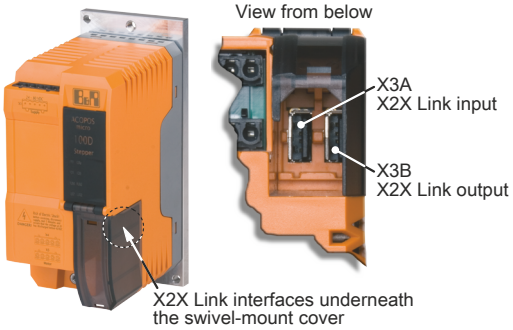
Figure	X2X Link connections
	The X2X Link connection is made using pre-assembled cables. For information about these cables, see section 3.5.3.3 "X2X Link cables" on page 139. **Information:** **Make sure that the X2X Link cable is properly connected and that the input and output are not mixed up by mistake. Female and male connectors are keyed accordingly to prevent this.**

Table 152: X3A/X3B connections - X2X Link

When using the pre-assembled X2X Link device attachment cable (X20CA0X48), the following pinout for the individual wires must be taken into consideration:

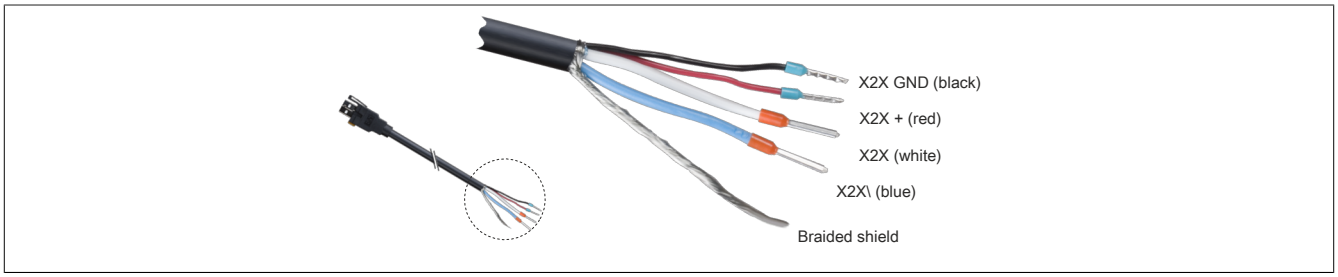


Figure 31: X3A/X3B connections - X2X Link device attachment cable - Wire colors

The X2X Link power supply for the ACOPOSmicro is generated internally from the 24 VDC supply, which means that it does not have to be supplied via an upstream power supply (e.g. X67PS1300 or X20BT9400). For subsequent modules, the X2X Link power supply (X2X+, red wire on the X2X cable) is fed through internally from X3A to X3B (bridged).

Information:

If the 24 VDC power supply for the ACOPOSmicro fails, the communication to the following modules can be maintained if the ACOPOSmicro also draws power from the X2X bus for communication. The typical power requirements of an ACOPOSmicro module for this is 0.75 W (max. 0.8 W).

Information:

By default, the X2X Link device attachment cable (see 3.5.3.3.1 "X20CA0X48.xxxx - X2X Link device attachment cables" on page 139) is keyed for the connection to the X2X Link input X3A. In order to be able to use this cable on X2X Link output X3B of the ACOPOSmicro, the coding must be changed accordingly.

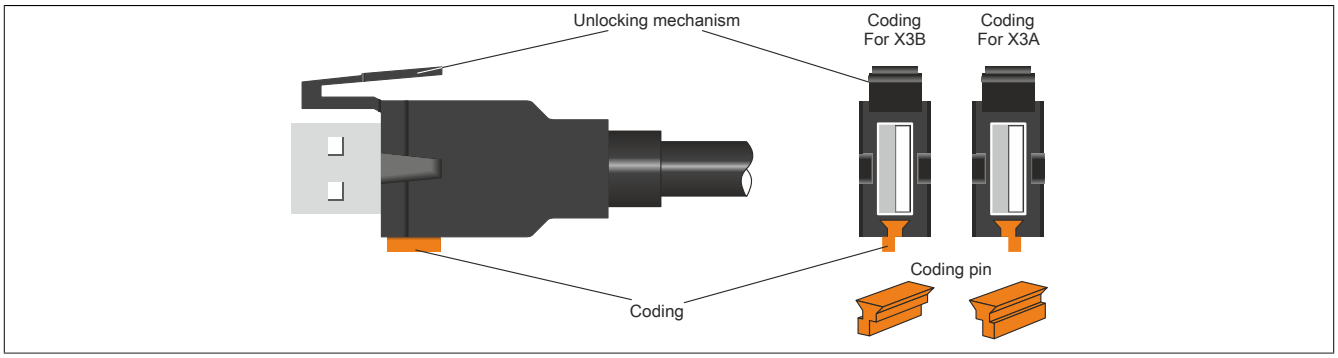
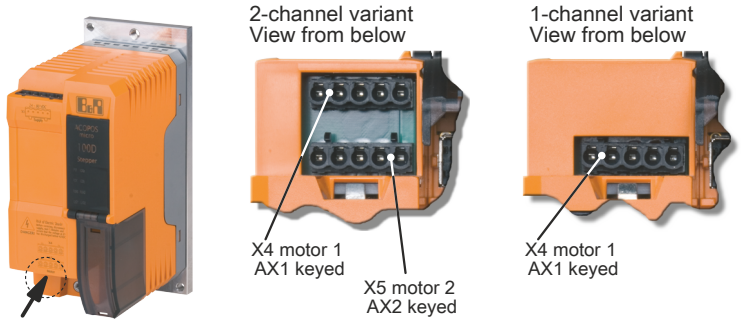


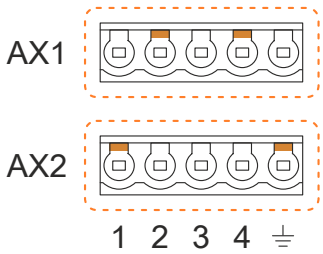
Figure 32: X2X Link connector with code pins

6.3.5 X5 - Stepper motor connection

Figure



Pinout



Pin		Description	
1	A	Winding A	Black
2	A\	Winding A\	Gray
3	B	Winding B	Brown
4	B\	Winding B\	Blue
⏚		PE (ground)	

The motor connection is made using the 0TB2105.4x1x terminal block.
For information about terminal block 0TB2105.4x1x, see section 3.5.2.3 "Terminal blocks for connecting motors" on page 126.

Table 153: X4/X5 connections - Stepper motor

Danger!

Motor connectors and all other connections are not permitted to be connected or disconnected when voltage is applied or during operation.

Information:

The shield plate that is included in the delivery must be used. The motor cable for axis 1 must be attached to the far right side of the shield plate, and the motor cable for axis 2 must be attached to the far left side of the shield plate.

Information:

Since the female connectors of the motor connections are coded, make sure that the corresponding terminal blocks are used with the appropriate coding. For more information, see the description in section 3.5.2.3 "Terminal blocks for connecting motors" on page 126.

6.3.5.1 X4/X5 - Output diagram - Stepper motor connection

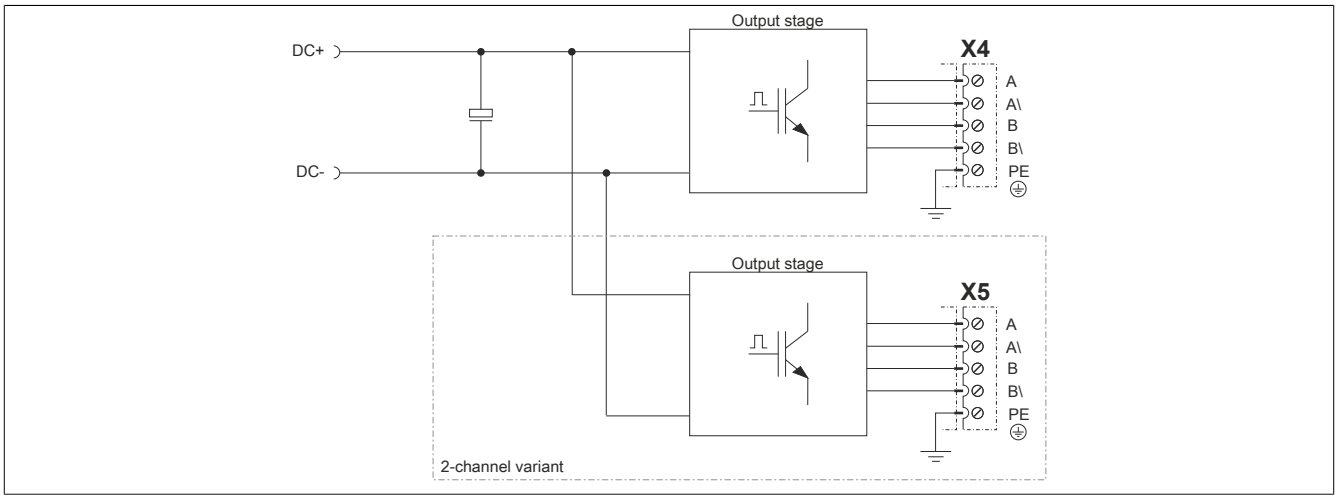


Figure 33: X4/X5 - Output diagram - Stepper motor connection

6.3.6 X6 - Encoder inputs

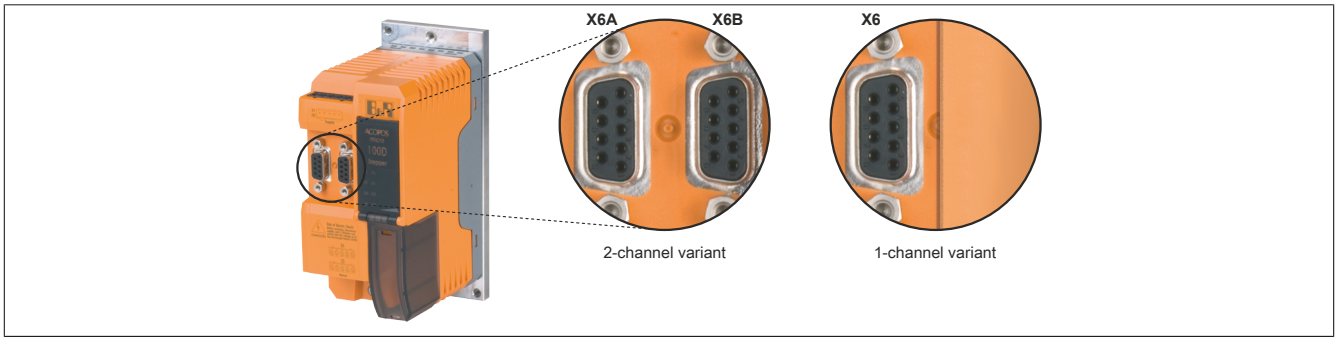


Figure 34: X6 - Encoder inputs

6.3.6.1 Incremental encoder input

6.3.6.1.1 Pinout

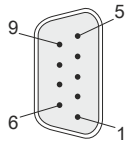
X6	Pin	Description	
	1	A	Channel A
	2	NC	Not connected
	3	B	Channel B
	4	NC	Not connected
	5	R	Channel R
	6	NC	Not connected
	7	Temp	Temperature measurement
	8	U+	+24 VDC encoder power supply output
	9	GND	GND - CPU power supply

Table 154: Incremental encoder input - Pinout

6.3.6.1.2 Input circuit diagram

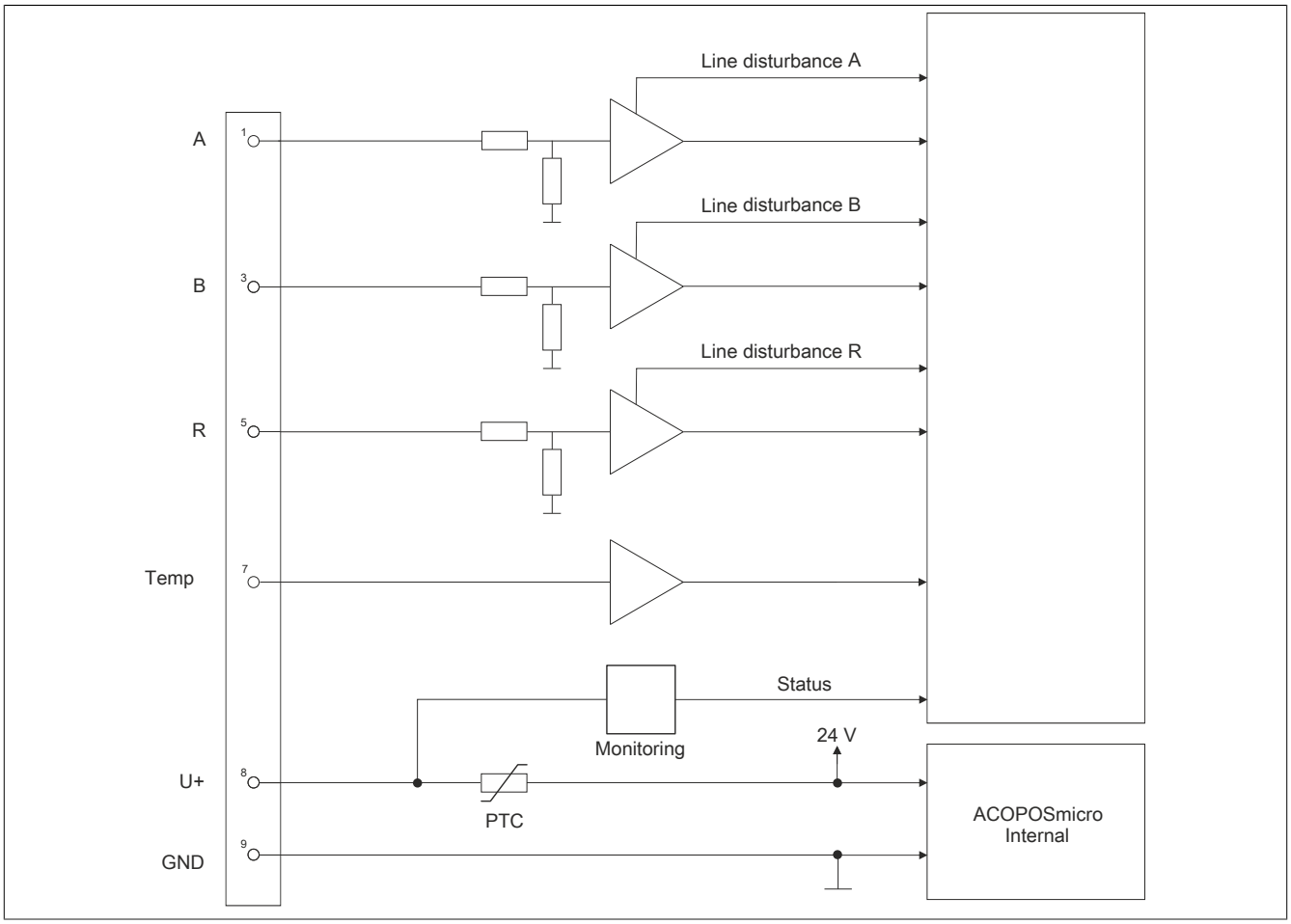


Figure 35: Incremental encoder input - Input circuit diagram

Information:

The +24 VDC encoder power supply is protected by a PTC thermistor for both encoder power supply lines. As a result, the load must be completely separated after the PTC has been tripped (e.g. due to a short circuit or overload) to allow the PTC to cool down.

6.3.6.2 HIPERFACE encoder input

6.3.6.2.1 Pinout

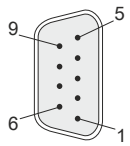
X6	Pin	Description	
	1	U+	Encoder power supply - Output
	2	SIN	Channel SIN
	3	REF SIN	REF SIN channel
	4	D\	Data input inverted
	5	COS	Channel COS
	6	GND	Encoder power supply 0 V
	7	NC	Not connected
	8	D	Data input
	9	REF COS	REF COS channel

Table 155: HIPERFACE encoder input - Pinout

6.3.6.2.2 Input/Output circuit diagram

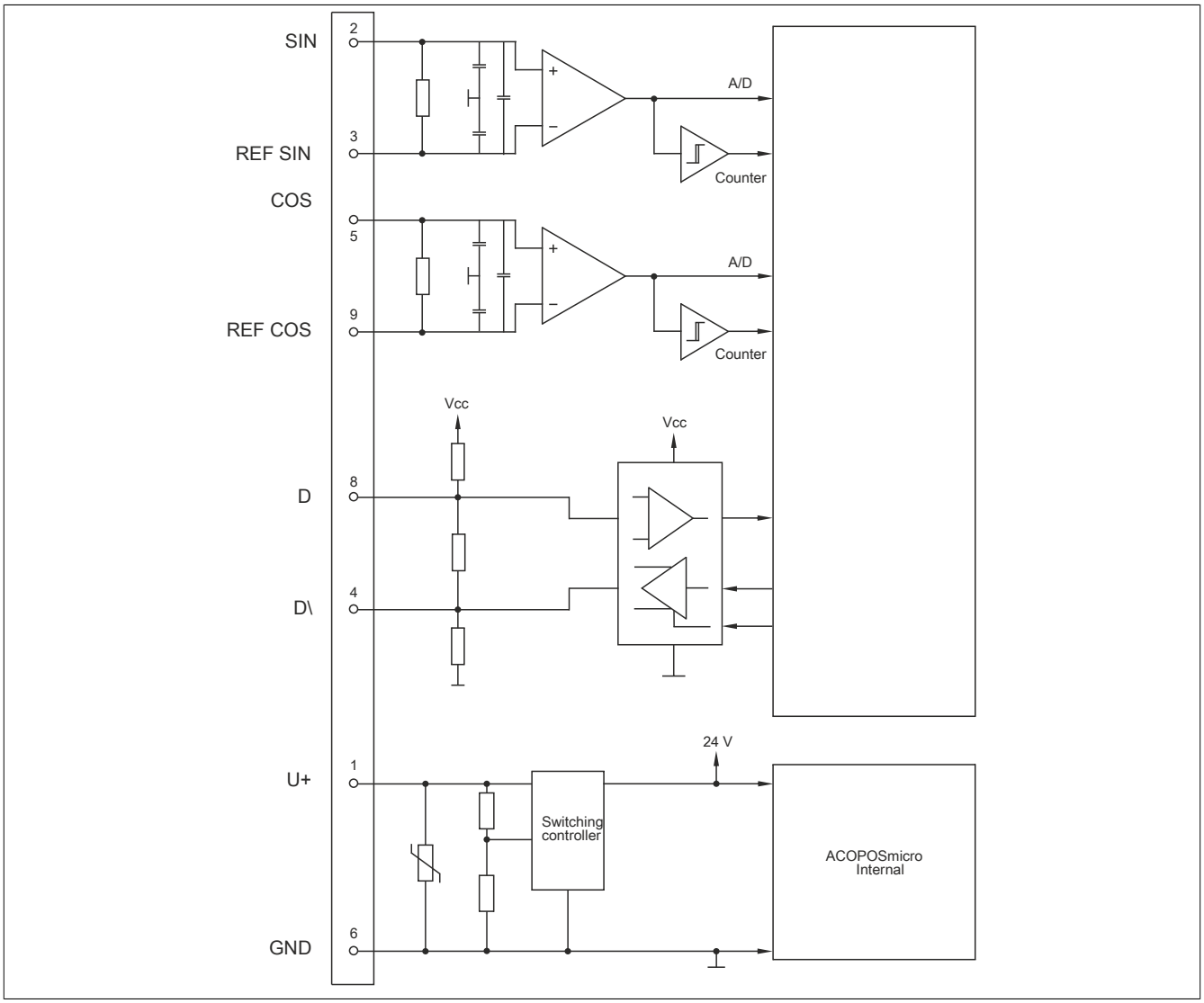


Figure 36: HIPERFACE encoder input - Input/Output circuit diagram

6.3.6.3 SSI encoder input

6.3.6.3.1 Pinout

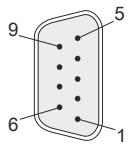
X6	Pin	Description	
	1	D	Data input D
	2	D\	Data input inverted D\
	3	---	Reserved
	4	T	Clock output
	5	T\	Clock output inverted T\
	6	---	Reserved
	7	---	Reserved
	8	U+	Encoder power supply 24 V
	9	GND	Encoder power supply 0 V

Table 156: SSI encoder input - Pinout

Information:

Reserved pins are not permitted to be connected!

6.3.6.3.2 Input/Output circuit diagram

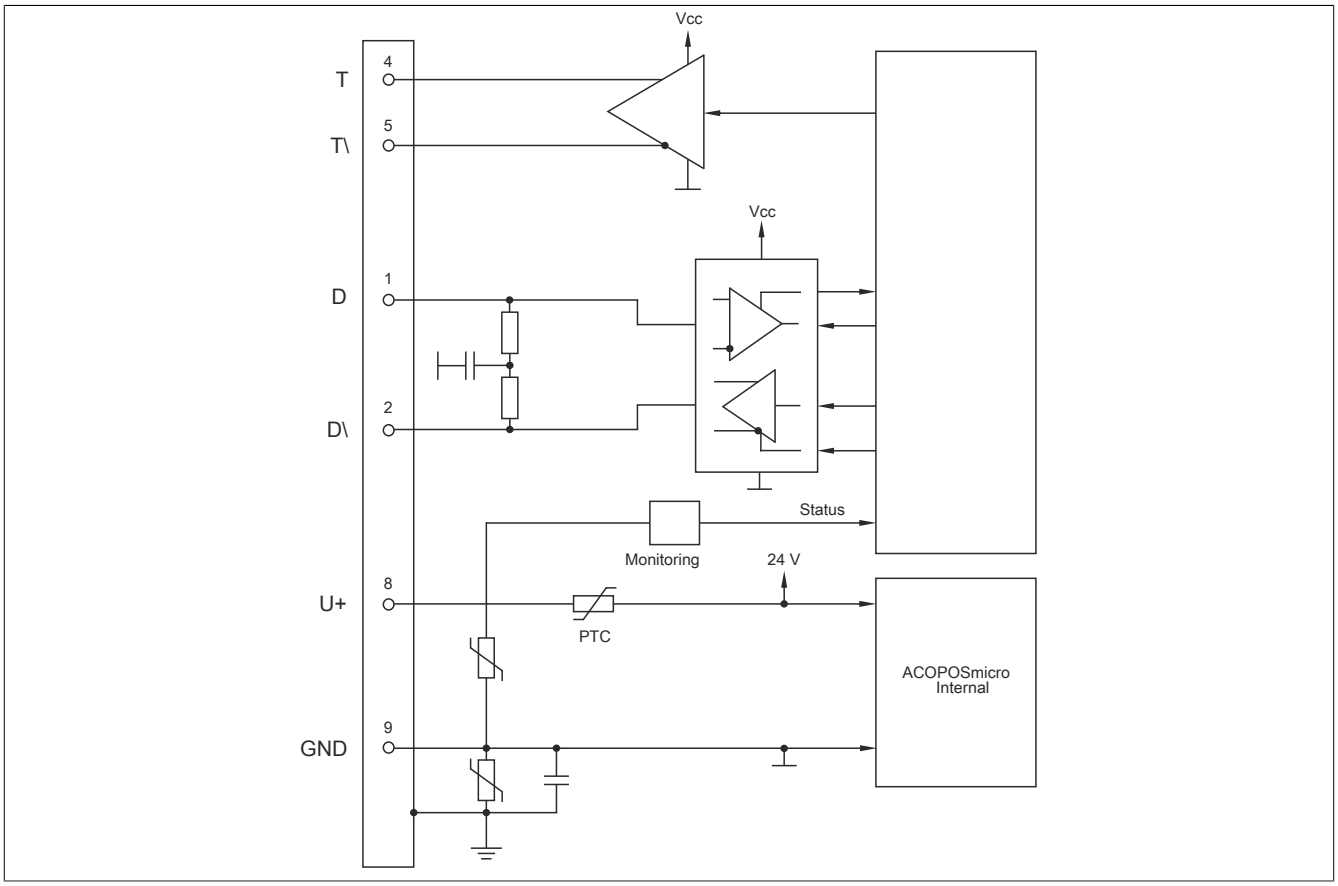


Figure 37: SSI encoder input - Input/Output circuit diagram

Information:

The +24 VDC encoder power supply is protected by a PTC thermistor for both encoder power supply lines. As a result, the load must be completely separated after the PTC has been tripped (e.g. due to a short circuit or overload) to allow the PTC to cool down.

6.3.7 X7 - Additional inputs/outputs

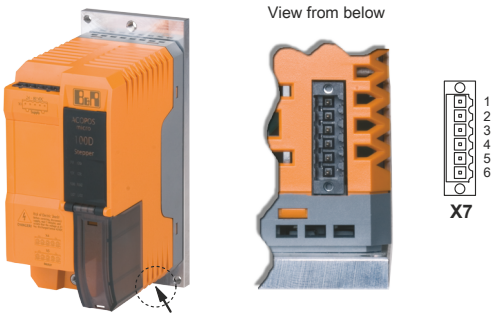
Figure					
					
Pinout[1]					
Additional digital inputs/outputs 80SD100XD.C04X-13				**Additional analog inputs 80SD100XD.C0XX-21**	
Pin	**Digital inputs/outputs**	**ABR incremental encoders**	**Counter**	**Pin**	**Analog inputs**
1	Digital output 1			1	Analog input 1 +
2	Digital output 2			2	Analog input 1 −
3	Digital input 1	A	Counter input 1	3	Shield
4	Digital input 2	B		4	Analog input 2 +
5	Digital input 3	R	External counter frequency	5	Analog input 2 −
6	Digital input 4		Reference for enable input	6	Shield
Additional inputs/outputs are connected using a terminal block (0TB1106.8010 or 0TB1106.8110). For information about these terminal blocks, see section 3.5.2.1 "Terminal block for connecting additional inputs/outputs" on page 124.					

Table 157: X7 - Additional inputs/outputs - Pinout

1) Pinout for each ACOPOSmicro variant

6.3.7.1 Input circuit diagram for additional digital inputs

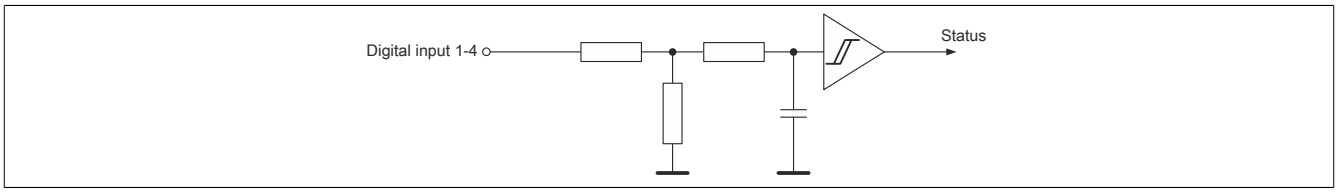


Figure 38: X7 connection - Input circuit diagram for additional digital inputs

6.3.7.2 Output circuit diagram for additional digital outputs

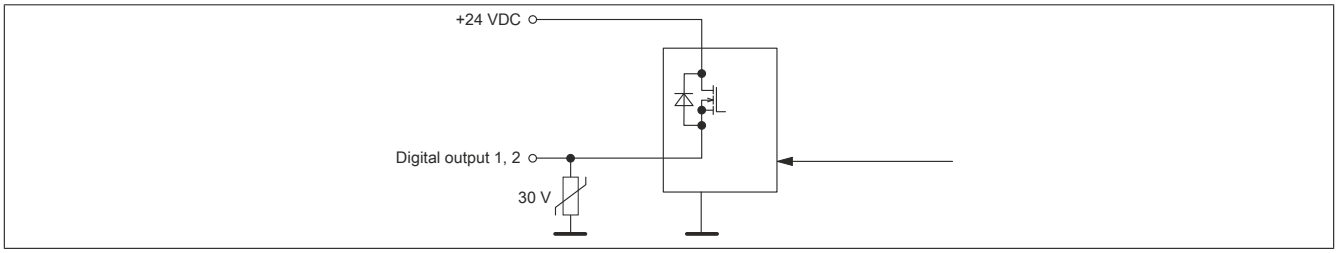


Figure 39: X7 connection - Output circuit diagram for additional digital outputs

6.3.7.3 Input circuit diagram for additional analog inputs

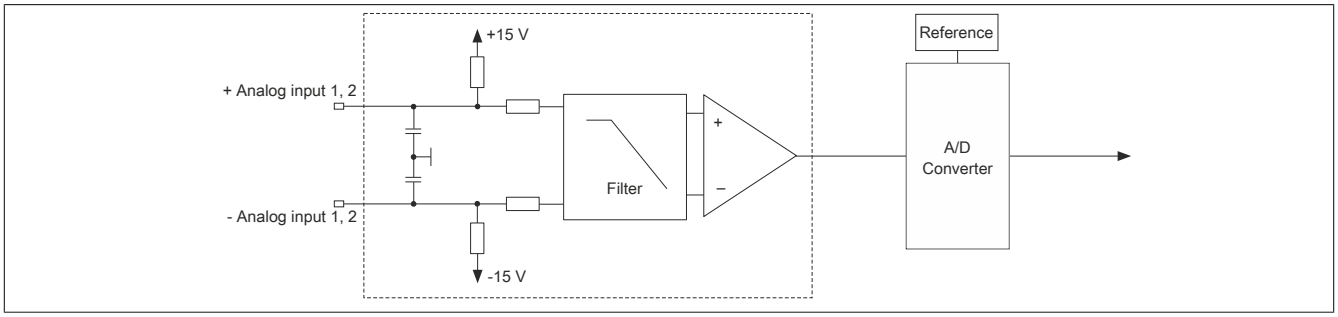
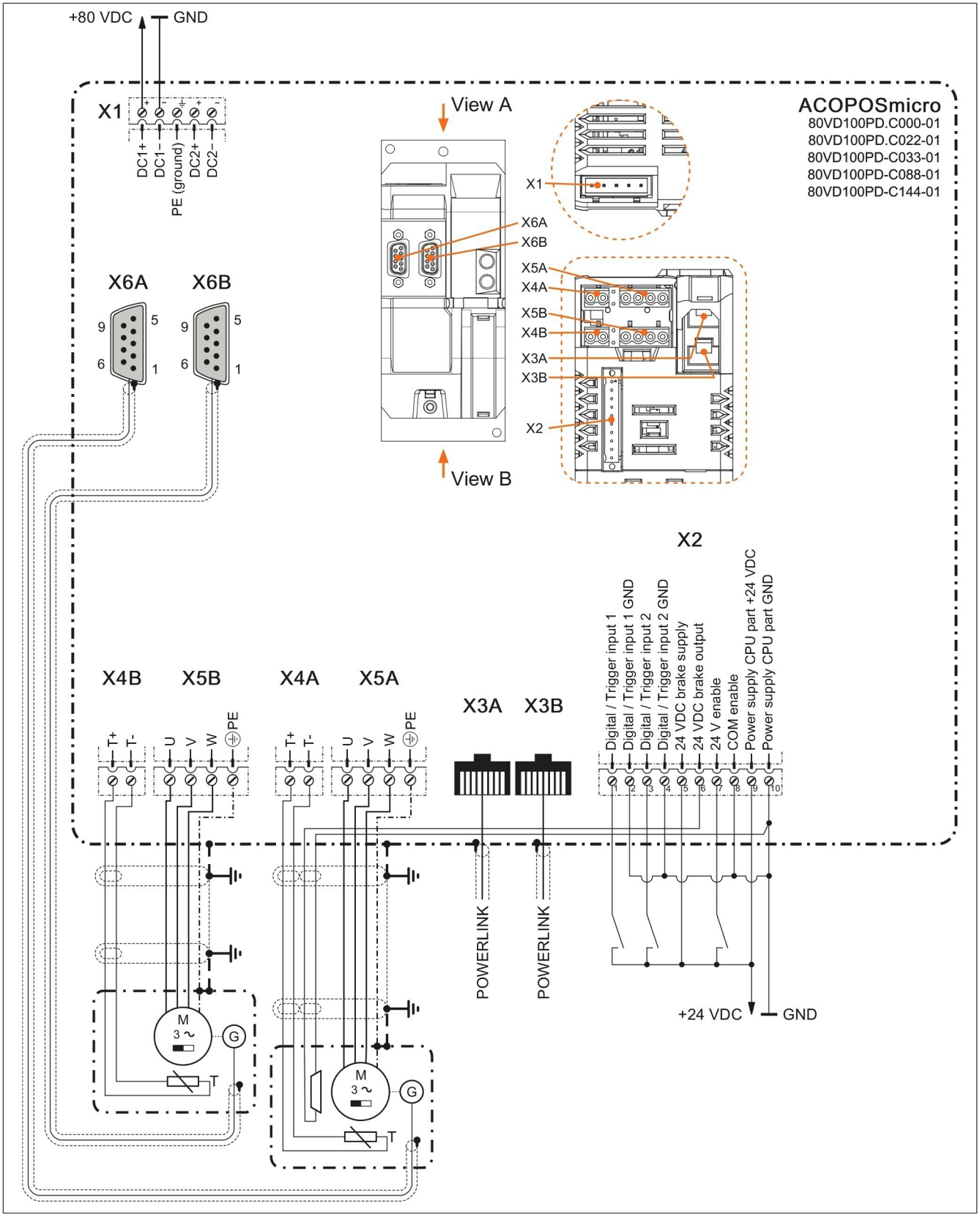


Figure 40: X7 connection - Input circuit diagram for additional analog inputs

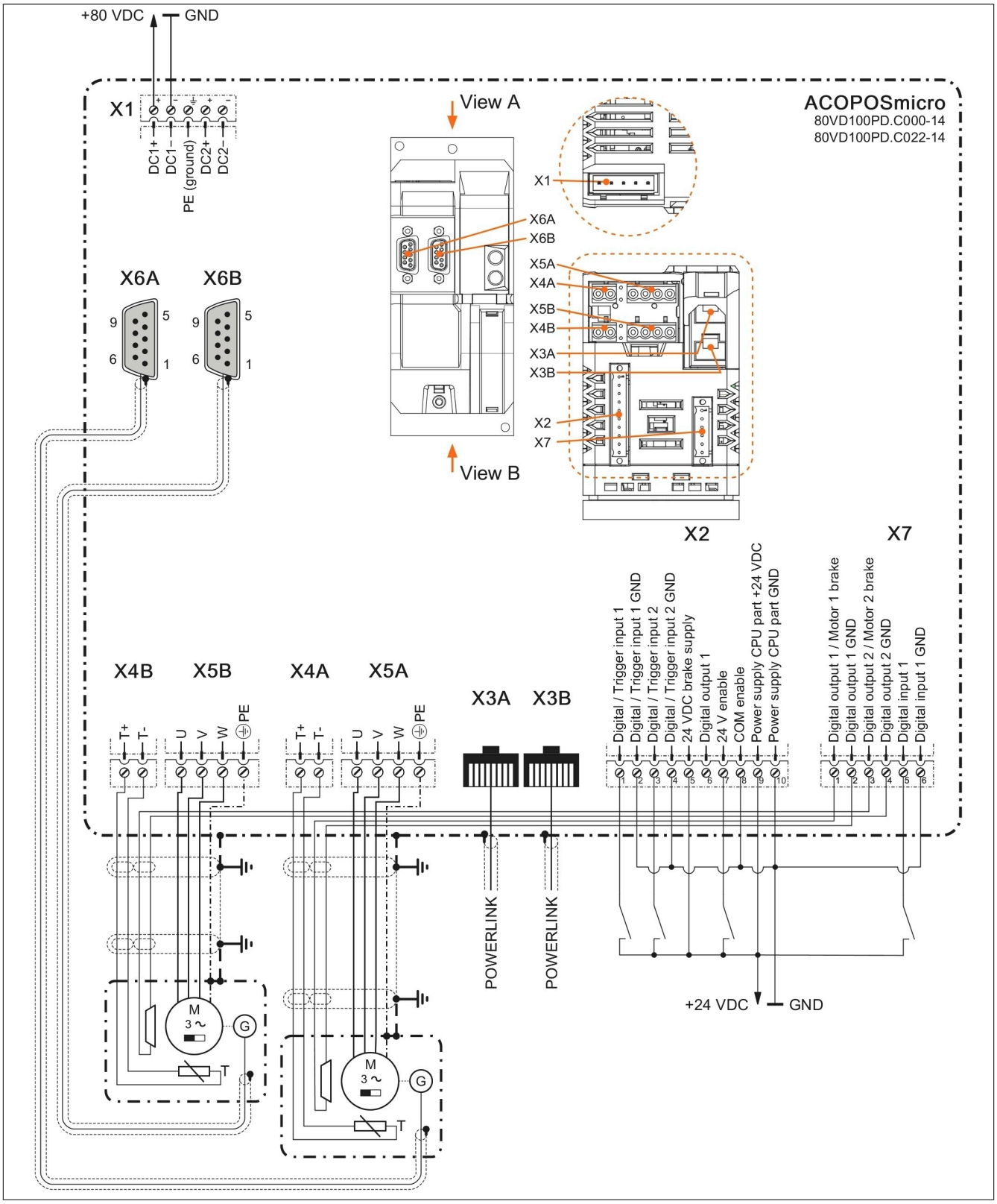
6.4 Inverter modules

6.4.1 Pinout overview

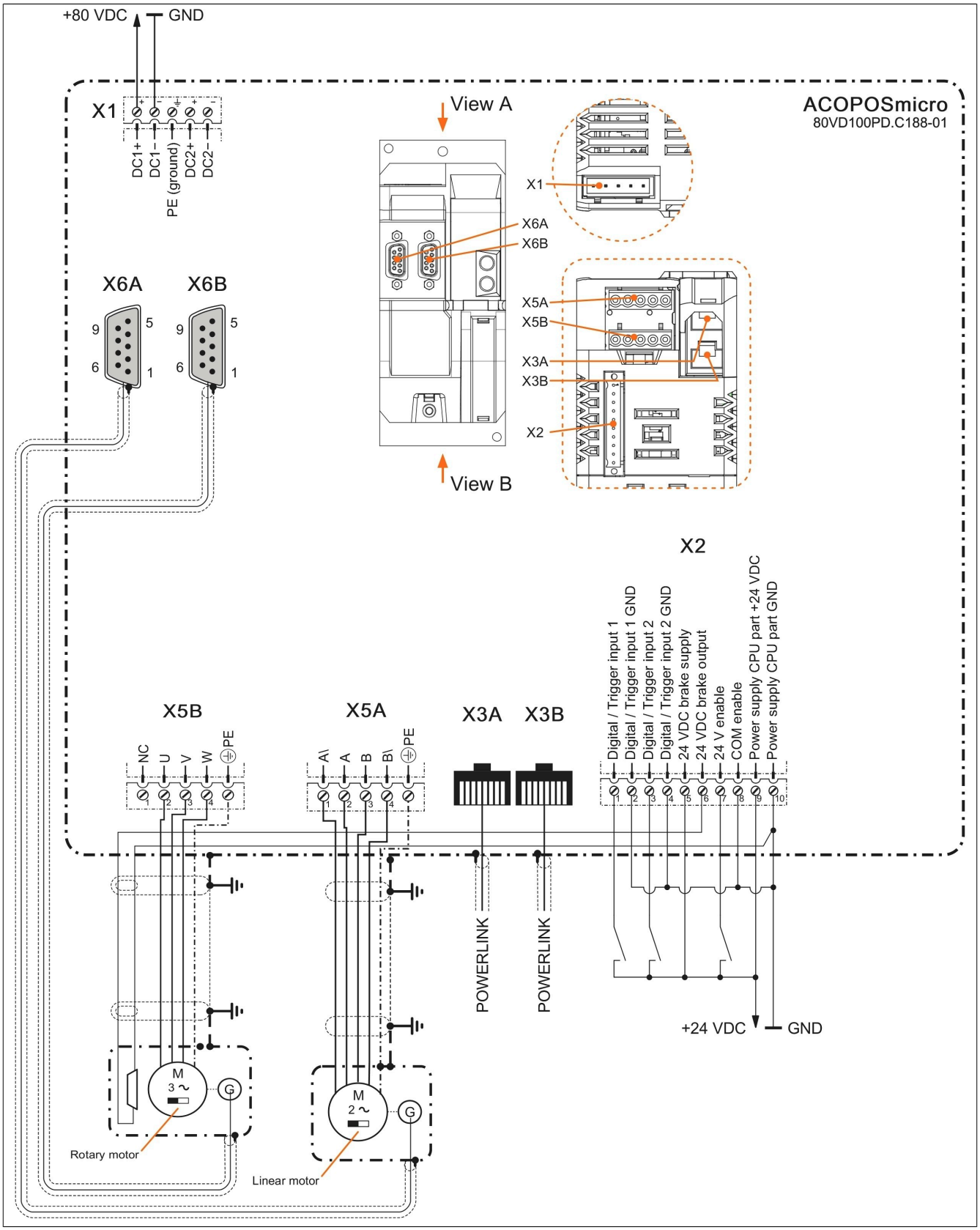
6.4.1.1 80VD100PD.C000-01, 80VD100PD.C022-01, 80VD100PD.C033-01, 80VD100PD.C088-01, 80VD100PD.C144-01



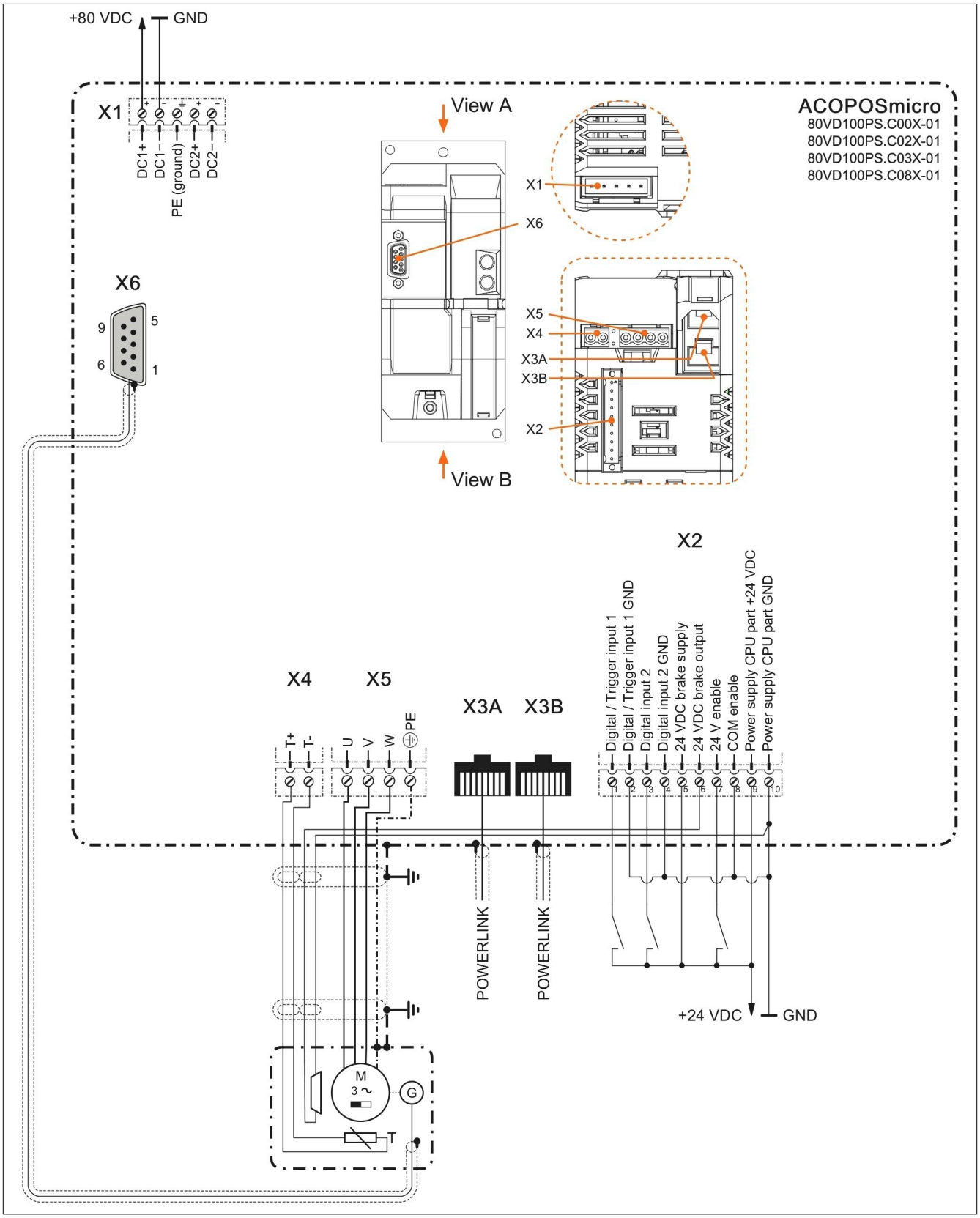
6.4.1.2 80VD100PD.C000-14, 80VD100PD.C022-14



6.4.1.3 80VD100PD.C188-01



6.4.1.4 80VD100PS.C00X-01, 80VD100PS.C02X-01, 80VD100PS.C03X-01, 80VD100PS.C08X-01



6.4.2 X1 - Power supply

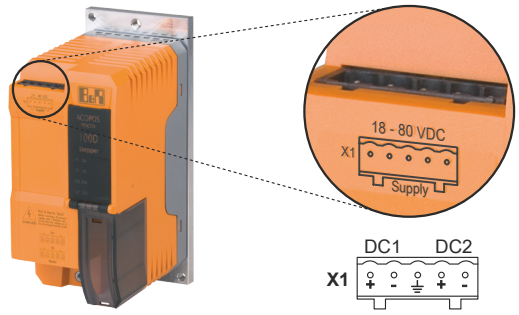
Figure	Pinout	
	Pin	Description
	+	DC1+
	-	DC1-
	⏚	PE (ground)
	+	DC2+
	-	DC2−
	The supply connection for the power unit is made using the 0TB2105.9021 or 0TB2105.9121-01 terminal block. See section "Terminal blocks for the connection of power supply units" on page 128.	

Table 158: X1 connection - Power supply

The DC1-/DC2- and DC1+/DC2+ connections are connected together inside the ACOPOSmicro. As a result, the supply connections can be used as follows:

- DC1 as the supply and DC2 to route the DC voltage
- DC1 and DC2 parallel to the supply at very high loads

For information about safeguarding the supply lines, see section "Fuse protection" on page 211.

Information:

In order to adhere to limit values for "disturbance voltages on the mains connections" of the ACOPOSmicro inverter modules, it is necessary to use the B&R 80PS080X3.10-01 power supply module for the DC bus voltage to X1.

6.4.2.1 X1 - Input circuit diagram for the power supply

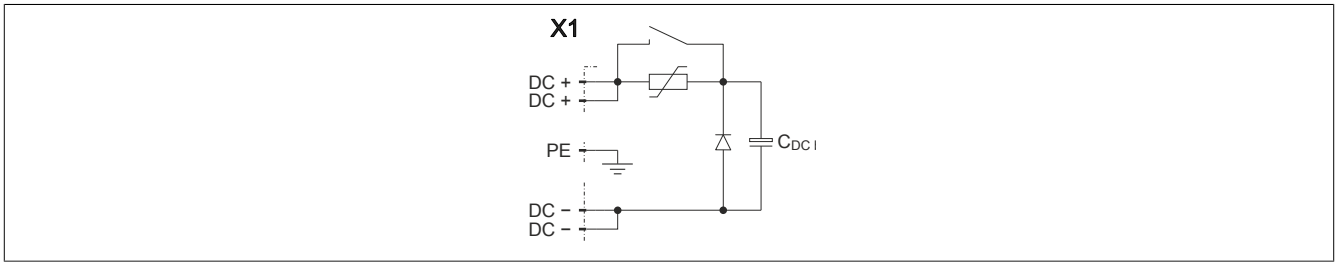


Figure 41: X1 connection - Input circuit diagram for the power supply

6.4.3 X2 - Power supply for the CPU and digital inputs/outputs

Figure	Pinout	
	**Pin**	**Description**
	1	Digital input 1
	2	Digital input 1 GND
	3	Digital input 2
	4	Digital input 2 GND
	5	24 VDC brake supply voltage[1)]
	6	24 VDC brake output[2)]
	7	24 V enable
	8	COM enable
	9	24 VDC CPU power supply
	10	GND CPU power supply
	The power supply connection for the CPU and digital inputs/outputs is made using a terminal block (0TB1110.8010, 0TB1110.8110, 0TB1310.3100, 0TB1310.8100 or 0TB1410.8110-01). See section "Terminal blocks for connecting the I/O and CPU power supplies" on page 125.	

Table 159: X2 connection - Power supply for the CPU and digital inputs/outputs

1) Reference potential: GND for CPU power supply (pin 10)
2) Pin 6 is available as a digital output for device variants with the suffix -14.
Control is performed via ParID OPTIONAL_CTRL_CMD + OPTIONAL_OUT1.
In this case, the brake output is connected to terminal X7.

Digital inputs 1 and 2 can be used as trigger inputs (see "Technical data" on page 23 for the respective drive module).

0TB1110 terminal blocks are single-row terminal blocks. In contrast, the 0TB1310.3100, 0TB1310.8100 and 0TB1410.8110-01 terminal blocks have three rows (3x 10 pins), which makes them particularly well-suited for connecting the inputs/outputs and acting as jumper terminals.

Information:

The red and blue rows of pins on the 0TB1310.3100, 0TB1310.8100 and 0TB1410.8110-01 terminal blocks are connected internally to simplify wiring. The user only has to create two connections so that the GND potential (blue) and the 24 VDC potential (red) can also supply the ACOPOSmicro CPU component on both rows of pins (see the following diagram).

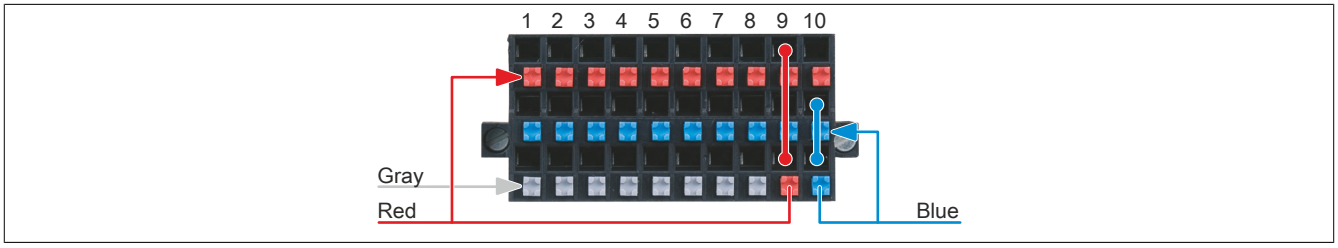


Figure 42: X2 connection - CPU power supply via terminal block 0TB1310.3100

6.4.3.1 X2 - Input/Output circuit diagram

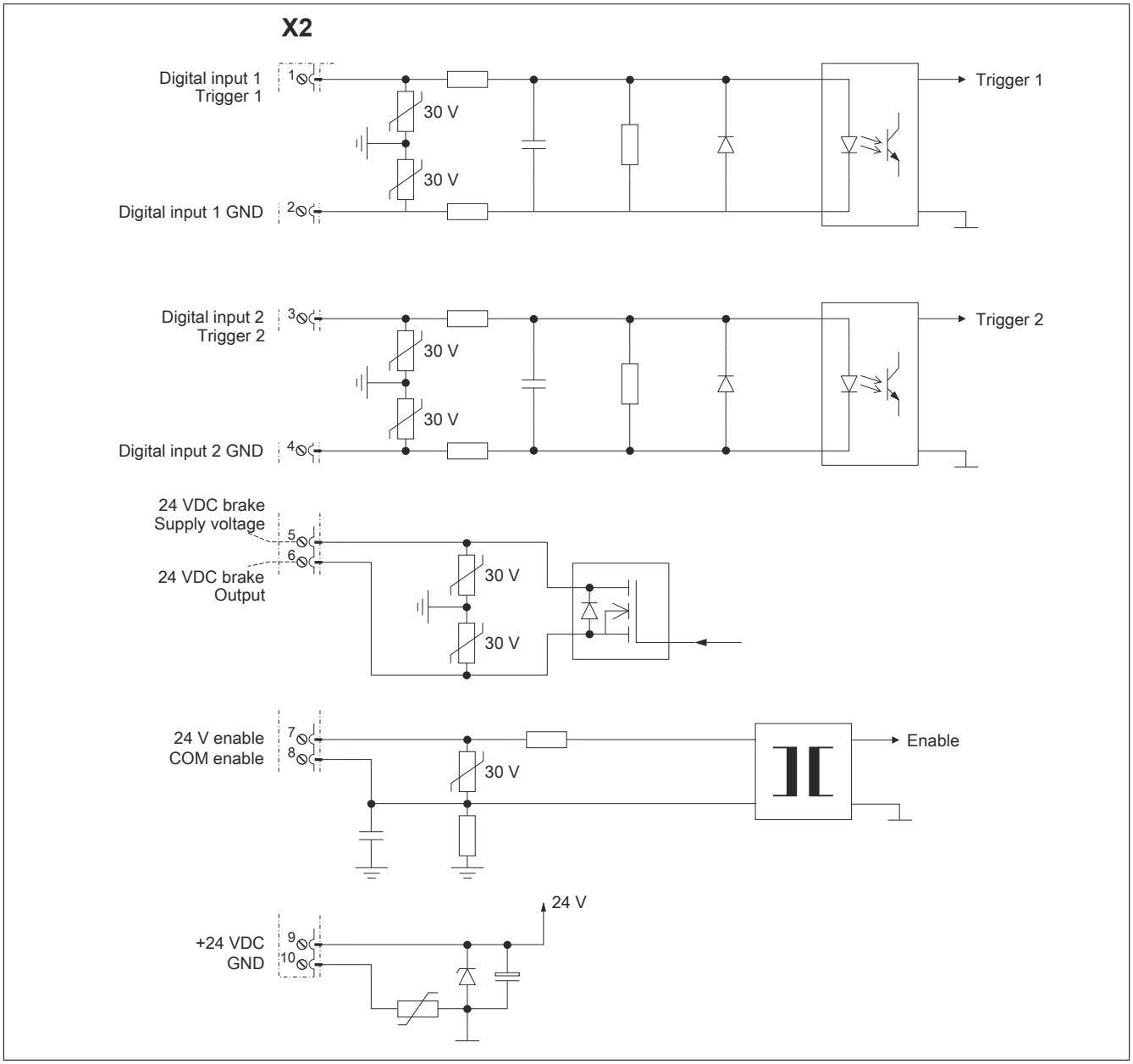


Figure 43: X2 connection - Input/Output circuit diagram

Danger!

The brake controller integrated in the ACOPOSmicro and the holding brake integrated in B&R standard motors fulfill the criteria of Safety Category B per EN 954-1.

Additional measures are necessary to achieve higher safety categories.

6.4.4 X3 - POWERLINK connections

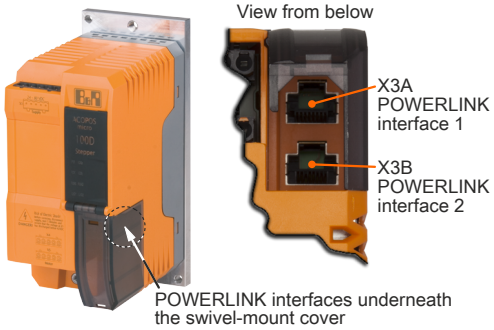
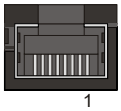
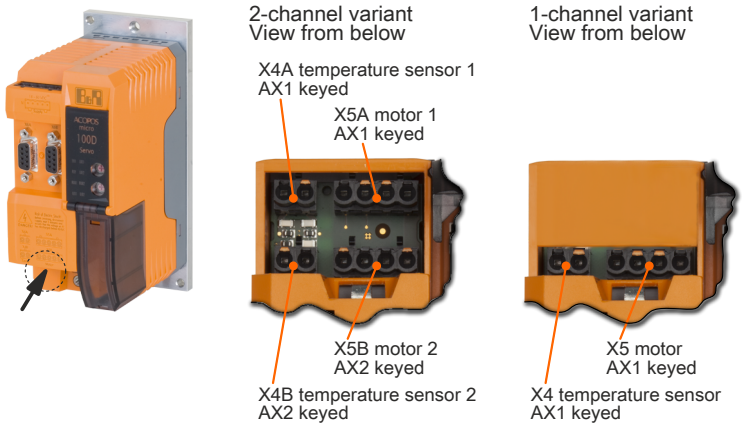
Figure	POWERLINK connections		
	**X3**	**Pin**	**Description**
		1	RXD
		2	RXD\
		3	TXD
		4	Termination
		5	Termination
		6	TXD\
		7	Termination
		8	Termination
	Connecting to a POWERLINK network is done using pre-assembled cables. See section "X20 POWERLINK cables" on page 132.		

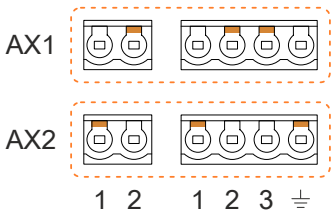
Table 160: X3 - POWERLINK connections

6.4.5 X4/X5 - Servo motor connection

Figure



Pinout



Pin			
Servo motor			
1	U	Motor phase U	Blue
2	V	Motor phase V	Brown
3	W	Motor phase W	Black
⏚	PE (ground)		
1	T+	Temperature sensor T+	White
2	T-	Temperature sensor T-	Red

The motor connection is made using the 0TB2104.4x1x terminal block, and the temperature sensor is connected to the 0TB2102.4x1x terminal block.
For information regarding terminal blocks, see section 3.5.2.3 "Terminal blocks for connecting motors" on page 126.

Table 161: X4/X5 - Servo motor connection

Danger!

Motor connectors and all other connections are not permitted to be connected or disconnected when voltage is applied or during operation.

Information:

The shield plate that is included in the delivery must be used. The motor cable for axis 1 must be attached to the far right side of the shield plate, and the motor cable for axis 2 must be attached to the far left side of the shield plate.

Information:

Since the female connectors of the motor and temperature sensor connectors are coded, make sure that the corresponding terminal blocks are used with the appropriate coding. For more information, see the description in section 3.5.2.3 "Terminal blocks for connecting motors" on page 126.

6.4.5.1 X4/X5 - Input/Output circuit diagram - Temperature sensor / Servo motor connection

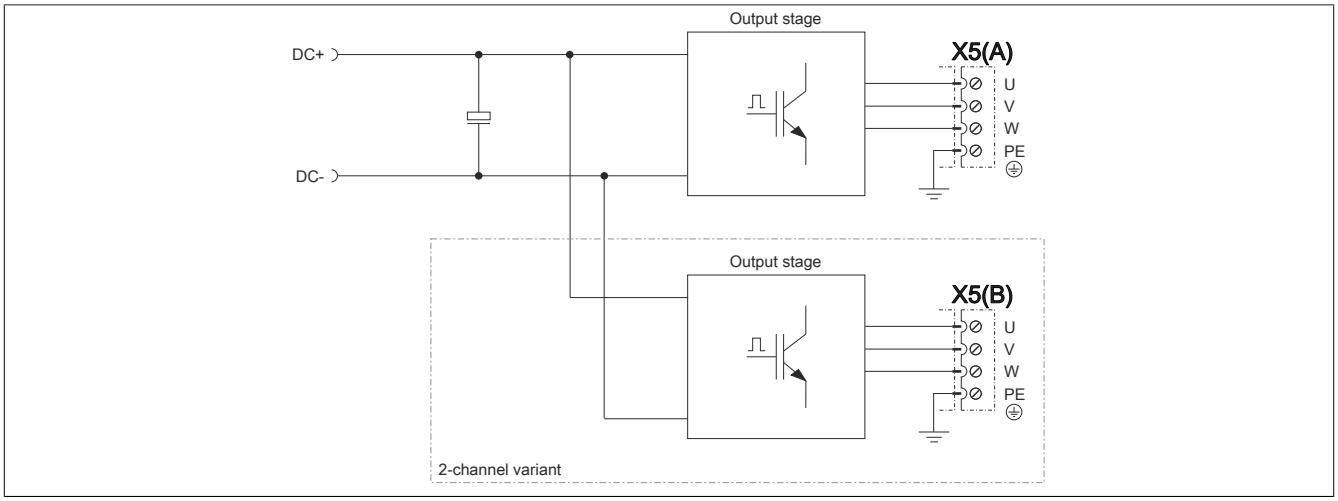


Figure 44: X5 - Output diagram - Servo motor connection

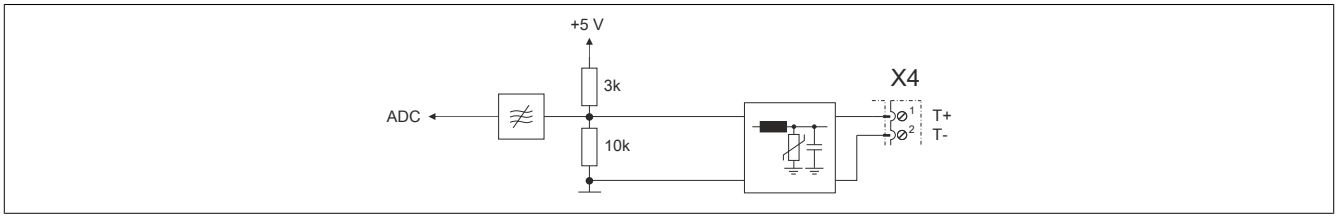


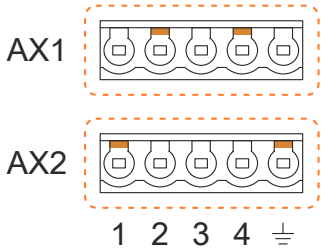
Figure 45: X4 - Output diagram - Servo motor temperature sensor connection

6.4.6 X5 - LinMot linear/rotary motor connection

Figure



Pinout



Pin	Linear motor			Rotary motor		
1	A\	PH 1-	Pink	NC	NC	
2	A	PH 1+	Red	U	A	Red
3	B	PH 2+	Blue	V	B	Pink
4	B\	PH 2-	Gray	W	C	Blue
⏚	PE (ground)			PE (ground)		

The motor connection is made using the 0TB2105.4x1x terminal block.
See section 3.5.2.3 "Terminal blocks for connecting motors" on page 126.

Table 162: X5 - Linear/Rotary motor connection

Danger!

Motor connectors and all other connections are not permitted to be connected or disconnected when voltage is applied or during operation.

Information:

Since the female connectors of the motor connectors are coded, make sure that the corresponding terminal blocks are used with the appropriate coding. (see section 3.5.2.3 "Terminal blocks for connecting motors" on page 126).

Information:

For additional information about LinMot®, see: www.linmot.com

6.4.7 X6 - Encoder inputs

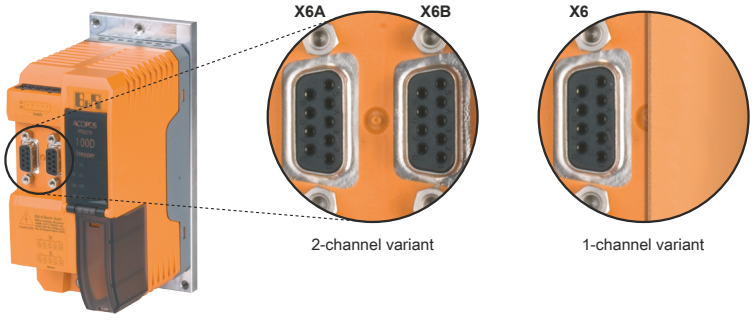


Figure 46: X6 - Encoder inputs

6.4.7.1 EnDat 2.2 encoder input

6.4.7.1.1 Pinout

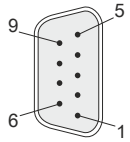
X6	Pin	Description	
	1	U+	Encoder power supply +12.5 V
	2	VBATT	Battery backup power supply
	3	NC	Not connected
	4	D	Data input
	5	T	Clock output
	6	GND 1	Encoder power supply GND
	7	GND 2	Battery backup power supply GND
	8	D\	Data input inverted
	9	T\	Clock output inverted

Table 163: EnDat 2.2 encoder input - Pinout

6.4.7.1.2 Input/Output circuit diagram

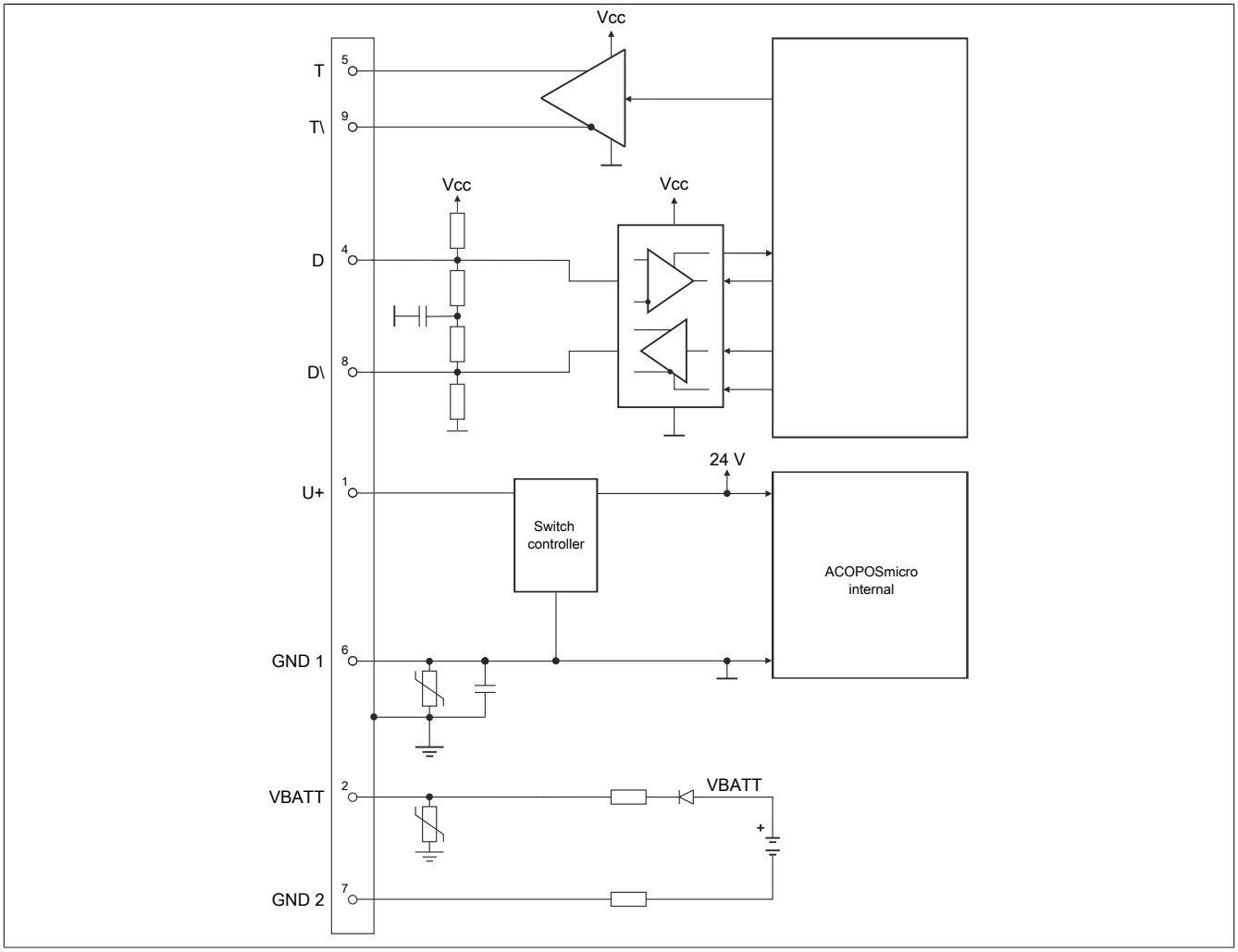


Figure 47: EnDat 2.2 encoder input - Input/Output circuit diagram

6.4.7.2 Resolver encoder input

6.4.7.2.1 Pinout

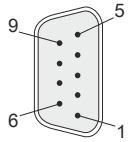
X6	Pin	Description	
	1	NC	Not connected
	2	NC	Not connected
	3	SIN	Channel SIN
	4	COS\	Channel COS inverted
	5	REF	Channel REF
	6	NC	Not connected
	7	SIN\	Channel SIN inverted
	8	COS	Channel COS
	9	REF\	Channel REF inverted

Table 164: Resolver encoder input - Pinout

6.4.7.2.2 Input circuit diagram

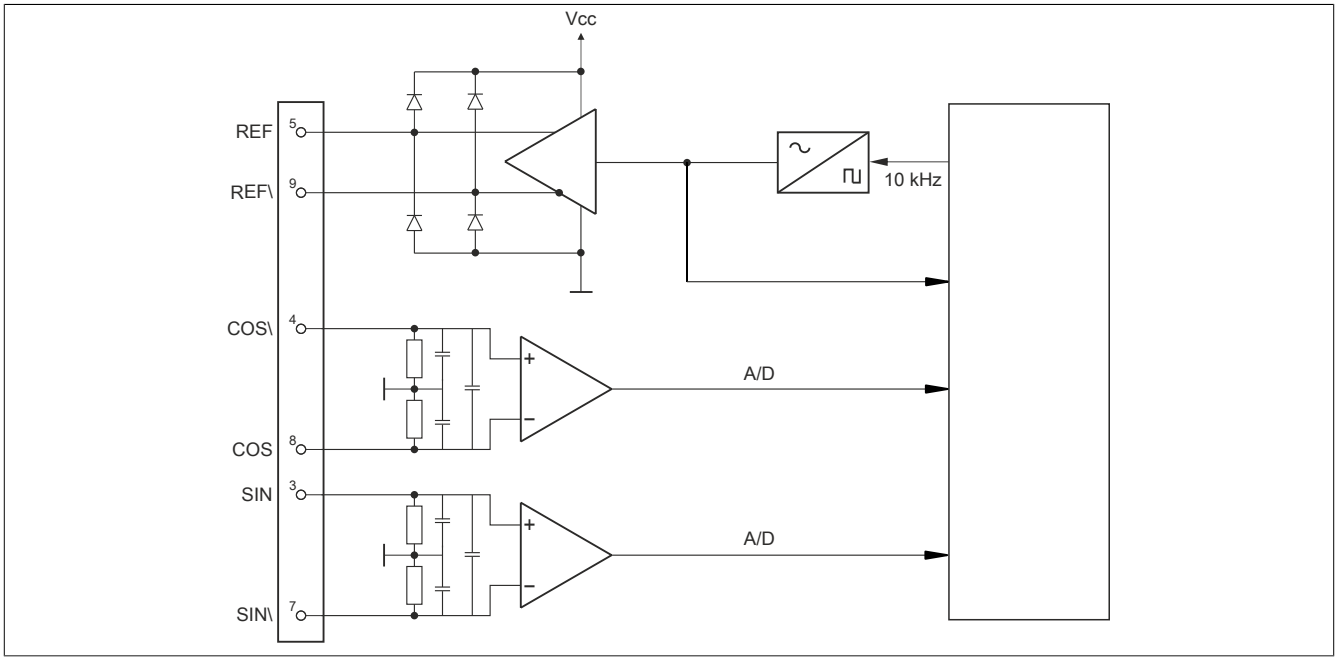


Figure 48: Resolver encoder input - Input circuit diagram

6.4.7.3 Incremental encoder input

6.4.7.3.1 Pinout

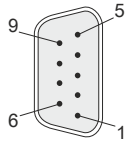
X6	Pin	Description	
	1	A	Channel A
	2	A\	Channel A inverted
	3	B	Channel B
	4	B\	Channel B inverted
	5	R	Channel R
	6	R\	Channel R inverted
	7	U+	+5 VDC encoder power supply output
	8	GND	GND - CPU power supply
	9	Shield	Shield connection

Table 165: Incremental encoder input - Pinout

6.4.7.3.2 Input/Output circuit diagram

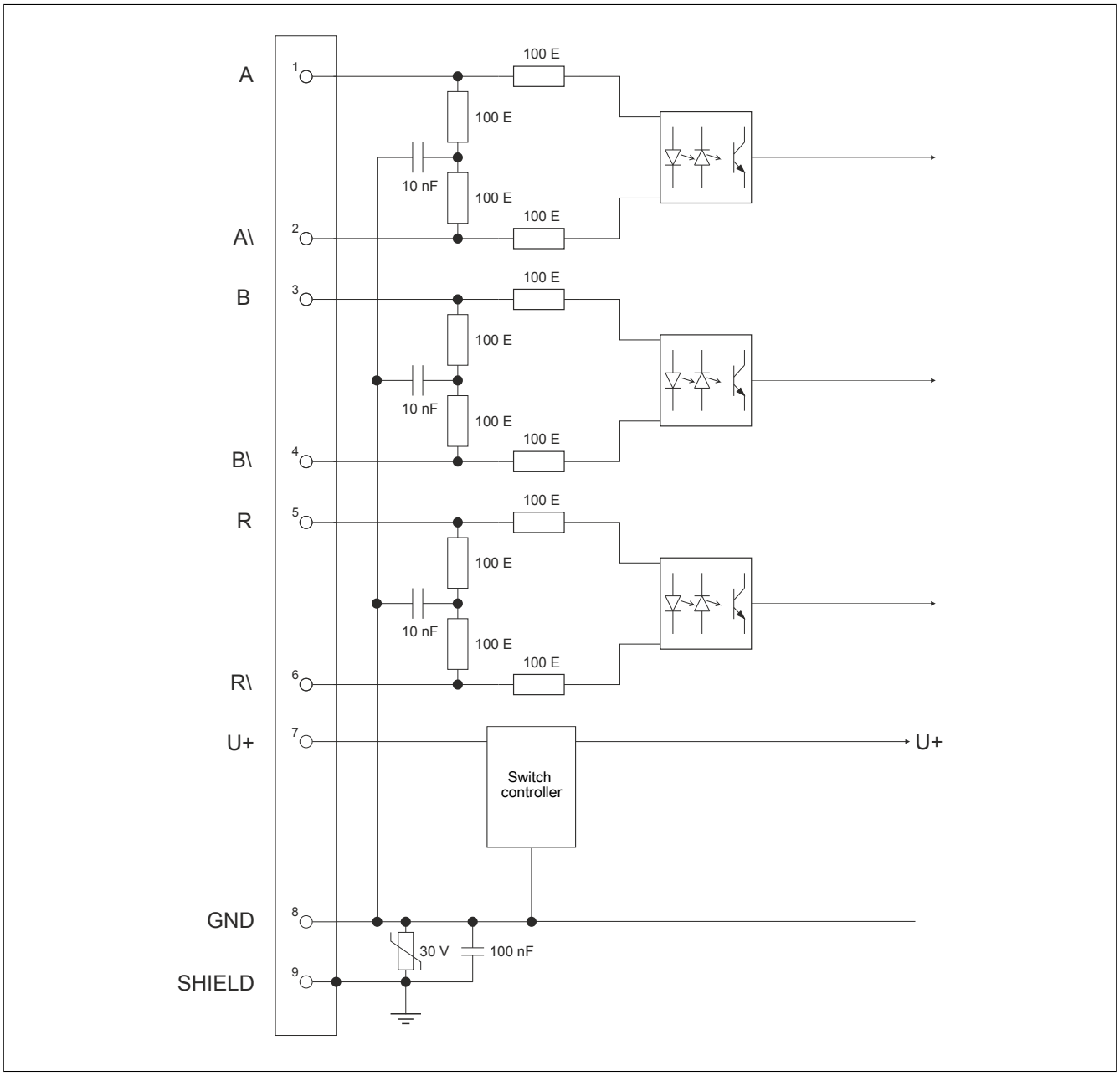


Figure 49: Incremental encoder - Input/Output circuit diagram

6.4.7.4 SSI encoder input

6.4.7.4.1 Pinout

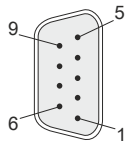
X6	Pin	Description	
	1	U+	Encoder power supply 5 V ±5%
	2	---	NC
	3	---	NC
	4	D	Data input
	5	T	Clock output
	6	GND 1	Encoder power supply GND
	7	---	NC
	8	D\	Data input inverted
	9	T\	Clock output inverted

Table 166: SSI absolute encoder - Pinout

6.4.7.4.2 Input/Output circuit diagram

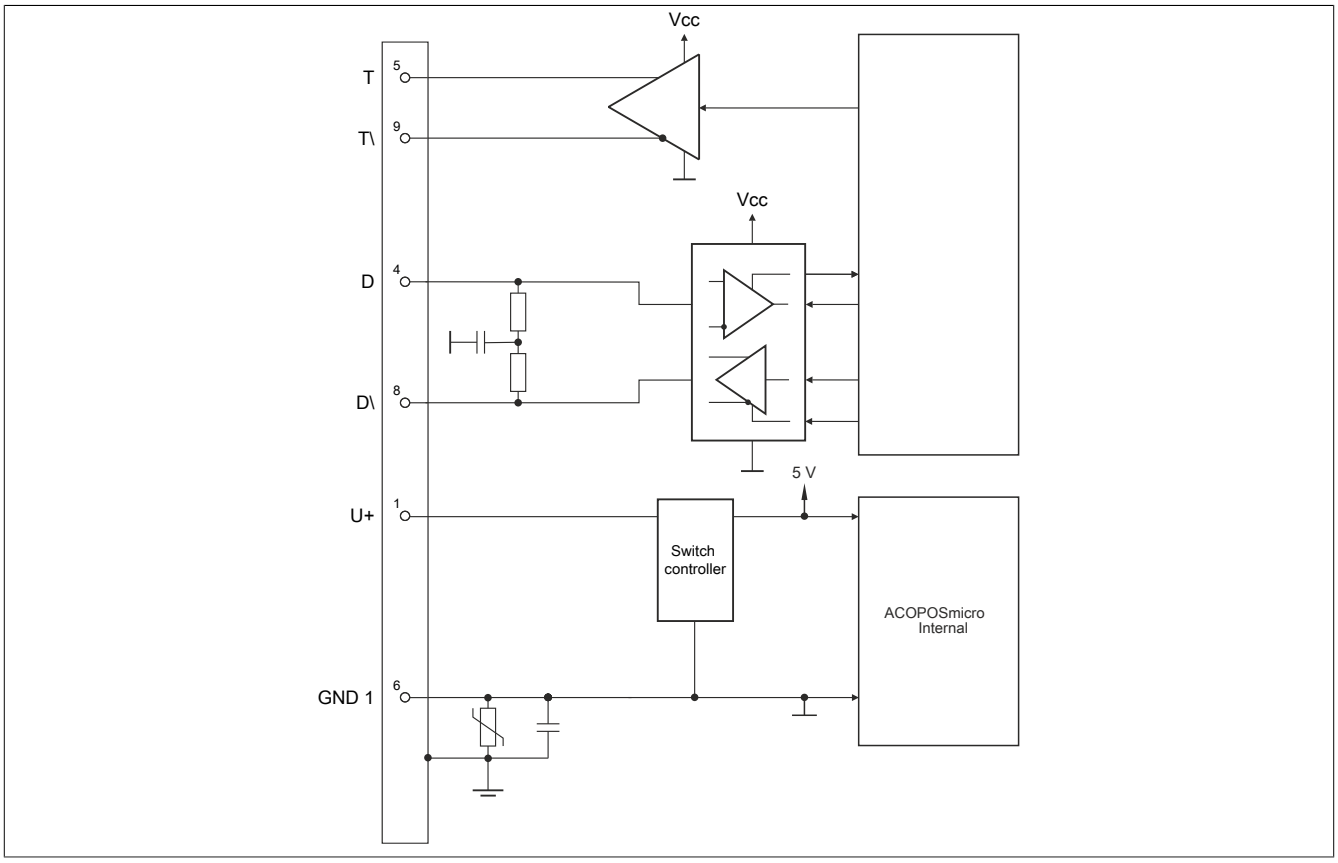


Figure 50: SSI absolute encoder - Input/Output circuit diagram

6.4.7.5 SinCos encoder

6.4.7.5.1 Pinout

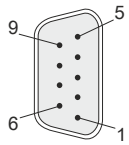
X6	Pin	Description	
	1	Sense\	Sense -
	2	R	Reference pulse +
	3	B	Cos +
	4	A	Sin +
	5	5 V	Encoder power supply 5 V
	6	R\	Reference pulse -
	7	B\	Cos -
	8	A\	Sin -
	9	GND	Encoder power supply GND

Table 167: SinCos encoder - Pinout

6.4.7.6 LinMot® encoder input

Information:

For additional information about LinMot®, see www.linmot.com.

6.4.7.6.1 Pinout

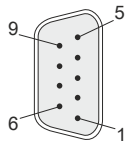
X6	Pin	Description
	1	Encoder power supply 5 V
	2	Sine input +
	3	NC
	4	NC
	5	Cosine input +
	6	Encoder power supply GND
	7	NC
	8	Temperature input
	9	NC

Table 168: LinMot® encoder input - Pinout

Information:

The connector pinout differs from the standard LinMot® pinout.

Information:

With a linear motor, the position is detected in a non-contact manner using magnetic field sensors that are sealed with the motor winding.

If the speed controller is not optimally configured, the current peaks that occur can have a negative effect (di/dt) on the position signal. This can cause the ACOPOSmicro to report errors 6061 and 7031.

An optimized controller cascade configuration (PCTRL position control, SCTRL speed control) is essential. A filter time (SCTRL_TI_FIL) of approx. 10 ms is also recommended to stabilize the speed controller.

6.4.8 X7 - Additional inputs/outputs

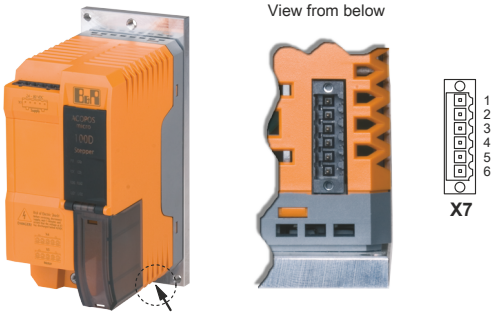
Figure	
	
Pinout	
Additional digital inputs/outputs 80VD100PD.C000-14 and 80VD100PD.C022-14	
Pin	**Digital inputs/outputs**
1	Digital output for brake channel 1 (motor cable B+)[1)]
2	GND
3	Digital output for brake channel 2 (motor cable B+)[1)]
4	GND
5	Digital input 1 / Trigger
6	GND digital input 1
Additional inputs/outputs are connected using a terminal block (0TB1106.8010 or 0TB1106.8110). For information about these terminal blocks, see section 3.5.2.1 "Terminal block for connecting additional inputs/outputs" on page 124.	

Table 169: X7 - Additional inputs/outputs - Pinout

1) In contrast, pin 6 of X2 is used as a normal digital output.

6.4.8.1 Input circuit diagram for additional digital inputs

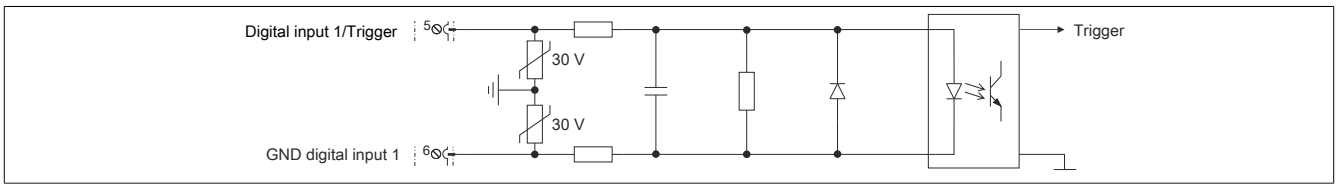


Figure 51: X7 connection - Input circuit diagram for additional digital inputs

6.4.8.2 Output circuit diagram for additional digital outputs

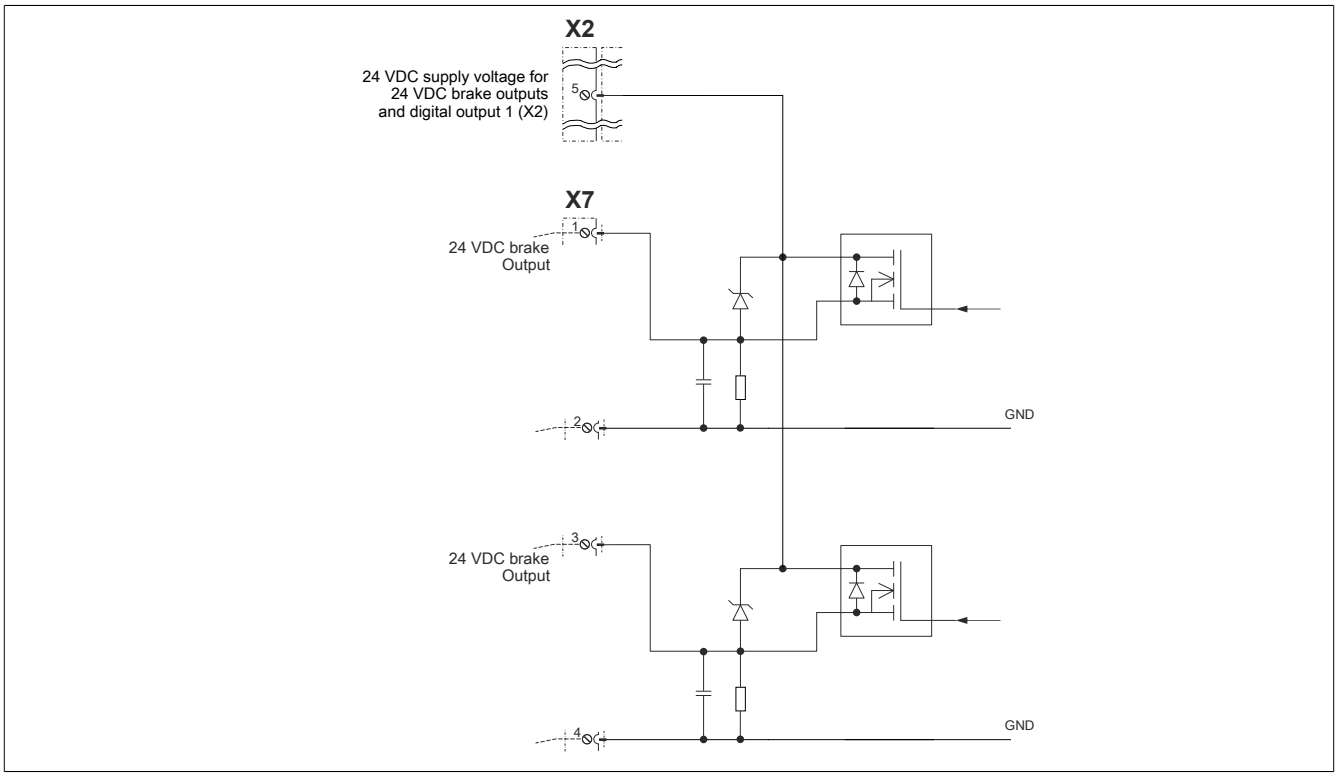
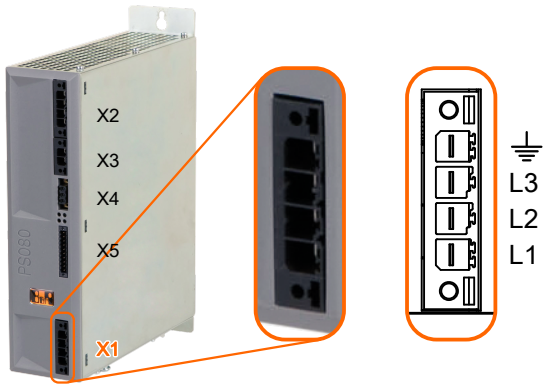


Figure 52: X7 connection - Output circuit diagram for additional digital outputs

6.5 Power supply module

6.5.1 X1 - Mains input

Figure



Pinout



Pin	Description
⏚	PE (ground)
L3	Line conductor L3
L2	Line conductor L2
L1	Line conductor L1

The mains connection is made with terminal block 0TB3104-7022 (see "Terminal blocks" in the ACOPOSmicro user's manual).

Table 170: X1 connector - Mains input

Information:

Max. load per pin: 41 A @ T_U = 20°C, 36 A @ T_U = 40°C

6.5.1.1 Network configuration

The mains connection is made using terminals X1 / L1, L2, L3 and PE. The power supply can be directly connected to TT and TN power systems (three-phase systems with grounded neutral).

Isolation transformers must be used with ungrounded IT power systems (three-phase power system with neutral isolated from ground or grounded through impedance) or corner-grounded TN-S systems with protective ground conductor. In this case, the secondary neutral must be grounded and connected to the power supply's protective ground conductor. This makes it possible to prevent overvoltages between line conductors and power supply housing. Three-phase isolation transformers with the corresponding input and output voltages and a vector group with secondary neutral are used here (e.g. 3x 400 V / 3x 400 V, Dyn5).

TT and TN power systems are very common in the USA and referred to as "Delta/Wye with grounded wye neutral". IT power systems are also known as "systems with ungrounded secondary", while corner-grounded TN-S power systems are sometimes called "Delta/Delta with grounded leg".

Danger!

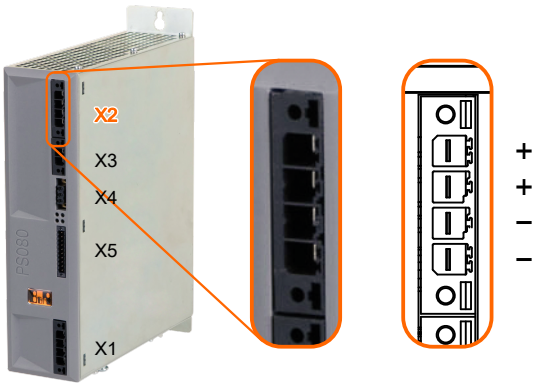
The power supply is only permitted to be operated directly on grounded three-phase industrial power systems (TN or TT systems). When used in residential areas, commercial areas or small businesses, additional filtering measures must be implemented by the user.

Danger!

The power supply is not permitted to be operated directly on IT power systems and corner-grounded TN-S power systems with a protective ground conductor!

6.5.2 X2 - Power output 24 to 80 VDC

Figure



Pinout



Pin	Description
+	Output +
+	Output +
–	Output –
–	Output –

The mains connection is made using terminal block 0TB3104-7021 (See section "Terminal blocks" on page 123.).

Table 171: X2 connector - Power output 24 to 80 VDC

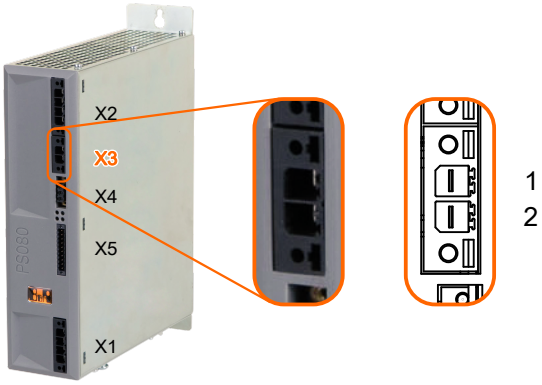
Information:

Max. load per pin: 41 A @ T_U = 20°C, 36 A @ T_U = 40°C

Wiring for parallel operation: See 3.4.5 "Parallel operation" on page 114.

6.5.3 X3 - Chopper output

Figure



Pinout



Pin	Description
1	Output +
2	Chopper resistance

The connection is made with terminal block 0TB3102-7010 (see "Terminal blocks" in the ACOPOSmicro user's manual).

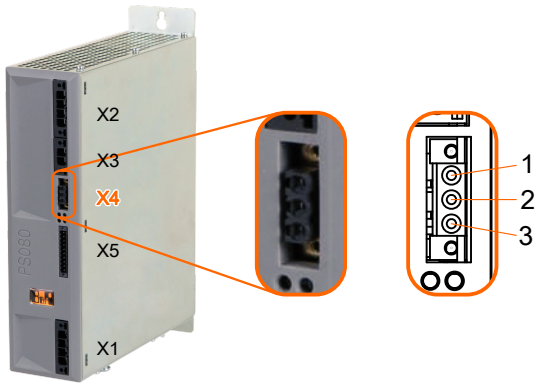
Table 172: X3 connector - Chopper output

Information:

Max. load per pin: 41 A @ T_U = 20°C, 36 A @ T_U = 40°C

6.5.4 X4 - Voltage output 24 VDC / 2 A

Figure



Pinout



Pin	Description
1	24 VDC output +
2	PE (ground)
3	24 VDC output -
The connection is made with terminal block 0TB103.3 (see "Terminal blocks" in the ACOPOSmicro user's manual).	

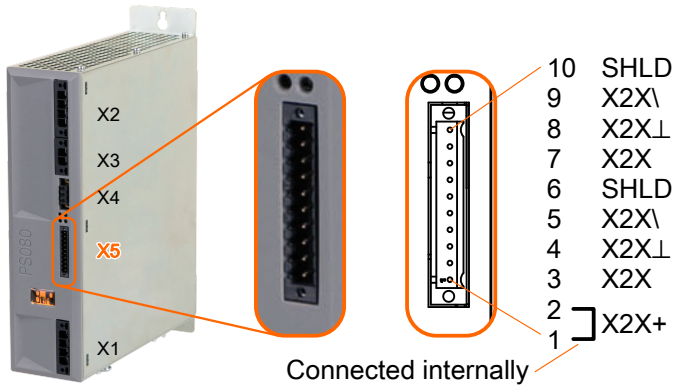
Table 173: X4 connector - Voltage output 24 VDC / 2 A

Warning!

Voltage output X4 is not permitted to be connected in parallel with other 80PS080X3.10-01 modules!

6.5.5 X5 - X2X Link interface

Figure



Pinout



Pin	Description	
1	X2X+ (connected internally)	
2		
3	X2X	X2X Link input
4	X2X GND	
5	X2X\	
6	Shield	
7	X2X	X2X Link output
8	X2X GND	
9	X2X\	
10	Shield	

The connection is made with terminal block 0TB1110.8010 (see "Terminal blocks" in the ACOPOSmicro user's manual).

Table 174: X5 connector - X2X Link interface

The power supply for X2X Link on module 80PS080X3.10-01 is provided via X2X+. As a result, the X2X Link network can be passed through to subsequent modules even when the mains voltage is switched off on module 80PS080X3.10-01. The behavior of the ModuleOK bit does not change (ModuleOK = FALSE when the mains voltage is off).

If no X2X Link power supply is connected, the X2X Link network is supplied internally. In this case, the X2X Link network is not passed through if the power supply module is switched off.

Information:

If the 24 VDC power supply for the ACOPOSmicro fails, the communication to the following modules can be maintained if the ACOPOSmicro also draws power from the X2X bus for communication. The typical power requirements of an ACOPOSmicro module for this is 0.75 W (max. 0.8 W).

7 Operation - Stepper motor modules

mapp Motion

The following variants are supported with mapp Motion:

- 80SD100XD.C011-01
- 80SD100XD.C033-01
- 80SD100XD.C044-01
- 80SD100XD.C0XX-01
- 80SD100XD.C0XX-21
- 80SD100XD.W044-01
- 80SD100XD.W0XX-01
- 80SD100XS.C04X-01
- 80SD100XS.C0XX-01

7.1 mapp Motion system requirements

This module can be operated with mapp Motion function blocks. The following minimum versions are required for this:

- Automation Studio: 4.7.2
- Automation Runtime: 4.72
- mapp Technology package: mapp Motion 5.9
- Hardware module upgrade: 2.2.0.0

7.2 Function models

A function model specifies the registers on the module (storage model) used by the application to operate the module. Only these registers are processed on the module during each cycle and transferred cyclically/acyclically via the bus. The function model is used to determine the module's functionality (default or ramp).

7.2.1 Minimum cycle time

The minimum cycle time specifies how far the bus cycle can be reduced without communication errors occurring. It is important to note that very fast cycles reduce the idle time available for handling monitoring, diagnostics and acyclic commands.

	Minimum cycle time
Function model "Standard"	250 µs
Function model "Ramp"	250 µs

7.2.2 Minimum I/O update time

The minimum I/O update time specifies how far the bus cycle can be reduced so that an I/O update is performed in each cycle.

	Minimum I/O update time
Function model "Standard"	250 µs
Function model "Ramp"	
Inputs	250 µs
Outputs[1)]	25 ms

1) Depends on the configuration of the "movement profile generator" on page "movement profile generator" on page 328.

7.2.3 Operation with bus controller

The following function models can be used depending on the bus system being used when operating the ACOPOSmicro on a bus controller:

Bus system	Function model
POWERLINK	All function models
All others	Function model "Ramp"

7.3 Function model - "Standard" without SDC

Function model "Standard" in the design without SDC (Smart Device Controller).

7.3.1 Register overviews

7.3.1.1 80SD100XD.C011-01 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	Position1Sync	Position2Sync	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		EncOk01		Bit 10: Status of encoder 1	BOOL				
		EncOk02		Bit 12: Status of encoder 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	UINT		•		
18	26	Motor1Step1	Motor2Step1	MotorStep2 motor configuration	UINT		•		
20	28	Motor1Step2	Motor2Step2	MotorStep3 motor configuration	UINT		•		
22	30	Motor1Step3	Motor2Step3	MotorStep4 motor configuration	UINT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
60	62	Position1Latched	Position2Latched	Latch of "Position" register	INT	•		•	
68	70	usSinceTrigger01	usSinceTrigger02	usSinceTrigger	UINT	•		•	
72		StepperLatchStatus		**Latch trigger status**	USINT	•		•	
		LatchInput01		Bit 0: Digital input for the latch event	BOOL				
		LatchDone01		Bit 1: Successful latching of the position counter	BOOL				
		LatchInput02		Bit 2: Digital input for the latch event	BOOL				
		LatchDone02		Bit 3: Successful latching of the position counter	BOOL				
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		TriggerInput01		Bit 4: Status of the trigger input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
		TriggerInput02		Bit 5: Status of the trigger input	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		**Latch configuration**	USINT				•
		StartLatch01		Bit 0: Switches latch function on/off for channel 1	BOOL		•		
		TriggerEdgePos01		Bit 1: Latches on positive edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on negative edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on positive edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on negative edge of trigger input 2	BOOL				
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		**Trigger configuration**	USINT				•
		TriggerEdge01		Bit 0: Edge of trigger 1 0 ... Positive 1 ... Negative	BOOL		•		
		StartTrigger01		Bit 1: Enables trigger 1 on state change	BOOL				
		TriggerEdge02		Bit 2: Edge of trigger 2 0 ... Positive 1 ... Negative	BOOL				
		StartTrigger02		Bit 3: Enables trigger 2 on state change	BOOL				
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•

Table 175: 80SD100XD.C011-01 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
88		CoolerTemperature		Heat sink temperature	SINT			●	
90		UZKVoltage		DC bus voltage	UINT			●	
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				●
334		BrakeConfig01		Configuration of the brake output	USINT				●
HIPERFACE encoder									
382	386	PosVal03	PosVal04	Encoder position	DINT	●			
1034	5130	Hf01SinCosVssMin	Hf02SinCosVssMin	Vss minimum	UINT				●
1038	5134	Hf01SinCosVssMax	Hf02SinCosVssMax	Vss maximum	UINT				●
1044	5140	Hf01SinCosQuitTime	Hf02SinCosQuitTime	Vss acknowledge time	UDINT				●
2053	6149	Hf01Parity	Hf02Parity	Parity	USINT				●
2055	6151	Hf01CharTimout	Hf02CharTimout	Timeout for HIPERFACE communication	USINT				●
2060	6156	Hf01Baud	Hf02Baud	Baud rate	UDINT				●
2073	6169	Hf01RefAdr	Hf02RefAdr	Reference station address	USINT				●
2075	6171	Hf01RefWidth	Hf02RefWidth	Position width for reference station	USINT				●
2113	6209	Hf01ErrorCounter	Hf02ErrorCounter	Error counter	USINT			●	
2115	6211	Hf01ErrorStationAdress	Hf02ErrorStationAdress	Node number of last error	USINT			●	
2117	6213	Hf01ErrorCommand	Hf02ErrorCommand	HIPERFACE command of last error	USINT			●	
2119	6215	Hf01ErrorCode	Hf02ErrorCode	Error code: 0x00 to 0xFE: Encoder status 0xFF: Command timeout	USINT			●	
2561	6657	Hf01AdrIdent	Hf02AdrIdent	Ident station	USINT				●
2563	6659	Hf01SelectionIdent	Hf02SelectionIdent	Extension selection	USINT				●
2631	6727	Hf01IdentOk	Hf02IdentOk	Ident OK	USINT			●	
2688	6784	Hf01Rs485Settings	Hf02Rs485Settings	Ident for RS485 settings	USINT			●	
2689	6785	Hf01EncoderType	Hf02EncoderType	Ident encoder type	USINT			●	
2690	6786	Hf01EepromSize	Hf02EepromSize	Ident for EEPROM size	USINT			●	
2691	6787	Hf01OptionFlags	Hf02OptionFlags	Ident for option flags	USINT			●	
2692	6788	Hf01FreeMemory	Hf02FreeMemory	Ident free memory	USINT			●	
2693	6789	Hf01DataFields	Hf02DataFields	Ident valid data fields	USINT			●	
2694	6790	Hf01ExtByte01	Hf02ExtByte01	Ident extension byte 1	USINT			●	
2695	6791	Hf01ExtByte02	Hf02ExtByte02	Ident extension byte 2	USINT			●	
2696	6792	Hf01ExtByte03	Hf02ExtByte03	Ident extension byte 3	USINT			●	
2697	6793	Hf01ExtByte04	Hf02ExtByte04	Ident extension byte 4	USINT			●	
2698	6794	Hf01ExtByte05	Hf02ExtByte05	Ident extension byte 5	USINT			●	
2699	6795	Hf01ExtByte06	Hf02ExtByte06	Ident extension byte 6	USINT			●	
2700	6796	Hf01ExtByte07	Hf02ExtByte07	Ident extension byte 7	USINT			●	
2701	6797	Hf01ExtByte08	Hf02ExtByte08	Ident extension byte 8	USINT			●	
2702	6798	Hf01ExtByte09	Hf02ExtByte09	Ident extension byte 9	USINT			●	
2703	6799	Hf01ExtByte10	Hf02ExtByte10	Ident extension byte 10	USINT			●	
2817	6913	Hf01AddPosAdr01	Hf02AddPosAdr01	Additional position 1 address	USINT				●
2825	6921	Hf01AddPosAdr02	Hf02AddPosAdr02	Additional position 2 address	USINT				●
2887	6983	Hf01AddPosOk	Hf02AddPosOk	Additional position OK	USINT			●	
2948	7044	Hf01AddPosTime01	Hf02AddPosTime01	Additional position time 1	UDINT			●	
2956	7052	Hf01AddPosition01	Hf02AddPosition01	Additional position 1	UDINT			●	
2964	7060	Hf01AddPosTime02	Hf02AddPosTime02	Additional position time 2	UDINT			●	
2972	7068	Hf01AddPosition02	Hf02AddPosition02	Additional position 2	UDINT			●	
3073	7169	Hf01AnalogAdrCh01	Hf02AnalogAdrCh01	Analog channel 1 address	USINT				●
3075	7171	Hf01AnalogCh01	Hf02AnalogCh01	Analog channel 1 channel	USINT				●
3081	7177	Hf01AnalogAdrCh02	Hf02AnalogAdrCh02	Analog channel 2 address	USINT				●
3083	7179	Hf01AnalogCh02	Hf02AnalogCh02	Analog channel 2 channel	USINT				●
3089	7185	Hf01AnalogAdrCh03	Hf02AnalogAdrCh03	Analog channel 3 address	USINT				●
3091	7187	Hf01AnalogCh03	Hf02AnalogCh03	Analog channel 3 channel	USINT				●
3097	7193	Hf01AnalogAdrCh04	Hf02AnalogAdrCh04	Analog channel 4 address	USINT				●
3099	7195	Hf01AnalogCh04	Hf02AnalogCh04	Analog channel 4 channel	USINT				●
3143	7239	Hf01AnalogChOk	Hf02AnalogChOk	Analog channel OK	USINT			●	
3204	7300	Hf01AnalogChTime01	Hf02AnalogChTime01	Analog channel 1 time	UDINT			●	
3210	7306	Hf01AnalogChValue01	Hf02AnalogChValue01	Analog channel 1 value	UINT			●	
3220	7316	Hf01AnalogChTime02	Hf02AnalogChTime02	Analog channel 2 time	UDINT			●	
3226	7322	Hf01AnalogChValue02	Hf02AnalogChValue02	Analog channel 2 value	UINT			●	
3236	7332	Hf01AnalogChTime03	Hf02AnalogChTime03	Analog channel 3 time	UDINT			●	
3242	7338	Hf01AnalogChValue03	Hf02AnalogChValue03	Analog channel 3 value	UINT			●	
3252	7348	Hf01AnalogChTime04	Hf02AnalogChTime04	Analog channel 4 time	UDINT			●	
3258	7354	Hf01AnalogChValue04	Hf02AnalogChValue04	Analog channel 4 value	UINT			●	

Table 175: 80SD100XD.C011-01 - Register in function model "Standard" without SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.2 80SD100XD.C033-01 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	Position1Sync	Position2Sync	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		EncOk01		Bit 10: Status of encoder 1	BOOL				
		EncoderPowerSupplyError		Bit 11: Encoder power supply not within the required range	BOOL				
		EncOk02		Bit 12: Status of encoder 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	UINT		•		
18	26	Motor1Step1	Motor2Step1	MotorStep2 motor configuration	UINT		•		
20	28	Motor1Step2	Motor2Step2	MotorStep3 motor configuration	UINT		•		
22	30	Motor1Step3	Motor2Step3	MotorStep4 motor configuration	UINT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
60	62	Position1Latched	Position2Latched	Latch of "Position" register	INT	•		•	
68	70	usSinceTrigger01	usSinceTrigger02	usSinceTrigger	UINT	•		•	
72		StepperLatchStatus		**Latch trigger status**	USINT	•		•	
		LatchInput01		Bit 0: Digital input for the latch event	BOOL				
		LatchDone01		Bit 1: Successful latching of the position counter	BOOL				
		LatchInput02		Bit 2: Digital input for the latch event	BOOL				
		LatchDone02		Bit 3: Successful latching of the position counter	BOOL				
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		TriggerInput01		Bit 4: Status of the trigger input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
		TriggerInput02		Bit 5: Status of the trigger input	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		**Latch configuration**	USINT				•
		StartLatch01		Bit 0: Switches latch function on/off for channel 1	BOOL		•		
		TriggerEdgePos01		Bit 1: Latches on positive edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on negative edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on positive edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on negative edge of trigger input 2	BOOL				
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		**Trigger configuration**	USINT				•
		TriggerEdge01		Bit 0: Edge of trigger 1 0 ... Positive 1 ... Negative	BOOL		•		
		StartTrigger01		Bit 1: Enables trigger 1 on state change	BOOL				
		TriggerEdge02		Bit 2: Edge of trigger 2 0 ... Positive 1 ... Negative	BOOL				
		StartTrigger02		Bit 3: Enables trigger 2 on state change	BOOL				
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•
334		BrakeConfig01		Configuration of the brake output	USINT				•
SSI absolute encoder									

Table 176: 80SD100XD.C033-01 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
382	386	PosVal03	PosVal04	Encoder position	DINT	●			
1281	1793	TempEnc01	TempEnc02	Encoder temperature	SINT			●	
1281	1793	ValidSSIBitLength01	ValidSSIBitLength02	Valid bits	USINT				●
1286	1798	EncoderConfiguration01	EncoderConfiguration02	Configuration	UINT				●
1289	1801	TotalSSIBitLength01	TotalSSIBitLength02	Total bits	USINT				●
1290	1802	SSI01HwVer	SSI02HwVer	Hardware revision	UINT			●	
1294	1806	SSI01FwVer	SSI02FwVer	Firmware version	UINT			●	
1294	1806	SSISystemCyclePrescaler01	SSISystemCyclePrescaler02	Prescaler	UINT				●
1298	1810	EncoderType01	EncoderType02	Encoder type	UINT				●
1300	1812	SSI01SerNr	SSI02SerNr	Serial number	UDINT			●	
1305	1817	SSI01NominalCurrent	SSI02NominalCurrent	Nominal current	USINT			●	
1310	1822	SSI01MotorID	SSI02MotorID	Motor identification	UINT			●	

Table 176: 80SD100XD.C033-01 - Register in function model "Standard" without SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.3 80SD100XD.C044-01, 80SD100XD.W044-01 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	Position1Sync	Position2Sync	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		IncrementalEncoderOk01		Bit 10: Status of encoder 1	BOOL				
		EncOk01		Bit 10: Status of encoder 1	BOOL				
		EncOk03		Bit 10: Status of encoder 1	BOOL				
		EncoderPowerSupplyError		Bit 11: Encoder power supply not within the required range	BOOL				
		IncrementalEncoderOk02		Bit 12: Status of encoder 2	BOOL				
		EncOk02		Bit 12: Status of encoder 2	BOOL				
		EncOk04		Bit 12: Status of encoder 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	UINT		•		
18	26	Motor1Step1	Motor2Step1	MotorStep2 motor configuration	UINT		•		
20	28	Motor1Step2	Motor2Step2	MotorStep3 motor configuration	UINT		•		
22	30	Motor1Step3	Motor2Step3	MotorStep4 motor configuration	UINT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
60	62	Position1Latched	Position2Latched	Latch of "Position" register	INT	•		•	
68	70	usSinceTrigger01	usSinceTrigger02	usSinceTrigger	UINT	•		•	
72		StepperLatchStatus		**Latch trigger status**	USINT	•		•	
		LatchInput01		Bit 0: Digital input for the latch event	BOOL				
		LatchDone01		Bit 1: Successful latching of the position counter	BOOL				
		LatchInput02		Bit 2: Digital input for the latch event	BOOL				
		LatchDone02		Bit 3: Successful latching of the position counter	BOOL				
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		TriggerInput01		Bit 4: Status of the trigger input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
		TriggerInput02		Bit 5: Status of the trigger input	BOOL				
		LatchDone03		Bit 6: Successful latching of the encoder counter	BOOL				
		LatchDone04		Bit 7: Successful latching of the encoder counter	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		**Latch configuration**	USINT				•
		StartLatch01		Bit 0: Switches latch function on/off for channel 1	BOOL		•		
		TriggerEdgePos01		Bit 1: Latches on positive edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on negative edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on positive edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on negative edge of trigger input 2	BOOL				
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		**Trigger configuration**	USINT				•
		TriggerEdge01		Bit 0: Edge of trigger 1 0 ... Positive 1 ... Negative	BOOL		•		
		StartTrigger01		Bit 1: Enables trigger 1 on state change	BOOL				
		TriggerEdge02		Bit 2: Edge of trigger 2 0 ... Positive 1 ... Negative	BOOL				
		StartTrigger02		Bit 3: Enables trigger 2 on state change	BOOL				
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•

Table 177: 80SD100XD.C044-01, 80SD100XD.W044-01 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				●
88		CoolerTemperature		Heat sink temperature	SINT			●	
90		UZKVoltage		DC bus voltage	UINT			●	
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				●
334		BrakeConfig01		Configuration of the brake output	USINT				●
Incremental encoders									
130	144	PosVal03	PosVal04	Encoder position	INT	●		●	
134	148	LatchVal03	LatchVal04	Latch of encoder position	INT	●		●	
154		StatusOutput15		**Control register for encoder**	USINT		●		
		ActivateReferencing03		Bit 0: Enables referencing on encoder 1	BOOL				
		ActivateReferencing04		Bit 4: Enables referencing on encoder 2	BOOL				
155		ConfigOutput11		Configuration of the encoder	USINT				●
158		ConfigOutput13		Extended encoder configuration	USINT				●
159		ABRLatchSource01		Reference source for encoder	USINT				●
160	161	TempEnc01	TempEnc02	Encoder temperature	SINT			●	
162	163	TempEncLimit01	TempEncLimit02	Encoder temperature limit	SINT				●

Table 177: 80SD100XD.C044-01, 80SD100XD.W044-01 - Register in function model "Standard" without SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.4 80SD100XD.C04X-13 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	Position1Sync	Position2Sync	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		IncrementalEncoderOk01		Bit 10: Status of encoder 1	BOOL				
		EncOk01		Bit 10: Status of encoder 1	BOOL				
		EncOk03		Bit 10: Status of encoder 1	BOOL				
		EncoderPowerSupplyError		Bit 11: Encoder power supply not within the required range	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	UINT		•		
18	26	Motor1Step1	Motor2Step1	MotorStep2 motor configuration	UINT		•		
20	28	Motor1Step2	Motor2Step2	MotorStep3 motor configuration	UINT		•		
22	30	Motor1Step3	Motor2Step3	MotorStep4 motor configuration	UINT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
60	62	Position1Latched	Position2Latched	Latch of "Position" register	INT	•		•	
68	70	usSinceTrigger01	usSinceTrigger02	usSinceTrigger	UINT	•		•	
72		StepperLatchStatus		**Latch trigger status**	USINT	•		•	
		LatchInput01		Bit 0: Digital input for the latch event	BOOL				
		LatchDone01		Bit 1: Successful latching of the position counter	BOOL				
		LatchInput02		Bit 2: Digital input for the latch event	BOOL				
		LatchDone02		Bit 3: Successful latching of the position counter	BOOL				
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		TriggerInput01		Bit 4: Status of the trigger input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
		TriggerInput02		Bit 5: Status of the trigger input	BOOL				
		LatchDone03		Bit 6: Successful latching of the encoder counter	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		**Latch configuration**	USINT				•
		StartLatch01		Bit 0: Switches latch function on/off for channel 1	BOOL		•		
		TriggerEdgePos01		Bit 1: Latches on positive edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on negative edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on positive edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on negative edge of trigger input 2	BOOL				
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		**Trigger configuration**	USINT				•
		TriggerEdge01		Bit 0: Edge of trigger 1 0 ... Positive 1 ... Negative	BOOL		•		
		StartTrigger01		Bit 1: Enables trigger 1 on state change	BOOL				
		TriggerEdge02		Bit 2: Edge of trigger 2 0 ... Positive 1 ... Negative	BOOL				
		StartTrigger02		Bit 3: Enables trigger 2 on state change	BOOL				
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•

Table 178: 80SD100XD.C04X-13 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
334		BrakeConfig01		Configuration of the brake output	USINT				•
Incremental encoders									
130		PosVal03		Encoder position	INT	•		•	
134		LatchVal03		Latch of encoder position	INT	•		•	
154		StatusOutput15		**Control register for encoder**	USINT		•		
		ActivateReferencing03		Bit 0: Enables referencing on encoder 1	BOOL				
155		ConfigOutput11		Configuration of the encoder	USINT				•
158		ConfigOutput13		Extended encoder configuration	USINT				•
159		ABRLatchSource01		Reference source for encoder	USINT				•
160		TempEnc01		Encoder temperature	SINT			•	
162		TempEncLimit01		Encoder temperature limit	SINT				•
Additional digital inputs/outputs									
192		Digital_in_do_rb		**Status of digital inputs and outputs**	USINT	•		•	
		DigitalInput03		Bit 0: Digital input 1	BOOL				
		DigitalInput04		Bit 1: Digital input 2	BOOL				
		DigitalInput05		Bit 2: Digital input 3	BOOL				
		DigitalInput06		Bit 3: Digital input 4	BOOL				
		DigitalOutputReadBack02		Bit 4: Digital output 1	BOOL				
		DigitalOutputReadBack03		Bit 5: Digital output 2	BOOL				
		CounterOverflow01		Bit 6: Counter overflow	BOOL				
		CounterLatchDone01		Bit 7: Successful latching of the counter	BOOL				
193		StatusOutput16		**Set digital outputs / Counter control register**	USINT		•		
		CounterOverflowDetectEnable01		Bit 0: Enables/Disables overflow detection for counter	BOOL				
		ActivateRefCounter01		Bit 2: Configures digital input 3 as R input	BOOL				
		CounterEnable01		Bit 3: Configures digital input 1 as counter	BOOL				
		DigitalOutput02		Bit 6: Writes to digital output 1	BOOL				
		DigitalOutput03		Bit 7: Writes to digital output 2	BOOL				
194		Counter01		Counter	INT	•			
196		CounterLatched01		Counter latch	INT	•			
198		ConfigOutput12		Counter configuration	UINT				•

Table 178: 80SD100XD.C04X-13 - Register in function model "Standard" without SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.5 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	Position1Sync	Position2Sync	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	UINT		•		
18	26	Motor1Step1	Motor2Step1	MotorStep2 motor configuration	UINT		•		
20	28	Motor1Step2	Motor2Step2	MotorStep3 motor configuration	UINT		•		
22	30	Motor1Step3	Motor2Step3	MotorStep4 motor configuration	UINT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput		Bit 7: Digital output for motor brake	BOOL				
60	62	Position1Latched	Position2Latched	Latch of "Position" register	INT	•		•	
68	70	usSinceTrigger01	usSinceTrigger02	usSinceTrigger	UINT	•		•	
72		StepperLatchStatus		**Latch trigger status**	USINT	•		•	
		LatchInput01		Bit 0: Digital input for the latch event	BOOL				
		LatchDone01		Bit 1: Successful latching of the position counter	BOOL				
		LatchInput02		Bit 2: Digital input for the latch event	BOOL				
		LatchDone02		Bit 3: Successful latching of the position counter	BOOL				
		StatusInput01		Bit 4: Logical state of the digital input	BOOL				
		TriggerInput01		Bit 4: Status of the trigger input	BOOL				
		StatusInput02		Bit 5: Logical state of the digital input	BOOL				
		TriggerInput02		Bit 5: Status of the trigger input	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		**Latch configuration**	USINT				•
		StartLatch01		Bit 0: Switches latch function on/off for channel 1	BOOL		•		
		TriggerEdgePos01		Bit 1: Latches on positive edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on negative edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on positive edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on negative edge of trigger input 2	BOOL				
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		**Trigger configuration**	USINT				•
		TriggerEdge01		Bit 0: Edge of trigger 1 0 ... Positive 1 ... Negative	BOOL		•		
		StartTrigger01		Bit 1: Enables trigger 1 on state change	BOOL				
		TriggerEdge02		Bit 2: Edge of trigger 2 0 ... Positive 1 ... Negative	BOOL				
		StartTrigger02		Bit 3: Enables trigger 2 on state change	BOOL				
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•
334		BrakeConfig01		Configuration of the brake output	USINT				•

Table 179: 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Register in function model "Standard" without SDC

DT Data type of the register
Cycl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.6 80SD100XD.C0XX-21 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	Position1Sync	Position2Sync	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	UINT		•		
18	26	Motor1Step1	Motor2Step1	MotorStep2 motor configuration	UINT		•		
20	28	Motor1Step2	Motor2Step2	MotorStep3 motor configuration	UINT		•		
22	30	Motor1Step3	Motor2Step3	MotorStep4 motor configuration	UINT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput		Bit 7: Digital output for motor brake	BOOL				
60	62	Position1Latched	Position2Latched	Latch of "Position" register	INT	•		•	
68	70	usSinceTrigger01	usSinceTrigger02	usSinceTrigger	UINT	•		•	
72		StepperLatchStatus		**Latch trigger status**	USINT	•		•	
		LatchInput01		Bit 0: Digital input for the latch event	BOOL				
		LatchDone01		Bit 1: Successful latching of the position counter	BOOL				
		LatchInput02		Bit 2: Digital input for the latch event	BOOL				
		LatchDone02		Bit 3: Successful latching of the position counter	BOOL				
		StatusInput01		Bit 4: Logical state of the digital input	BOOL				
		TriggerInput01		Bit 4: Status of the trigger input	BOOL				
		StatusInput02		Bit 5: Logical state of the digital input	BOOL				
		TriggerInput02		Bit 5: Status of the trigger input	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		**Latch configuration**	USINT				•
		StartLatch01		Bit 0: Switches latch function on/off for channel 1	BOOL		•		
		TriggerEdgePos01		Bit 1: Latches on positive edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on negative edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on positive edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on negative edge of trigger input 2	BOOL				
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		**Trigger configuration**	USINT				•
		TriggerEdge01		Bit 0: Edge of trigger 1 0 ... Positive 1 ... Negative	BOOL		•		
		StartTrigger01		Bit 1: Enables trigger 1 on state change	BOOL				
		TriggerEdge02		Bit 2: Edge of trigger 2 0 ... Positive 1 ... Negative	BOOL				
		StartTrigger02		Bit 3: Enables trigger 2 on state change	BOOL				
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•
334		BrakeConfig01		Configuration of the brake output	USINT				•
Additional analog inputs									
1409				**Status of the analog inputs**	USINT	•			
		AnalogInput01OK		Bit 0: Status of analog input 1	BOOL				
		AnalogInput02OK		Bit 1: Status of analog input 2	BOOL				
1414		AnalogInput01		Analog input 1	INT	•			

Table 180: 80SD100XD.C0XX-21 - Register in function model "Standard" without SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
1418		AnalogInput02		Analog input 2	INT	•			
Trace register									
1039	1167			**Trace control word**	USINT		•		
		TraceEnable01	TraceEnable02	Bit 0: Enables/Disables the trace function	BOOL				
1091	1219			**Trace status information**	USINT	•			
		TraceEnabled01	TraceEnabled02	Bit 0: Trace function enabled/disabled	BOOL				
		TraceWriteActive01	TraceWriteActive02	Bit 2: Trace data recording active/inactive	BOOL				
		TraceReadActive01	TraceReadActive02	Bit 3: Trace data reading active/inactive	BOOL				
		ReadyForTrigger01	ReadyForTrigger02	Bit 4: Trigger readiness	BOOL				
		TriggerActive01	TriggerActive02	Bit 5: Trigger active/inactive	BOOL				
		TraceOK01	TraceOK02	Bit 6: Trace OK	BOOL				
		TraceError01	TraceError02	Bit 7: Trace error	BOOL				
1094	1222	FreeBufferSize01	FreeBufferSize02	Trace buffer status	UINT	•		•	
1098	1226	TriggerCount01	TriggerCount02	Number of triggers executed	UINT	•		•	
1102	1230	TriggerFailCount01	TriggerFailCount02	Number of failed triggers	UINT	•		•	
1345				**Trace trigger**	USINT		•		
		TraceTrigger01		Bit 0: Activates trigger for analog input 1	BOOL				
		TraceTrigger02		Bit 1: Activates trigger for analog input 2	BOOL				

Table 180: 80SD100XD.C0XX-21 - Register in function model "Standard" without SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.7 80SD100XS.C04X-01 - Register in function model "Standard" without SDC

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	Position1Sync	Position	INT	•		•	
10	Error	**Errors causes and status information**	UINT	•		•	
	OvertemperatureError01	Bit 1: Overtemperature on channel 1	BOOL				
	CurrentError01	Bit 2: Current setpoint on motor 1 not reached	BOOL				
	OvercurrentError01	Bit 3: Overcurrent motor 1	BOOL				
	DrvOk01	Bit 8: Drive status of motor 1	BOOL				
	IncrementalEncoderOk01	Bit 10: Status of encoder 1	BOOL				
	EncOk01	Bit 10: Status of encoder 1	BOOL				
	EncOk03	Bit 10: Status of encoder 1	BOOL				
	EncoderPowerSupplyError	Bit 11: Encoder power supply not within the required range	BOOL				
	ModulePowerSupplyError	Bit 13: Module power supply not within the required range	BOOL				
	Enable	Bit 14: Status of the enable input	BOOL				
	UZKStatus	Bit 15: Power supply status of the power unit	BOOL				
12	Motoridentification01	Motor identification	UINT			•	
16	Motor1Step0	MotorStep1 motor configuration	UINT		•		
18	Motor1Step1	MotorStep2 motor configuration	UINT		•		
20	Motor1Step2	MotorStep3 motor configuration	UINT		•		
22	Motor1Step3	MotorStep4 motor configuration	UINT		•		
33	ConfigOutput03	Holding current	USINT				•
34	ConfigOutput04	Nominal current	USINT				•
35	ConfigOutput05	Maximum current	USINT				•
46	ConfigOutput02	Module configuration	UINT				•
54	StatusOutput14	**Error acknowledgment / Digital output of motor brake**	USINT		•		
	ClearError01	Bit 0: Acknowledges errors from motor 1	BOOL				
	DigitalOutput01	Bit 7: Digital output for motor brake	BOOL				
60	Position1Latched	Latch of "Position" register	INT	•		•	
68	usSinceTrigger01	usSinceTrigger	UINT	•		•	
72	StepperLatchStatus	**Latch trigger status**	USINT	•		•	
	LatchInput01	Bit 0: Digital input for the latch event	BOOL				
	LatchDone01	Bit 1: Successful latching of the position counter	BOOL				
	DigitalInput01	Bit 4: Logical state of the digital input	BOOL				
	TriggerInput01	Bit 4: Status of the trigger input	BOOL				
	DigitalInput02	Bit 5: Logical state of the digital input	BOOL				
	LatchDone03	Bit 6: Successful latching of the encoder counter	BOOL				
73	LifeCnt	Lifecycle counter	SINT	•			
76	StepperLatchConfig	**Latch configuration**	USINT				•
	StartLatch01	Bit 0: Switches latch function on/off for channel 1	BOOL		•		
	TriggerEdgePos01	Bit 1: Latches on positive edge of trigger input 1	BOOL				
	TriggerEdgeNeg01	Bit 2: Latches on negative edge of trigger input 1	BOOL				
77	StepperLatchSource01	Reference source for internal position counter	USINT				•
78	TriggerConfig	**Trigger configuration**	USINT				•
	TriggerEdge01	Bit 0: Edge of trigger 1 0 ... Positive 1 ... Negative	BOOL		•		
	StartTrigger01	Bit 1: Enables trigger 1 on state change	BOOL				
80	Temperature	Temperature	SINT			•	
81	MotorIdentTrigger	Motor ID trigger	USINT				•
84	ConfigOutput09	Full step threshold	UINT				•
88	CoolerTemperature	Heat sink temperature	SINT			•	
90	UZKVoltage	DC bus voltage	UINT			•	
320	ConfigOutput14	Motor settling time	USINT				•
334	BrakeConfig01	Configuration of the brake output	USINT				•
Incremental encoders							
130	PosVal03	Encoder position	INT	•		•	
134	LatchVal03	Latch of encoder position	INT	•		•	
154	StatusOutput15	**Control register for encoder**	USINT		•		
	ActivateReferencing03	Bit 0: Enables referencing on encoder 1	BOOL				
155	ConfigOutput11	Configuration of the encoder	USINT				•
158	ConfigOutput13	Extended encoder configuration	USINT				•
159	ABRLatchSource01	Reference source for encoder	USINT				•
160	TempEnc01	Encoder temperature	SINT			•	
162	TempEncLimit01	Encoder temperature limit	SINT				•

Table 181: 80SD100XS.C04X-01 - Register in function model "Standard" without SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.8 80SD100XS.C04X-13 - Register in function model "Standard" without SDC

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	Position1Sync	Position	INT	•		•	
10	Error	**Errors causes and status information**	UINT	•		•	
	OvertemperatureError01	Bit 1: Overtemperature on channel 1	BOOL				
	CurrentError01	Bit 2: Current setpoint on motor 1 not reached	BOOL				
	OvercurrentError01	Bit 3: Overcurrent motor 1	BOOL				
	DrvOk01	Bit 8: Drive status of motor 1	BOOL				
	IncrementalEncoderOk01	Bit 10: Status of encoder 1	BOOL				
	EncOk01	Bit 10: Status of encoder 1	BOOL				
	EncOk03	Bit 10: Status of encoder 1	BOOL				
	EncoderPowerSupplyError	Bit 11: Encoder power supply not within the required range	BOOL				
	ModulePowerSupplyError	Bit 13: Module power supply not within the required range	BOOL				
	Enable	Bit 14: Status of the enable input	BOOL				
	UZKStatus	Bit 15: Power supply status of the power unit	BOOL				
12	Motoridentification01	Motor identification	UINT			•	
16	Motor1Step0	MotorStep1 motor configuration	UINT		•		
18	Motor1Step1	MotorStep2 motor configuration	UINT		•		
20	Motor1Step2	MotorStep3 motor configuration	UINT		•		
22	Motor1Step3	MotorStep4 motor configuration	UINT		•		
33	ConfigOutput03	Holding current	USINT				•
34	ConfigOutput04	Nominal current	USINT				•
35	ConfigOutput05	Maximum current	USINT				•
46	ConfigOutput02	Module configuration	UINT				•
54	StatusOutput14	**Error acknowledgment / Digital output of motor brake**	USINT		•		
	ClearError01	Bit 0: Acknowledges errors from motor 1	BOOL				
	DigitalOutput01	Bit 7: Digital output for motor brake	BOOL				
60	Position1Latched	Latch of "Position" register	INT	•		•	
68	usSinceTrigger01	usSinceTrigger	UINT	•		•	
72	StepperLatchStatus	**Latch trigger status**	USINT	•		•	
	LatchInput01	Bit 0: Digital input for the latch event	BOOL				
	LatchDone01	Bit 1: Successful latching of the position counter	BOOL				
	StatusInput01	Bit 4: Logical state of the digital input	BOOL				
	TriggerInput01	Bit 4: Status of the trigger input	BOOL				
	StatusInput02	Bit 5: Logical state of the digital input	BOOL				
	LatchDone03	Bit 6: Successful latching of the encoder counter	BOOL				
73	LifeCnt	Lifecycle counter	SINT	•			
76	StepperLatchConfig	**Latch configuration**	USINT				•
	StartLatch01	Bit 0: Switches latch function on/off for channel 1	BOOL		•		
	TriggerEdgePos01	Bit 1: Latches on positive edge of trigger input 1	BOOL				
	TriggerEdgeNeg01	Bit 2: Latches on negative edge of trigger input 1	BOOL				
77	StepperLatchSource01	Reference source for internal position counter	USINT				•
78	TriggerConfig	**Trigger configuration**	USINT				•
	TriggerEdge01	Bit 0: Edge of trigger 1 0 ... Positive 1 ... Negative	BOOL		•		
	StartTrigger01	Bit 1: Enables trigger 1 on state change	BOOL				
80	Temperature	Temperature	SINT			•	
81	MotorIdentTrigger	Motor ID trigger	USINT				•
84	ConfigOutput09	Full step threshold	UINT				•
88	CoolerTemperature	Heat sink temperature	SINT			•	
90	UZKVoltage	DC bus voltage	UINT			•	
320	ConfigOutput14	Motor settling time	USINT				•
334	BrakeConfig01	Configuration of the brake output	USINT				•
Incremental encoders							
130	PosVal03	Encoder position	INT	•		•	
134	LatchVal03	Latch of encoder position	INT	•		•	
154	StatusOutput15	**Control register for encoder**	USINT		•		
	ActivateReferencing03	Bit 0: Enables referencing on encoder 1	BOOL				
155	ConfigOutput11	Configuration of the encoder	USINT				•
158	ConfigOutput13	Extended encoder configuration	USINT				•
159	ABRLatchSource01	Reference source for encoder	USINT				•
160	TempEnc01	Encoder temperature	SINT			•	
162	TempEncLimit01	Encoder temperature limit	SINT				•
Additional digital inputs/outputs							

Table 182: 80SD100XS.C04X-13 - Register in function model "Standard" without SDC

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
192	Digital_in_do_rb	**Status of digital inputs and outputs**	USINT	•		•	
	DigitalInput03	Bit 0: Digital input 1	BOOL				
	DigitalInput04	Bit 1: Digital input 2	BOOL				
	DigitalInput05	Bit 2: Digital input 3	BOOL				
	DigitalInput06	Bit 3: Digital input 4	BOOL				
	DigitalOutputReadBack02	Bit 4: Digital output 1	BOOL				
	DigitalOutputReadBack03	Bit 5: Digital output 2	BOOL				
	CounterOverflow01	Bit 6: Counter overflow	BOOL				
	CounterLatchDone01	Bit 7: Successful latching of the counter	BOOL				
193	StatusOutput16	**Set digital outputs / Counter control register**	USINT		•		
	CounterOverflowDetectEnable0	Bit 0: Enables/Disables overflow detection for counter	BOOL				
	ActivateRefCounter01	Bit 2: Configures digital input 3 as R input	BOOL				
	CounterEnable01	Bit 3: Configures digital input 1 as counter	BOOL				
	DigitalOutput02	Bit 6: Writes to digital output 1	BOOL				
	DigitalOutput03	Bit 7: Writes to digital output 2	BOOL				
194	Counter01	Counter	INT	•			
196	CounterLatched01	Counter latch	INT	•			
198	ConfigOutput12	Counter configuration	UINT				•

Table 182: 80SD100XS.C04X-13 - Register in function model "Standard" without SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.9 80SD100XS.C0XX-01 - Register in function model "Standard" without SDC

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	PositionSync	Position	INT	●		●	
10	Error	**Errors causes and status information**	UINT	●		●	
	OvertemperatureError	Bit 1: Overtemperature on channel 1	BOOL				
	CurrentError	Bit 2: Current setpoint on motor 1 not reached	BOOL				
	OvercurrentError	Bit 3: Overcurrent motor 1	BOOL				
	DrvOk01	Bit 8: Drive status of motor 1	BOOL				
	ModulePowerSupplyError	Bit 13: Module power supply not within the required range	BOOL				
	Enable	Bit 14: Status of the enable input	BOOL				
	UZKStatus	Bit 15: Power supply status of the power unit	BOOL				
12	Motor identification	Motor identification	UINT			●	
16	MotorStep0	MotorStep1 motor configuration	UINT		●		
18	MotorStep1	MotorStep2 motor configuration	UINT		●		
20	MotorStep2	MotorStep3 motor configuration	UINT		●		
22	MotorStep3	MotorStep4 motor configuration	UINT		●		
33	ConfigOutput03	Holding current	USINT				●
34	ConfigOutput04	Nominal current	USINT				●
35	ConfigOutput05	Maximum current	USINT				●
46	ConfigOutput02	Module configuration	UINT				●
54	StatusOutput14	**Error acknowledgment / Digital output of motor brake**	USINT		●		
	ClearError	Bit 0: Acknowledges errors from motor 1	BOOL				
	DigitalOutput	Bit 7: Digital output for motor brake	BOOL				
60	PositionLatched	Latch of "Position" register	INT	●		●	
68	usSinceTrigger	usSinceTrigger	UINT	●		●	
72	StepperLatchStatus	**Latch trigger status**	USINT	●		●	
	LatchInput	Bit 0: Digital input for the latch event	BOOL				
	LatchDone	Bit 1: Successful latching of the position counter	BOOL				
	StatusInput01	Bit 4: Logical state of the digital input	BOOL				
	TriggerInput	Bit 4: Status of the trigger input	BOOL				
	StatusInput02	Bit 5: Logical state of the digital input	BOOL				
73	LifeCnt	Lifecycle counter	SINT	●			
76	StepperLatchConfig	**Latch configuration**	USINT				●
	StartLatch	Bit 0: Switches latch function on/off for channel 1	BOOL		●		
	TriggerEdgePos	Bit 1: Latches on positive edge of trigger input 1	BOOL				
	TriggerEdgeNeg	Bit 2: Latches on negative edge of trigger input 1	BOOL				
77	StepperLatchSource01	Reference source for internal position counter	USINT				●
78	TriggerConfig	**Trigger configuration**	USINT				●
	TriggerEdge	Bit 0: Edge of trigger 1 0 ... Positive 1 ... Negative	BOOL		●		
	StartTrigger	Bit 1: Enables trigger 1 on state change	BOOL				
80	Temperature	Temperature	SINT			●	
81	MotorIdentTrigger	Motor ID trigger	USINT				●
84	ConfigOutput09	Full step threshold	UINT				●
88	CoolerTemperature	Heat sink temperature	SINT			●	
90	UZKVoltage	DC bus voltage	UINT			●	
320	ConfigOutput14	Motor settling time	USINT				●
334	BrakeConfig01	Configuration of the brake output	USINT				●

Table 183: 80SD100XS.C0XX-01 - Register in function model "Standard" without SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

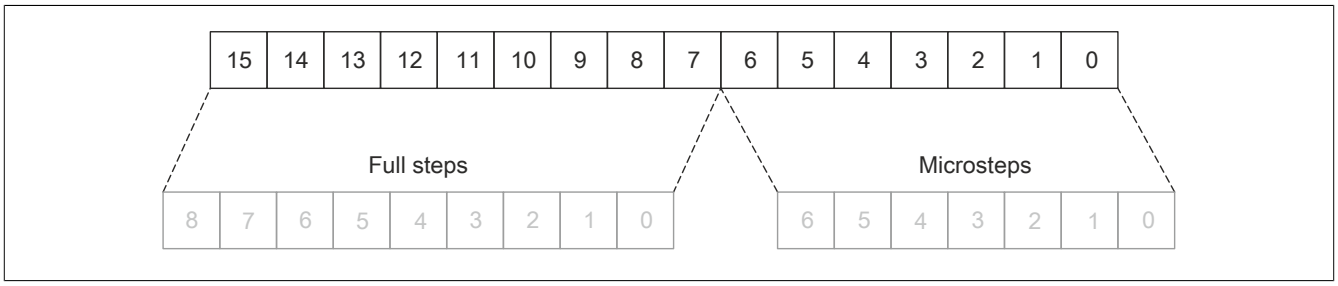
7.3.2 Register for all ACOPOSmicro

7.3.2.1 Position

This register is used to read the internal position counter of a motor axis. This corresponds to the position calculated by the ACOPOSmicro (position setpoint). Each of these is a cyclic 16-bit counter for each channel.

The lowest 5-8 bits represent microsteps, while the highest 8-11 bits represent full steps (depending on bits 5 and 6 of the register "Module configuration" on page 277).

Example of the internal position counter format (7-bit micro-steps, i.e. set bit 5 + 6 of the module configuration to binary 10):



The contents of the ABR counter and the internal position counter can be exchanged on ACOPOSmicro variants with an incremental encoder by setting bits 3 and/or 7 in the Configuration of the incremental encoder register (see section "Configuration of the incremental encoder" on page 310).

Register	Incremental encoder configuration	
	Bit 3 (channel 1) / Bit 7 (channel 2) = 0	Bit 3 (channel 1) / Bit 7 (channel 2) = 1
Position	Internal position counter	Incremental encoder counter
Incremental encoder counter	Incremental encoder counter	Internal position counter

7.3.2.2 Errors causes and status information

Individual bits indicate either an error (E) or status information (S):

Bit	Description[1]		
0		0 ... Reserved	
1	F	0 ... No error 1 ... Error: Overtemperature	Motor 1
2	F	0 ... No error 1 ... Error: Current setpoint not reached	
3	F	0 ... No error 1 ... Error: Overcurrent	
4		0 ... Reserved	
5	F	0 ... No error 1 ... Error: Overtemperature	Motor 2
6	F	0 ... No error 1 ... Error: Current setpoint not reached	
7	F	0 ... No error 1 ... Error: Overcurrent	
8	S	Status of drive 1: 0 ... Not ready for operation 1 ... Ready for operation	Motor 1
9	S	Status of drive 2: 0 ... Not ready for operation 1 ... Ready for operation	Motor 2

Bit	Description[1]		
10	S	Status of encoder 1: 0 ... Not ready for operation 1 ... Ready for operation	Encoder
11	F	Encoder power supply error 0 ... 24 VDC OK 1 ... Error: Encoder power supply not within required range	
12	S	Status of encoder 2: 0 ... Not ready for operation 1 ... Ready for operation	
13	F	Module power supply error 0 ... 24 VDC OK 1 ... Error: Undervoltage	
14	S	Enable status (corresponds to the enable input) 0 ... Disable 1 ... Enable OK	
15	S	Status of power supply for power unit (UZK ... DC bus voltage): 0 ... Power unit supply not within required range 1 ... Power unit supply OK (18 V ≤ DC bus voltage ≤ 80 V) This status only indicates the supply for the power unit if the enable input (bit 14) is set. If the enable input is not set, bit 15 is always 0, regardless of the power supply to the power unit.	

1) On ACOPOSmicro 1-channel variants, none of the bits that affect motor 2 have any function (0 ... Reserved).
Depending on the ACOPOSmicro variant, the bits that affect the encoder have no function (0 ... Reserved).

If an error (indicated by "E" in the table) is detected, the corresponding error bit remains set until the error is acknowledged (see 7.3.2.7 "Error acknowledgment / Digital output of motor brake" on page 277). Status bits (S) are not affected by the error acknowledgment.

Error "Current setpoint not reached" (bits 2 and 6)

This error bit is set if the required current cannot be applied to the motor windings. This can be (but does not have to be) caused by an open circuit. At higher speeds (depending on the motor), this error message can also occur even without an open circuit if the desired current can no longer be provided to the motor windings. Because of the back electromotive force on the motor, this bit is set at lower speeds if the motor is running at no load (as compared with full or partial loads).

Status of "drive X" (bits 8 and 9)

These bits have the value 0 if at least one of the following conditions exists:

- The supply voltage on the power unit is not in the required area.
- The module is not enabled (enable input).
- An overtemperature error is present.
- The corresponding motor is not powered.

Status "Status of encoder X" (bits 10 + 12)

These bits have the value 0 if at least one of the following conditions exists:

- The encoder power supply (bit 11) is not OK.
- There is an open circuit on the encoder (if encoder monitoring enabled).

7.3.2.3 Motor identification

This register is used to easily differentiate and identify connected motor types (for service purposes).

The value of this register equals the amount of time (in µs) needed to apply a current increase of ΔI = 1 A to a motor winding. This time depends on several factors:

- The amplitude of operating voltage (DC bus voltage)
- The inductance and resistance of the motor winding

Notes about motor identification		
1.	To achieve reproducible results, the measurement must be made under the following defined conditions: a) At standstill b) Motors must be in a half-step position (phase A with full current, phase B with no current). The internal step counter of the ACOPOSmicro (see 7.3.2.1 "Position" on page 274) must therefore look like this: ▪ Full steps are divisible by 4. ▪ Microsteps = 0	
2.	Condition 1.b is present after the ACOPOSmicro is reset or turned on. Immediately afterwards, when the holding current is applied to the motor for the first time (at standstill), the time it takes to apply the current is measured. This is therefore a suitable time to read the motor identification register in the application.	
3.	A current setting of at least 15% of the module's nominal current (10 A) is recommended for the nominal current register (see section 7.3.2.5 "Holding current, nominal current, maximum current" on page 276) as the operating range for determining the motor ID due to the lower relative inaccuracy at higher currents.	
4.	Range of values for the motor ID register	
	Motor ID register	**Explanation**
	0	No motor identifier available (after turning on for as long as the measurement conditions are not met)
	1 ... 32767	Valid range of values for the motor ID register
	65504 ... 65519	Ground fault: Measurement not possible
	65531	Overcurrent: Measurement not possible
	65532	Open circuit: Measurement not possible
	65533	Incorrect motor position: Measurement not possible
	65534	Invalid value: Overflow
	65535	Busy: Measurement in progress

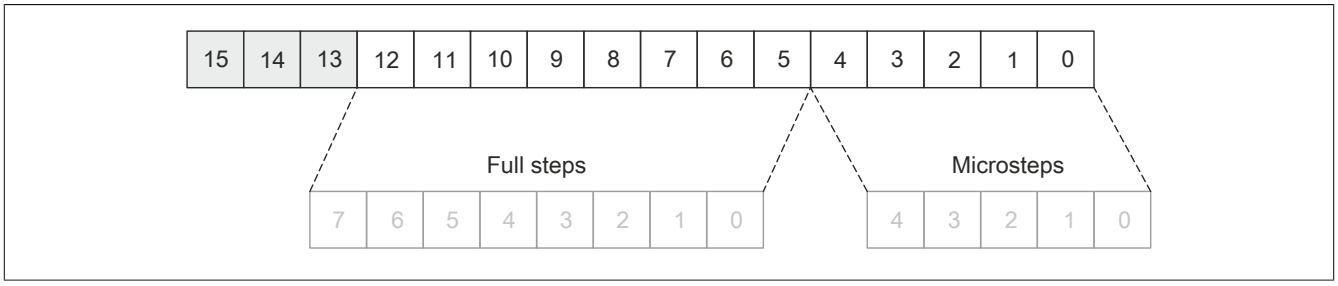
Table 184: Notes about motor identification

7.3.2.4 Motor configuration

These four registers (MotorStep1 to MotorStep4) are used to specify the amount and direction of steps that must be carried out by the module during the next X2X cycle in addition to selecting motor current (see also 7.3.2.5 "Holding current, nominal current, maximum current" on page 276). Depending on the required resolution and maximum configurable speed, the module configuration can be used to specify which bit position is used as the 1s position for full steps (see bits 5 and 6 of the "Module configuration" on page 277 register).

Bit	Description
0 - 12	Number of steps for the module to move during the next X2X cycle
13	Direction of movement: 0 ... Direction = Positive 1 ... Direction = Negative
14 - 15	Motor current selection: 00 ... Motor not powered 01 ... Holding current 10 ... Nominal current 11 ... Maximum current

Example for 5-bit microsteps (setting bits 5 and 6 of the module configuration to binary 00):



The number of transfer values per X2X cycle is specified in the module configuration by bits 3 + 4 (see "Module configuration" on page 277). If only one transfer value (bits 3 + 4 = 00) is specified, then the motor is advanced by MotorStep1 until the next X2X cycle. If 2 or 4 transfer values are specified, then the X2X cycle is divided accordingly.

Example: X2X cycle = 1 ms (1000 µs)

Time	Number of transfer values (see "Module configuration" on page 277)		
	1 (bits 3 - 4 = 00)	2 (bits 3 - 4 = 01)	4 (bits 3 - 4 = 10)
0 - 250 µs)	MotorStep1	MotorStep1	MotorStep1
250 - 500 µs)			MotorStep2
500 - 750 µs)		MotorStep2	MotorStep3
750 - 1000 µs)			MotorStep4

7.3.2.5 Holding current, nominal current, maximum current

The holding current, nominal current and maximum current registers are used to configure the desired motor current. The value set here corresponds to the amplitude of the motor current.

- Unit: Percent of the module's nominal current (100% is equal to 10 A)

During runtime, it is possible to switch between the preconfigured current values using bits 14 and15 in the "MotorStepX" registers (see"Motor configuration" on page 276).

As expected:

- Holding current < Nominal current < Maximum current

The motor's nominal current is entered in the nominal current register according to the motor's data sheet.

Register	Description
Holding current	The holding current should be selected in situations when less torque is required (e.g. at standstill). This reduces the heating of the motor.
Nominal current	Current during "normal operation". A current setting of at least 15% of the module's nominal current (10 A) is recommended for the nominal current register (see section) due to the lower relative inaccuracy at higher currents.
Maximum current	Maximum current should be selected if a higher motor torque is required during acceleration phases (short-term).

Energizing the motor:

In order to operate the motor, the DriveEnable bit must be set (evaluation is edge-sensitive).

The module energizes the motor and sets bit "DrvOk01" after the motor settling time expires as long as no errors occur. If bit "DriveEnable" is reset or an error occurs during operation, the motor is switched off and "DrvOk" is set to FALSE.

The motor can be energized again with a rising edge.

Information:

If the switch-on command is issued due to a rising edge on DriveEnable while an error is present (e.g. DC bus voltage not OK, "UZKStatus" = FALSE), then the motor is not switched on by the module. The edge-sensitive evaluation of DriveEnable prevents the motor from being switched on again automatically if an error that occurred is no longer pending later on. For this reason, the application must ensure that DriveEnable is only set if all conditions for switching on the motor are met. Otherwise, DrvOk remains set to FALSE.

7.3.2.6 Module configuration

Bit	Description
0 - 2	0 ... Reserved
3 - 4	Number of values transferred per X2X cycle (see registers MotorStep1 - MotorStep4 in section "Motor configuration" on page 276): 00 ... 1 x Δs / Δt (transfer values: MotorStep1) 01 ... 2 x Δs / Δt (transfer values: MotorStep1 - MotorStep2) 10 ... 4 x Δs / Δt (transfer values: MotorStep1 - MotorStep4) 11 ... Reserved **Information: This setting applies to both channels on 2-channel variants.**
5 - 6	Resolution of microsteps for "MotorStepX" and "Position". 00 ... 5 bits (bits 0 - 4) 01 ... 6 bits (bits 0 - 5) 10 ... 7 bits (bits 0 - 6) 11 ... 8 bits (bits 0 - 7) See "Motor configuration" on page 276 and "Position" on page 274.
7 - 13	0 ... Reserved
14	0 ... SDC life sign monitoring on 1 ... SDC life sign monitoring off
15	0 ... SDC information on 1 ... SDC information off

Neither SDC life sign monitoring nor SDC information is permitted to be changed at runtime. Settings are only permitted to be made via the I/O configuration (causes cyclic registers to be shown/hidden).

If SDC information is enabled, the number of transfer values is permanently set at 1 x Δs / Δt per X2X Link cycle. The resolution of the microsteps is 8 bits.

7.3.2.7 Error acknowledgment / Digital output of motor brake

Bit	Description
0	Error acknowledgment for motor 1
1	Error acknowledgment for Motor 2
2 - 6	0 ... Reserved
7	Status of digital output / motor brake 0 ... Motor brake off 1 ... Motor brake on

7.3.2.8 Position latch

The position counter (internal position counter) is applied to this register when a latch event occurs (see "Latch trigger status" on page 278).

On ACOPOSmicro variants with an incremental encoder, setting bits 3 and/or 7 in the register Configuration of the incremental encoder (see page 310) exchanges the contents of this register with the register Latch of the incremental encoder (see page 310).

Register	Incremental encoder configuration	
	Bit 3 (channel 1) / Bit 7 (channel 2) = 0	Bit 3 (channel 1) / Bit 7 (channel 2) = 1
Position latch	Internal position counter latch	Incremental encoder counter latch
Incremental encoder counter latch	Incremental encoder counter latch	Internal position counter latch

7.3.2.9 usSinceTrigger

This register indicates the time (in µs) that has passed since the trigger event occurred (see "Latch trigger status" on page 278).

7.3.2.10 Latch trigger status

Bit	Description[1)]	
0	LatchInput: Digital input for the latch event (level)	Stepper motor 1
1	LatchDone: Changes its state each time the counter state is successfully latched (reset value = 0)	
2	LatchInput: Digital input for the latch event (level)	Stepper motor 2
3	LatchDone: Changes its state each time the counter state is successfully latched (reset value = 0)	
4	Trigger 1: Trigger input (level)	
5	Trigger 2: Trigger input (level)	
6	LatchDone: Changes its state each time incremental encoder counter 1 is successfully latched (reset value = 0) See Control register for incremental encoder (see 310) and register Configuration of the incremental encoder (see 310)	Incremental encoder counter 1
7	LatchDone: Changes its state each time incremental encoder counter 2 is successfully latched (reset value = 0) See Control register for incremental encoder (see 310) and register Configuration of the incremental encoder (see 310)	Incremental encoder counter 2

1) On ACOPOSmicro 1-channel variants, none of the bits that affect stepper motor 2 and trigger 2 have any function (0 ... Reserved).
For some ACOPOSmicro variants, the bits that affect the encoder have no function (0 ... Reserved).

7.3.2.11 Lifecycle counter

This value is incremented with each X2X cycle (the counter starts back at zero if an overflow occurs) and is used to detect a module error, module failure or network failure.

7.3.2.12 Latch configuration

Bit	Description
0	0 ... Reserved
1 - 2	00 ... Reserved 01 ... Latch stepper position 1 on positive edge of trigger 1 input 10 ... Latch stepper position 1 on negative edge of trigger 1 input 11 ... Reserved
3 - 4	0 ... Reserved
5 - 6	00 ... Reserved 01 ... Latch stepper position 2 on positive edge of trigger 2 input 10 ... Latch stepper position 2 on negative edge of trigger 2 input
7	0 ... Reserved

7.3.2.13 Reference source for internal position counter

Bit	Description
0 - 3	Reference source for internal position counter 1: 0 ... Digital input 1 1 ... Digital input 2 2 - 14 ... Reserved 15 ... R input of incremental encoder counter 1[1)]
4 - 7	Reference source for internal position counter 2: 0 ... Digital input 1 1 ... Digital input 2 2 - 13 ... Reserved 14 ... R input of incremental encoder counter 2[1)] 15 ... Reserved

1) Encoder-specific states can be reserved depending on the ACOPOSmicro variants (x ... Reserved).

7.3.2.14 Trigger configuration

Bit	Description[1)]
0	0 ... Trigger 1: Trigger edge = Positive 1 ... Trigger 1: Trigger edge = Negative
1	Enable trigger 1 (when a change occurs)
2	0 ... Trigger 2: Trigger edge = Positive 1 ... Trigger 2: Trigger edge = Negative
3	Enable trigger 2 (when a change occurs)
4 - 7	0 ... Reserved

1) On ACOPOSmicro 1-channel variants, the bits for trigger 2 have no function (0 ... Reserved).

Trigger function procedure:

- Select the desired trigger edge using bit 0 (trigger 1) or bit 2 (trigger 1).
- Enable the trigger function by changing the state of bit 1 (trigger 1) or bit 3 (trigger 1). When this bit changes, usSinceTrigger (µs counter) is cleared.
- When the trigger event occurs, the µs counter usSinceTrigger is started.
- The counter usSinceTrigger cannot overflow, i.e. the counter is stopped at 2^{16} - 1 and retains this value until the next time the trigger function is enabled.

The trigger function can be re-enabled at any time by changing the state of bit 1 or bit 3, regardless of whether a trigger event has occurred or if usSinceTrigger has reached the maximum value.

7.3.2.15 Temperature

The internal module temperature (on the controller board) is output in °C.

Measurement range: -40 to +125°C

Overtemperature cutoff (starting at +85°C)

If the module temperature reaches or exceeds +85°C...

- ...The application is notified via the "Overtemperature" error bit.
- ...All of the module's outputs are disabled (turned off).

Once the module temperature sinks to +83°C, the error bit is automatically cleared by the module and the outputs are re-enabled again (powered).

The module temperature will not reach the cutoff limit when operating the module within the specified ambient conditions and the permissible output current range. The temperature cutoff serves only to protect the module hardware and is not permitted to be misused for operating the module beyond the specified range as this reduces its service life.

7.3.2.16 Motor ID trigger

This register is used to asynchronously measure the motor ID. The application must ensure that the conditions for measurement are fulfilled (see Tab. 182 "Notes about motor identification" on page 276).

Bit	Description[1)]
0	0 ... No effect 1 ... Positive edge triggers motor ID measurement for motor 1
1	0 ... No effect 1 ... Positive edge triggers motor ID measurement for motor 2
2 - 7	0 ... Reserved

1) On ACOPOSmicro 1-channel variants, the bits for motor 2 have no function (0 ... Reserved).

7.3.2.17 Full step threshold

This register configures angular velocity (unit: steps/second). When this defined speed has been reached, the drive will automatically change from microsteps to full step mode. This makes it possible to optimize torque at higher speeds, while microstep mode ensures optimal radial runout at lower speeds.

It does not make sense to change to full step mode when at a standstill because fine positioning would then no longer be possible. This is why value "0" does not make sense in the full step threshold register and is interpreted as disabling full step mode (i.e. the motor will always be operated in microstep mode).

Example

Microstep mode should change to full step mode at 500 steps/second. On a motor with 200 steps per revolution, this would be equal to a speed of:

$$T^{-1} = \frac{500\ \text{Steps/second}}{200\ \text{Steps/revolution}} = 2.5 \cdot \frac{\text{Revolutions}}{\text{Second}} = 150\ \text{Min}^{-1}$$

7.3.2.18 Heat sink temperature

This register indicates the temperature of the power board.

- Unit: °C
- Measurement range: +10 to +125°C

7.3.2.19 DC bus voltage

Contains the supply voltage in the power unit (in volts).

7.3.2.20 Motor settling time

This register determines the motor setting time. The motor settling time determines the minimum time between when the motor is powered on to when the drive bit is set. The setting is made in steps of 10 ms.

Unit: ms

Range of values: 1 to 255, 10 ms to 2.55 s

Default: 10 ms

7.3.2.21 Configuration of the brake output

Bit	Description
0 - 1	Brake output 00 ... Digital output 01 ... Brake output for motor 1 10 ... Brake output for motor 2 11 ... Reserved
2 - 7	0 ... Reserved

7.3.3 Registers for ACOPOSmicro variants with additional digital inputs/outputs

7.3.3.1 Status of digital inputs and outputs

Bit	Description			
0	Status of digital input 1		A	Counter input 1
1	Status of digital input 2		B	Counter input 1
2	Status of digital input 3		R	External counter frequency for counter input 1
3	Status of digital input 4			Reference for enable input
4	Status of digital output 1			
5	Status of digital output 2			
6	Overflow of counter 1 (only valid if gate or period measurement is set in the counter configuration with bits 3 - 6):			
	0	Counter value within the counting range (0 to $7FFF) This value is only valid if bit 0 of the counter control register is set.		
	1	Counter overflow This bit is reset with bit 0 of the counter control register.		
7	LatchDone: Changes its state each time the counter state is successfully latched (reset value = 0)			

7.3.3.2 Set digital outputs / Counter control register

Bit	Description	
0	0	Disable detection of counter overflow and resets the overflow bit of counter 1
	1	Enable detection of counter overflow
1	0	Reserved
2	Referencing (only applies in AB(R) mode, see bits 8 and 9 in the counter configuration)	
	0	Disable referencing
	1	Enable referencing
3	0	Reset the counter (to zero)
	1	Start the counter
	Note: Only set after the counter configuration is completed!	
4 - 5	0	Reserved
6	Set digital output 1	
7	Set digital output 2	

7.3.3.3 Counter

This register contains the current counter state. Different counters (event counter, ABR counter, etc.) are available depending on the configuration.

7.3.3.4 Counter latch

The counter is applied to this register when the next latch event occurs (see ABR mode in "Counter configuration" on page 281).

7.3.3.5 Counter configuration

Bit	Description	
0 - 1	Counter frequency (only valid if set in gate or period measurement):	
	00	Internal counter frequency 4 MHz
	01	Internal counter frequency 31.25 kHz
	10	External counter frequency (digital input 3)
	11	Reserved
2	0	Reserved

Bit	Description	
3 - 6	Counter mode:	
	0000	No counter
	0001	Event counter, positive edge
	0010	Event counter, negative edge
	0011	Event counter, both edges
	0100	Period measurement between two consecutive negative edges
	0101	Period measurement between two consecutive positive edges
	0110	Gate measurement of the LOW level
	0111	Gate measurement of the HIGH level
	1000	AB counter without referencing
	1001	ABR counter with referencing Counter set to zero on positive edge of R
	1010	ABR counter with referencing Counter set to zero on negative edge of R
	1011	ABR counter with immediate referencing Counter set to zero on positive edge of bit 2 of the counter control register
	1100	AB counter without referencing
	1101	ABR counter with referencing Counter state applied to the counter latch register on positive edge of R
	1110	ABR counter with referencing Counter state applied to the counter latch register on negative edge of R
	1111	ABR counter with immediate referencing Counter state applied to the counter latch register on positive edge of bit 2 of the counter control register
7	0	Reserved
8 - 9	Configuration of the reference for the enable input (digital input 4)	
	00	Digital input 4 (reference enable input) does not affect the R input. The R input is always enabled.
	01	Reserved
	10	R input active if the reference for the enable input is LOW
	11	R input active if the reference for the enable input is HIGH
10 - 15	0	Reserved

7.3.4 Registers for ACOPOSmicro variants with additional analog inputs

7.3.4.1 Status of the analog inputs

Bit	Description	
0	Analog input 1	0 ... OK 1 ... Outside valid range or open circuit
1	Analog input 2	
2-7	0 ... Reserved	

In addition to the status information, the analog value of the corresponding input will also be set if an error occurs (status bit = 1):

Error	Analog value (dec.)	Analog value (hex.)
Open circuit	+32,767	0x7FFF
Input voltage > +10 V	+32,767	0x7FFF
Input voltage < -10 V	-32,767	0x8001
Invalid value	-32,768	0x8000

7.3.4.2 Analog input 1 / Analog input 2

These two registers contain the analog value of the corresponding input.

Relationship between input voltage and register value:

Input voltage	Value of the register
+10 V	+32,767
:	:
-10 V	-32,768

7.3.5 Trace functionality for ACOPOSmicro variants with analog inputs

7.3.5.1 Trace registers

7.3.5.1.1 Trace control word

Bit 0 of the trace control word is used to turn trace functionality on/off for the corresponding analog input.

Bit	Description
0	0 ... Trace function disabled 1 ... Trace function enabled
1-15	0 ... Reserved

A buffer overflow error can be cleared by resetting bit 0.

7.3.5.1.2 Trace status information

Bit	Description
0	0 ... Trace function switched off 1 ... Trace function switched on
1	0 ... Reserved
2	0 ... Trace data recording inactive 1 ... Trace data recording active
3	0 ... Trace data reading inactive 1 ... Trace data reading active
4	0 ... Not ready for trigger 1 ... Ready for trigger
5	Trigger active 0 ... No trigger active, trace recording stopped 1 ... Processing trigger, recording trace data
6	Trace OK 0 ... Buffer overflow or trace function turned off for analog input 1 ... No buffer overflow error
7	Trace error 0 ... No buffer overflow or trace function turned off for analog input 1 ... Buffer overflow error

7.3.5.1.3 Trace buffer status

This register contains the amount of buffer memory (in bytes) available for a trace recording. The buffer must be large enough for the configured number of sampled values to be recorded.

If "Infinite trace" has been selected, then the buffer must be read fast enough for analog values to be recorded at the configured sampling rate.

7.3.5.1.4 Number of triggers executed

This register contains the number of successfully executed trigger events (trace recordings).

7.3.5.1.5 Number of failed triggers

This register contains the number of failed trigger events (trace recordings).

This register is increased by one whenever a trigger event occurs under the following conditions:

- The trace function is not enabled.
- The trace buffer is full (two trigger events in short succession).
- Pre-trigger function: If the configured number of recordings has not yet been reached before the trigger event.

7.3.5.1.6 Trace trigger

You can use this register to start recording separately for each trace instance. This is only possible if the trigger function has been enabled for the corresponding analog input.

Bit	Description	
0	Trigger for trace instance 1	The trigger event is triggered on a positive edge (bit changes from 0 → 1).
1	Trigger for trace instance 2	
2-7	0 ... Reserved	

7.3.5.2 Trace runtime configuration

This section specifies how the trace runtime configuration is made in Automation Studio:

7.3.5.2.1 Turning trace on/off for analog input X (Trace AnalogInput01/02 = on/off)

The trace function must first be turned on/off for the respective analog channel.

If the trace function was turned on for both analog inputs, then the recorded trace data will be provided by the AsIoTrc library in the following order:

Sampling	Array index	Channel
1	0	Analog input 1
	1	Analog input 2
2	2	Analog input 1
	3	Analog input 2
:	:	:

Table 185: Order of trace data from two analog channels

7.3.5.2.2 Number of trace buffers

The number of local trace buffers must also be set on the CPU.

This number specifies how many trace recordings the CPU can save. If a trigger event occurs, even though all configured trace buffers are full, then the corresponding sampled values will be lost.

The recorded trace data buffers are read out with the AsIoTrc library.

7.3.5.2.3 Number of samples

The number of sampled values to be recorded on the ACOPOSmicro module must then be set. It is important to make sure that the trace buffer is large enough for the trace data on the module to be recorded.

If "Infinite trace" has been selected, then the buffer must be read fast enough for analog values to be recorded at the configured sampling rate.

The total number of samples from all channels (channel 1 and 2 for trace 1 and 2) is not permitted to be greater than 8192.

7.3.5.2.4 Block sizes for asynchronous data transfer (AsynSize)

A higher value here will result in faster data transfer from the module to the CPU.

7.3.5.2.5 Number of data blocks sent before repetition (AsynForward)

Each data block transferred must be acknowledged by the X2X Link master. If an acknowledgment has not been received after the number of data blocks defined here, then all non-confirmed data blocks will be sent again.

7.3.5.2.6 Trace mode

Trace mode	Description
Triggered	Trace recording will start after the trigger event (see bit 0/1 of the register "Trace trigger" on page 284).
Infinite	Infinite trace can be started with bit 0/1 of the register Trace trigger (see page 284). X2X must be configured in such a way as to ensure that the amount of data generated can be transferred quickly enough. The trace buffer must be read quickly to prevent an overflow in the module's local memory and to ensure that the samples can be recorded at the configured sampling rate.

7.3.5.2.7 Recording range of trace data (trace start/stop position)

This defines the number of samples that should be recorded before/after the trigger event.

Trigger type	Start position	Stop position	Beginning of recording	End of recording
Post-trigger	x ≥ 0	y > 0	x samples after trigger event	y samples after start position
Pre-trigger	x < 0	y > 0	x samples before trigger event	y samples after trigger event

7.3.5.3 Trace library

Library AsIoTrc must be used to read the recorded trace data (see **Automation Help** for more information).

The ACOPOSmicro module with additional analog inputs has two separate trace instances that can be triggered at different times independently of one another.

Each trace instance has a device name:

- <Hardware address of the module>.<Trace instance>

This device name is used by the AsIoTrcGet library function to read the trace data from the desired instance.

Examples:

- Trace for trace instance 1: "SS1.IF1.ST1.TRC1"
- Trace for trace instance 2: "SS1.IF1.ST1.TRC2"

7.4 Function model "Standard" with SDC

Function model "Standard" in the design with SDC (Smart Device Controller). This is also referred to as "Motion-Configuration".

7.4.1 Register overviews

7.4.1.1 80SD100XD.C011-01 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	ActPos01	ActPos02	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		EncOk01		Bit 10: Status of encoder 1	BOOL				
		EncOk03		Bit 10: Status of encoder 1	BOOL				
		EncOk02		Bit 12: Status of encoder 2	BOOL				
		EncOk04		Bit 12: Status of encoder 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	INT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
72				**Latch trigger status**	USINT	•			
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		Latch configuration	USINT				•
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		Trigger configuration	USINT				•
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
300	302	RefPulsePos01	RefPulsePos02	Position latched	INT	•			
308	309	RefPulseCnt01	RefPulseCnt02	Reference pulse counter	SINT	•			
312	314	TriggerTime01	TriggerTime02	Trigger moment	INT	•			
318		StatusOutput17		**Current settings**	USINT		•		
		DriveEnable01		Bit 0: Enables drive 1	BOOL				
		BoostCurrent01		Bit 1: Uses acceleration current for motor 1	BOOL				
		StandstillCurrent01		Bit 2: Uses stall current for motor 1	BOOL				
		DriveEnable02		Bit 4: Enables drive 2	BOOL				
		BoostCurrent02		Bit 5: Uses acceleration current for motor 2	BOOL				
		StandstillCurrent02		Bit 6: Uses stall current for motor 2	BOOL				
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•
322		ConfigOutput16		Trigger configuration	USINT				•
323		ConfigOutput17		Latch configuration	USINT				•
324	324	ActTime01	ActTime02	NetTime of the last valid position value	INT	•			
326	327	TriggerCnt01	TriggerCnt02	Trigger counter	SINT	•			
328	330	SetTime01	SetTime02	SDC life sign monitoring	INT		•		
332	333	DelayedCurrentSwitchOff01	DelayedCurrentSwitchOff02	Turn-off delay	USINT				•
334		BrakeConfig01		Configuration of the brake output	USINT				•
HIPERFACE encoder									

Table 186: 80SD100XD.C011-01 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
382	386	PosVal03	PosVal04	Encoder position	DINT	●			
1034	5130	Hf01SinCosVssMin	Hf02SinCosVssMin	Vss minimum	UINT				●
1038	5134	Hf01SinCosVssMax	Hf02SinCosVssMax	Vss maximum	UINT				●
1044	5140	Hf01SinCosQuitTime	Hf02SinCosQuitTime	Vss acknowledge time	UDINT				●
2053	6149	Hf01Parity	Hf02Parity	Parity	USINT				●
2055	6151	Hf01CharTimout	Hf02CharTimout	Timeout for HIPERFACE communication	USINT				●
2060	6156	Hf01Baud	Hf02Baud	Baud rate	UDINT				●
2073	6169	Hf01RefAdr	Hf02RefAdr	Reference station address	USINT				●
2075	6171	Hf01RefWidth	Hf02RefWidth	Position width for reference station	USINT				●
2113	6209	Hf01ErrorCounter	Hf02ErrorCounter	Error counter	USINT			●	
2115	6211	Hf01ErrorStationAdress	Hf02ErrorStationAdress	Node number of last error	USINT			●	
2117	6213	Hf01ErrorCommand	Hf02ErrorCommand	HIPERFACE command of last error	USINT			●	
2119	6215	Hf01ErrorCode	Hf02ErrorCode	Error code: 0x00 to 0xFE: Encoder status 0xFF: Command timeout	USINT			●	
2561	6657	Hf01AdrIdent	Hf02AdrIdent	Ident station	USINT				●
2563	6659	Hf01SelectionIdent	Hf02SelectionIdent	Extension selection	USINT				●
2631	6727	Hf01IdentOk	Hf02IdentOk	Ident OK	USINT			●	
2688	6784	Hf01Rs485Settings	Hf02Rs485Settings	Ident for RS485 settings	USINT			●	
2689	6785	Hf01EncoderType	Hf02EncoderType	Ident encoder type	USINT			●	
2690	6786	Hf01EepromSize	Hf02EepromSize	Ident for EEPROM size	USINT			●	
2691	6787	Hf01OptionFlags	Hf02OptionFlags	Ident for option flags	USINT			●	
2692	6788	Hf01FreeMemory	Hf02FreeMemory	Ident free memory	USINT			●	
2693	6789	Hf01DataFields	Hf02DataFields	Ident valid data fields	USINT			●	
2694	6790	Hf01ExtByte01	Hf02ExtByte01	Ident extension byte 1	USINT			●	
2695	6791	Hf01ExtByte02	Hf02ExtByte02	Ident extension byte 2	USINT			●	
2696	6792	Hf01ExtByte03	Hf02ExtByte03	Ident extension byte 3	USINT			●	
2697	6793	Hf01ExtByte04	Hf02ExtByte04	Ident extension byte 4	USINT			●	
2698	6794	Hf01ExtByte05	Hf02ExtByte05	Ident extension byte 5	USINT			●	
2699	6795	Hf01ExtByte06	Hf02ExtByte06	Ident extension byte 6	USINT			●	
2700	6796	Hf01ExtByte07	Hf02ExtByte07	Ident extension byte 7	USINT			●	
2701	6797	Hf01ExtByte08	Hf02ExtByte08	Ident extension byte 8	USINT			●	
2702	6798	Hf01ExtByte09	Hf02ExtByte09	Ident extension byte 9	USINT			●	
2703	6799	Hf01ExtByte10	Hf02ExtByte10	Ident extension byte 10	USINT			●	
2817	6913	Hf01AddPosAdr01	Hf02AddPosAdr01	Additional position 1 address	USINT				●
2825	6921	Hf01AddPosAdr02	Hf02AddPosAdr02	Additional position 2 address	USINT				●
2887	6983	Hf01AddPosOk	Hf02AddPosOk	Additional position OK	USINT			●	
2948	7044	Hf01AddPosTime01	Hf02AddPosTime01	Additional position time 1	UDINT			●	
2956	7052	Hf01AddPosition01	Hf02AddPosition01	Additional position 1	UDINT			●	
2964	7060	Hf01AddPosTime02	Hf02AddPosTime02	Additional position time 2	UDINT			●	
2972	7068	Hf01AddPosition02	Hf02AddPosition02	Additional position 2	UDINT			●	
3073	7169	Hf01AnalogAdrCh01	Hf02AnalogAdrCh01	Analog channel 1 address	USINT				●
3075	7171	Hf01AnalogCh01	Hf02AnalogCh01	Analog channel 1 channel	USINT				●
3081	7177	Hf01AnalogAdrCh02	Hf02AnalogAdrCh02	Analog channel 2 address	USINT				●
3083	7179	Hf01AnalogCh02	Hf02AnalogCh02	Analog channel 2 channel	USINT				●
3089	7185	Hf01AnalogAdrCh03	Hf02AnalogAdrCh03	Analog channel 3 address	USINT				●
3091	7187	Hf01AnalogCh03	Hf02AnalogCh03	Analog channel 3 channel	USINT				●
3097	7193	Hf01AnalogAdrCh04	Hf02AnalogAdrCh04	Analog channel 4 address	USINT				●
3099	7195	Hf01AnalogCh04	Hf02AnalogCh04	Analog channel 4 channel	USINT				●
3143	7239	Hf01AnalogChOk	Hf02AnalogChOk	Analog channel OK	USINT			●	
3204	7300	Hf01AnalogChTime01	Hf02AnalogChTime01	Analog channel 1 time	UDINT			●	
3210	7306	Hf01AnalogChValue01	Hf02AnalogChValue01	Analog channel 1 value	UINT			●	
3220	7316	Hf01AnalogChTime02	Hf02AnalogChTime02	Analog channel 2 time	UDINT			●	
3226	7322	Hf01AnalogChValue02	Hf02AnalogChValue02	Analog channel 2 value	UINT			●	
3236	7332	Hf01AnalogChTime03	Hf02AnalogChTime03	Analog channel 3 time	UDINT			●	
3242	7338	Hf01AnalogChValue03	Hf02AnalogChValue03	Analog channel 3 value	UINT			●	
3252	7348	Hf01AnalogChTime04	Hf02AnalogChTime04	Analog channel 4 time	UDINT			●	
3258	7354	Hf01AnalogChValue04	Hf02AnalogChValue04	Analog channel 4 value	UINT			●	

Table 186: 80SD100XD.C011-01 - Register in function model "Standard" with SDC

DT Data type of the register
Cycl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.2 80SD100XD.C033-01 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	ActPos01	ActPos02	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		EncOk01		Bit 10: Status of encoder 1	BOOL				
		EncOk03		Bit 10: Status of encoder 1	BOOL				
		EncoderPowerSupplyError		Bit 11: Encoder power supply not within the required range	BOOL				
		EncOk02		Bit 12: Status of encoder 2	BOOL				
		EncOk04		Bit 12: Status of encoder 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	INT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
72				**Latch trigger status**	USINT	•			
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		Latch configuration	USINT				•
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		Trigger configuration	USINT				•
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
300	302	RefPulsePos01	RefPulsePos02	Position latched	INT	•			
308	309	RefPulseCnt01	RefPulseCnt02	Reference pulse counter	SINT	•			
312	314	TriggerTime01	TriggerTime02	Trigger moment	INT	•			
318		StatusOutput17		**Current settings**	USINT		•		
		DriveEnable01		Bit 0: Enables drive 1	BOOL				
		BoostCurrent01		Bit 1: Uses acceleration current for motor 1	BOOL				
		StandstillCurrent01		Bit 2: Uses stall current for motor 1	BOOL				
		DriveEnable02		Bit 4: Enables drive 2	BOOL				
		BoostCurrent02		Bit 5: Uses acceleration current for motor 2	BOOL				
		StandstillCurrent02		Bit 6: Uses stall current for motor 2	BOOL				
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•
322		ConfigOutput16		Trigger configuration	USINT				•
323		ConfigOutput17		Latch configuration	USINT				•
324	324	ActTime01	ActTime02	NetTime of the last valid position value	INT	•			
326	327	TriggerCnt01	TriggerCnt02	Trigger counter	SINT	•			
328	330	SetTime01	SetTime02	SDC life sign monitoring	INT		•		
332	333	DelayedCurrentSwitchOff01	DelayedCurrentSwitchOff02	Turn-off delay	USINT				•
334		BrakeConfig01		Configuration of the brake output	USINT				•
SSI absolute encoder									
382	386	PosVal03	PosVal04	Encoder position	DINT	•			
1281	1793	TempEnc01	TempEnc02	Encoder temperature	SINT			•	
1281	1793	ValidSSIBitLength01	ValidSSIBitLength02	Valid bits	USINT				•
1286	1798	EncoderConfiguration01	EncoderConfiguration02	Configuration	UINT				•
1289	1801	TotalSSIBitLength01	TotalSSIBitLength02	Total bits	USINT				•
1290	1802	SSI01HwVer	SSI02HwVer	Hardware revision	UINT			•	
1294	1806	SSI01FwVer	SSI02FwVer	Firmware version	UINT			•	

Table 187: 80SD100XD.C033-01 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
1294	1806	SSISystemCyclePrescaler01	SSISystemCyclePrescaler02	Prescaler	UINT				●
1298	1810	EncoderType01	EncoderType02	Encoder type	UINT				●
1300	1812	SSI01SerNr	SSI02SerNr	Serial number	UDINT			●	
1305	1817	SSI01NominalCurrent	SSI02NominalCurrent	Nominal current	USINT			●	
1310	1822	SSI01MotorID	SSI02MotorID	Motor identification	UINT			●	

Table 187: 80SD100XD.C033-01 - Register in function model "Standard" with SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.3 80SD100XD.C044-01, 80SD100XD.W044-01 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	ActPos01	ActPos02	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		EncOk01		Bit 10: Status of encoder 1	BOOL				
		EncOk03		Bit 10: Status of encoder 1	BOOL				
		EncoderPowerSupplyError		Bit 11: Encoder power supply not within the required range	BOOL				
		EncOk02		Bit 12: Status of encoder 2	BOOL				
		EncOk04		Bit 12: Status of encoder 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	INT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
72				**Latch trigger status**	USINT	•			
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
		LatchDone03		Bit 6: Successful latching of the encoder counter	BOOL				
		LatchDone04		Bit 7: Successful latching of the encoder counter	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		Latch configuration	USINT				•
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		Trigger configuration	USINT				•
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
300	302	RefPulsePos01	RefPulsePos02	Position latched	INT	•			
308	309	RefPulseCnt01	RefPulseCnt02	Reference pulse counter	SINT	•			
312	314	TriggerTime01	TriggerTime02	Trigger moment	INT	•			
318		StatusOutput17		**Current settings**	USINT		•		
		DriveEnable01		Bit 0: Enables drive 1	BOOL				
		BoostCurrent01		Bit 1: Uses acceleration current for motor 1	BOOL				
		StandstillCurrent01		Bit 2: Uses stall current for motor 1	BOOL				
		DriveEnable02		Bit 4: Enables drive 2	BOOL				
		BoostCurrent02		Bit 5: Uses acceleration current for motor 2	BOOL				
		StandstillCurrent02		Bit 6: Uses stall current for motor 2	BOOL				
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•
322		ConfigOutput16		Trigger configuration	USINT				•
323		ConfigOutput17		Latch configuration	USINT				•
324	324	ActTime01	ActTime02	NetTime of the last valid position value	INT	•			
326	327	TriggerCnt01	TriggerCnt02	Trigger counter	SINT	•			
328	330	SetTime01	SetTime02	SDC life sign monitoring	INT		•		
332	333	DelayedCurrentSwitchOff01	DelayedCurrentSwitchOff02	Turn-off delay	USINT				•
334		BrakeConfig01		Configuration of the brake output	USINT				•
Incremental encoders									
130	144	PosVal03	PosVal04	Encoder position	INT	•		•	
134	148	LatchVal03	LatchVal04	Latch of encoder position	INT	•		•	
154		StatusOutput15		**Control register for encoder**	USINT		•		
		ActivateReferencing03		Bit 0: Enables referencing on encoder 1	BOOL				
		ActivateReferencing04		Bit 4: Enables referencing on encoder 2	BOOL				

Table 188: 80SD100XD.C044-01, 80SD100XD.W044-01 - Register in function model "Standard" with SDC

Register (dec.)		Name		Description	DT	Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2			R	W	R	W
155		ConfigOutput11		Configuration of the encoder	USINT				●
158		ConfigOutput13		Extended encoder configuration	USINT				●
159		ABRLatchSource01		Reference source for encoder	USINT				●
160	161	TempEnc01	TempEnc02	Encoder temperature	SINT			●	
162	163	TempEncLimit01	TempEncLimit02	Encoder temperature limit	SINT				●

Table 188: 80SD100XD.C044-01, 80SD100XD.W044-01 - Register in function model "Standard" with SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.4 80SD100XD.C04X-13 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	ActPos01	ActPos02	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		EncOk01		Bit 10: Status of encoder 1	BOOL				
		EncOk03		Bit 10: Status of encoder 1	BOOL				
		EncoderPowerSupplyError		Bit 11: Encoder power supply not within the required range	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	INT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
72				**Latch trigger status**	USINT	•			
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
		LatchDone03		Bit 6: Successful latching of the encoder counter	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		Latch configuration	USINT				•
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		Trigger configuration	USINT				•
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
300	302	RefPulsePos01	RefPulsePos02	Position latched	INT	•			
308	309	RefPulseCnt01	RefPulseCnt02	Reference pulse counter	SINT	•			
312	314	TriggerTime01	TriggerTime02	Trigger moment	INT	•			
318		StatusOutput17		**Current settings**	USINT		•		
		DriveEnable01		Bit 0: Enables drive 1	BOOL				
		BoostCurrent01		Bit 1: Uses acceleration current for motor 1	BOOL				
		StandstillCurrent01		Bit 2: Uses stall current for motor 1	BOOL				
		DriveEnable02		Bit 4: Enables drive 2	BOOL				
		BoostCurrent02		Bit 5: Uses acceleration current for motor 2	BOOL				
		StandstillCurrent02		Bit 6: Uses stall current for motor 2	BOOL				
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•
322		ConfigOutput16		Trigger configuration	USINT				•
323		ConfigOutput17		Latch configuration	USINT				•
324	324	ActTime01	ActTime02	NetTime of the last valid position value	INT	•			
326	327	TriggerCnt01	TriggerCnt02	Trigger counter	SINT	•			
328	330	SetTime01	SetTime02	SDC life sign monitoring	INT		•		
332	333	DelayedCurrentSwitchOff01	DelayedCurrentSwitchOff02	Turn-off delay	USINT				•
334		BrakeConfig01		Configuration of the brake output	USINT				•
Incremental encoders									
130		PosVal03		Encoder position	INT	•		•	
134		LatchVal03		Latch of encoder position	INT	•		•	
154		StatusOutput15		**Control register for encoder**	USINT		•		
		ActivateReferencing03		Bit 0: Enables referencing on encoder 1	BOOL				
155		ConfigOutput11		Configuration of the encoder	USINT				•
158		ConfigOutput13		Extended encoder configuration	USINT				•
159		ABRLatchSource01		Reference source for encoder	USINT				•
160		TempEnc01		Encoder temperature	SINT			•	

Table 189: 80SD100XD.C04X-13 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
162		TempEncLimit01		Encoder temperature limit	SINT				•
Additional digital inputs/outputs									
192		Digital_in_do_rb		**Status of digital inputs and outputs**	USINT	•		•	
		DigitalInput03		Bit 0: Digital input 1	BOOL				
		DigitalInput04		Bit 1: Digital input 2	BOOL				
		DigitalInput05		Bit 2: Digital input 3	BOOL				
		DigitalInput06		Bit 3: Digital input 4	BOOL				
		DigitalOutputReadBack02		Bit 4: Digital output 1	BOOL				
		DigitalOutputReadBack03		Bit 5: Digital output 2	BOOL				
		CounterOverflow01		Bit 6: Counter overflow	BOOL				
		CounterLatchDone01		Bit 7: Successful latching of the counter	BOOL				
193		StatusOutput16		**Set digital outputs / Counter control register**	USINT		•		
		CounterOverflowDetectEnable01		Bit 0: Enables/Disables overflow detection for counter	BOOL				
		ActivateRefCounter01		Bit 2: Configures digital input 3 as R input	BOOL				
		CounterEnable01		Bit 3: Configures digital input 1 as counter	BOOL				
		DigitalOutput02		Bit 6: Writes to digital output 1	BOOL				
		DigitalOutput03		Bit 7: Writes to digital output 2	BOOL				
194		Counter01		Counter	INT	•			
196		CounterLatched01		Counter latch	INT	•			
198		ConfigOutput12		Counter configuration	UINT				•

Table 189: 80SD100XD.C04X-13 - Register in function model "Standard" with SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.5 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	ActPos01	ActPos02	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	INT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54		StatusOutput14		**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
72				**Latch trigger status**	USINT	•			
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		Latch configuration	USINT				•
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		Trigger configuration	USINT				•
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
300	302	RefPulsePos01	RefPulsePos02	Position latched	INT	•			
308	309	RefPulseCnt01	RefPulseCnt02	Reference pulse counter	SINT	•			
312	314	TriggerTime01	TriggerTime02	Trigger moment	INT	•			
318		StatusOutput17		**Current settings**	USINT		•		
		DriveEnable01		Bit 0: Enables drive 1	BOOL				
		BoostCurrent01		Bit 1: Uses acceleration current for motor 1	BOOL				
		StandstillCurrent01		Bit 2: Uses stall current for motor 1	BOOL				
		DriveEnable02		Bit 4: Enables drive 2	BOOL				
		BoostCurrent02		Bit 5: Uses acceleration current for motor 2	BOOL				
		StandstillCurrent02		Bit 6: Uses stall current for motor 2	BOOL				
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•
322		ConfigOutput16		Trigger configuration	USINT				•
323		ConfigOutput17		Latch configuration	USINT				•
324	324	ActTime01	ActTime02	NetTime of the last valid position value	INT	•			
326	327	TriggerCnt01	TriggerCnt02	Trigger counter	SINT	•			
328	330	SetTime01	SetTime02	SDC life sign monitoring	INT		•		
332	333	DelayedCurrentSwitchOff01	DelayedCurrentSwitchOff02	Turn-off delay	USINT				•
334		BrakeConfig01		Configuration of the brake output	USINT				•

Table 190: 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Register in function model "Standard" with SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.6 80SD100XD.C0XX-21 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	2	ActPos01	ActPos02	Position	INT	•		•	
10		Error		**Errors causes and status information**	UINT	•		•	
		OvertemperatureError01		Bit 1: Overtemperature on channel 1	BOOL				
		CurrentError01		Bit 2: Current setpoint on motor 1 not reached	BOOL				
		OvercurrentError01		Bit 3: Overcurrent motor 1	BOOL				
		OvertemperatureError02		Bit 5: Overtemperature on channel 2	BOOL				
		CurrentError02		Bit 6: Current setpoint on motor 2 not reached	BOOL				
		OvercurrentError02		Bit 7: Overcurrent motor 2	BOOL				
		DrvOk01		Bit 8: Drive status of motor 1	BOOL				
		DrvOk02		Bit 9: Drive status of motor 2	BOOL				
		ModulePowerSupplyError		Bit 13: Module power supply not within the required range	BOOL				
		Enable		Bit 14: Status of the enable input	BOOL				
		UZKStatus		Bit 15: Power supply status of the power unit	BOOL				
12	14	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
16	24	Motor1Step0	Motor2Step0	MotorStep1 motor configuration	INT		•		
33	36	ConfigOutput03	ConfigOutput06	Holding current	USINT				•
34	37	ConfigOutput04	ConfigOutput07	Nominal current	USINT				•
35	38	ConfigOutput05	ConfigOutput08	Maximum current	USINT				•
46		ConfigOutput02		Module configuration	UINT				•
54				**Error acknowledgment / Digital output of motor brake**	USINT		•		
		ClearError01		Bit 0: Acknowledges errors from motor 1	BOOL				
		ClearError02		Bit 1: Acknowledges errors from motor 2	BOOL				
		DigitalOutput01		Bit 7: Digital output for motor brake	BOOL				
72				**Latch trigger status**	USINT	•			
		DigitalInput01		Bit 4: Logical state of the digital input	BOOL				
		DigitalInput02		Bit 5: Logical state of the digital input	BOOL				
73		LifeCnt		Lifecycle counter	SINT	•			
76		StepperLatchConfig		Latch configuration	USINT				•
77		StepperLatchSource01		Reference source for internal position counter	USINT				•
78		TriggerConfig		Trigger configuration	USINT				•
80		Temperature		Temperature	SINT			•	
81		MotorIdentTrigger		Motor ID trigger	USINT				•
84	86	ConfigOutput09	ConfigOutput10	Full step threshold	UINT				•
88		CoolerTemperature		Heat sink temperature	SINT			•	
90		UZKVoltage		DC bus voltage	UINT			•	
300	302	RefPulsePos01	RefPulsePos02	Position latched	INT	•			
308	309	RefPulseCnt01	RefPulseCnt02	Reference pulse counter	SINT	•			
312	314	TriggerTime01	TriggerTime02	Trigger moment	INT	•			
318				**Current settings**	USINT		•		
		DriveEnable01		Bit 0: Enables drive 1	BOOL				
		BoostCurrent01		Bit 1: Uses acceleration current for motor 1	BOOL				
		StandstillCurrent01		Bit 2: Uses stall current for motor 1	BOOL				
		DriveEnable02		Bit 4: Enables drive 2	BOOL				
		BoostCurrent02		Bit 5: Uses acceleration current for motor 2	BOOL				
		StandstillCurrent02		Bit 6: Uses stall current for motor 2	BOOL				
320	321	ConfigOutput14	ConfigOutput15	Motor settling time	USINT				•
322		ConfigOutput16		Trigger configuration	USINT				•
323		ConfigOutput17		Latch configuration	USINT				•
324	324	ActTime01	ActTime02	NetTime of the last valid position value	INT	•			
326	327	TriggerCnt01	TriggerCnt02	Trigger counter	SINT	•			
328	330	SetTime01	SetTime02	SDC life sign monitoring	INT		•		
332	333	DelayedCurrentSwitchOff01	DelayedCurrentSwitchOff02	Turn-off delay	USINT				•
334		BrakeConfig01		Configuration of the brake output	USINT				•
Additional analog inputs									
1409				**Status of the analog inputs**	USINT	•			
		AnalogInput01OK		Bit 0: Status of analog input 1	BOOL				
		AnalogInput02OK		Bit 1: Status of analog input 2	BOOL				
1414		AnalogInput01		Analog input 1	INT	•			
1418		AnalogInput02		Analog input 2	INT	•			
Trace register									
1039	1167			**Trace control word**	USINT		•		
		TraceEnable01	TraceEnable02	Bit 0: Enables/Disables the trace function	BOOL				

Table 191: 80SD100XD.C0XX-21 - Register in function model "Standard" with SDC

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
1091	1219			**Trace status information**	USINT	•			
		TraceEnabled01	TraceEnabled02	Bit 0: Trace function enabled/disabled	BOOL				
		TraceWriteActive01	TraceWriteActive02	Bit 2: Trace data recording active/inactive	BOOL				
		TraceReadActive01	TraceReadActive02	Bit 3: Trace data reading active/inactive	BOOL				
		ReadyForTrigger01	ReadyForTrigger02	Bit 4: Trigger readiness	BOOL				
		TriggerActive01	TriggerActive02	Bit 5: Trigger active/inactive	BOOL				
		TraceOK01	TraceOK02	Bit 6: Trace OK	BOOL				
		TraceError01	TraceError02	Bit 7: Trace error	BOOL				
1094	1222	FreeBufferSize01	FreeBufferSize02	Trace buffer status	UINT	•		•	
1098	1226	TriggerCount01	TriggerCount02	Number of triggers executed	UINT	•		•	
1102	1230	TriggerFailCount01	TriggerFailCount02	Number of failed triggers	UINT	•		•	
1345				**Trace trigger**	USINT		•		
		TraceTrigger01		Bit 0: Activates trigger for analog input 1	BOOL				
		TraceTrigger02		Bit 1: Activates trigger for analog input 2	BOOL				

Table 191: 80SD100XD.C0XX-21 - Register in function model "Standard" with SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.7 80SD100XS.C04X-01 - Register in function model "Standard" with SDC

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	ActPos01	Position	INT	•		•	
10	Error	**Errors causes and status information**	UINT	•		•	
	OvertemperatureError01	Bit 1: Overtemperature on channel 1	BOOL				
	CurrentError01	Bit 2: Current setpoint on motor 1 not reached	BOOL				
	OvercurrentError01	Bit 3: Overcurrent motor 1	BOOL				
	DrvOk01	Bit 8: Drive status of motor 1	BOOL				
	EncOk01	Bit 10: Status of encoder 1	BOOL				
	EncOk03	Bit 10: Status of encoder 1	BOOL				
	EncoderPowerSupplyError	Bit 11: Encoder power supply not within the required range	BOOL				
	ModulePowerSupplyError	Bit 13: Module power supply not within the required range	BOOL				
	Enable	Bit 14: Status of the enable input	BOOL				
	UZKStatus	Bit 15: Power supply status of the power unit	BOOL				
12	Motoridentification01	Motor identification	UINT			•	
16	Motor1Step0	MotorStep1 motor configuration	INT		•		
33	ConfigOutput03	Holding current	USINT				•
34	ConfigOutput04	Nominal current	USINT				•
35	ConfigOutput05	Maximum current	USINT				•
46	ConfigOutput02	Module configuration	UINT				•
54	StatusOutput14	**Error acknowledgment / Digital output of motor brake**	USINT		•		
	ClearError01	Bit 0: Acknowledges errors from motor 1	BOOL				
	DigitalOutput01	Bit 7: Digital output for motor brake	BOOL				
72		**Latch trigger status**	USINT	•			
	DigitalInput01	Bit 4: Logical state of the digital input	BOOL				
	DigitalInput02	Bit 5: Logical state of the digital input	BOOL				
	LatchDone03	Bit 6: Successful latching of the encoder counter	BOOL				
73	LifeCnt	Lifecycle counter	SINT	•			
76	StepperLatchConfig	Latch configuration	USINT				•
77	StepperLatchSource01	Reference source for internal position counter	USINT				•
78	TriggerConfig	Trigger configuration	USINT				•
80	Temperature	Temperature	SINT			•	
81	MotorIdentTrigger	Motor ID trigger	USINT				•
84	ConfigOutput09	Full step threshold	UINT				•
88	CoolerTemperature	Heat sink temperature	SINT			•	
90	UZKVoltage	DC bus voltage	UINT			•	
300	RefPulsePos01	Position latched	INT	•			
308	RefPulseCnt01	Reference pulse counter	SINT	•			
312	TriggerTime01	Trigger moment	INT	•			
318	StatusOutput17	**Current settings**	USINT		•		
	DriveEnable01	Bit 0: Enables drive 1	BOOL				
	BoostCurrent01	Bit 1: Uses acceleration current for motor 1	BOOL				
	StandstillCurrent01	Bit 2: Uses stall current for motor 1	BOOL				
320	ConfigOutput14	Motor settling time	USINT				•
322	ConfigOutput16	Trigger configuration	USINT				•
323	ConfigOutput17	Latch configuration	USINT				•
324	ActTime01	NetTime of the last valid position value	INT	•			
326	TriggerCnt01	Trigger counter	SINT	•			
328	SetTime01	SDC life sign monitoring	INT		•		
332	DelayedCurrentSwitchOff01	Turn-off delay	USINT				•
334	BrakeConfig01	Configuration of the brake output	USINT				•
Incremental encoders							
130	PosVal03	Encoder position	INT	•		•	
134	LatchVal03	Latch of encoder position	INT	•		•	
154	StatusOutput15	**Control register for encoder**	USINT		•		
	ActivateReferencing03	Bit 0: Enables referencing on encoder 1	BOOL				
155	ConfigOutput11	Configuration of the encoder	USINT				•
158	ConfigOutput13	Extended encoder configuration	USINT				•
159	ABRLatchSource01	Reference source for encoder	USINT				•
160	TempEnc01	Encoder temperature	SINT			•	
162	TempEncLimit01	Encoder temperature limit	SINT				•

Table 192: 80SD100XS.C04X-01 - Register in function model "Standard" with SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.8 80SD100XS.C04X-13 - Register in function model "Standard" with SDC

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	ActPos01	Position	INT	•		•	
10	Error	**Errors causes and status information**	UINT	•		•	
	OvertemperatureError01	Bit 1: Overtemperature on channel 1	BOOL				
	CurrentError01	Bit 2: Current setpoint on motor 1 not reached	BOOL				
	OvercurrentError01	Bit 3: Overcurrent motor 1	BOOL				
	DrvOk01	Bit 8: Drive status of motor 1	BOOL				
	EncOk01	Bit 10: Status of encoder 1	BOOL				
	EncOk03	Bit 10: Status of encoder 1	BOOL				
	EncoderPowerSupplyError	Bit 11: Encoder power supply not within the required range	BOOL				
	ModulePowerSupplyError	Bit 13: Module power supply not within the required range	BOOL				
	Enable	Bit 14: Status of the enable input	BOOL				
	UZKStatus	Bit 15: Power supply status of the power unit	BOOL				
12	Motoridentification01	Motor identification	UINT			•	
16	Motor1Step0	MotorStep1 motor configuration	INT		•		
33	ConfigOutput03	Holding current	USINT				•
34	ConfigOutput04	Nominal current	USINT				•
35	ConfigOutput05	Maximum current	USINT				•
46	ConfigOutput02	Module configuration	UINT				•
54	StatusOutput14	**Error acknowledgment / Digital output of motor brake**	USINT		•		
	ClearError01	Bit 0: Acknowledges errors from motor 1	BOOL				
	DigitalOutput01	Bit 7: Digital output for motor brake	BOOL				
72		**Latch trigger status**	USINT	•			
	DigitalInput01	Bit 4: Logical state of the digital input	BOOL				
	DigitalInput02	Bit 5: Logical state of the digital input	BOOL				
	LatchDone03	Bit 6: Successful latching of the encoder counter	BOOL				
73	LifeCnt	Lifecycle counter	SINT	•			
76	StepperLatchConfig	Latch configuration	USINT				•
77	StepperLatchSource01	Reference source for internal position counter	USINT				•
78	TriggerConfig	Trigger configuration	USINT				•
80	Temperature	Temperature	SINT			•	
81	MotorIdentTrigger	Motor ID trigger	USINT				•
84	ConfigOutput09	Full step threshold	UINT				•
88	CoolerTemperature	Heat sink temperature	SINT			•	
90	UZKVoltage	DC bus voltage	UINT			•	
300	RefPulsePos01	Position latched	INT	•			
308	RefPulseCnt01	Reference pulse counter	SINT	•			
312	TriggerTime01	Trigger moment	INT	•			
318	StatusOutput17	**Current settings**	USINT		•		
	DriveEnable01	Bit 0: Enables drive 1	BOOL				
	BoostCurrent01	Bit 1: Uses acceleration current for motor 1	BOOL				
	StandstillCurrent01	Bit 2: Uses stall current for motor 1	BOOL				
320	ConfigOutput14	Motor settling time	USINT				•
322	ConfigOutput16	Trigger configuration	USINT				•
323	ConfigOutput17	Latch configuration	USINT				•
324	ActTime01	NetTime of the last valid position value	INT	•			
326	TriggerCnt01	Trigger counter	SINT	•			
328	SetTime01	SDC life sign monitoring	INT		•		
332	DelayedCurrentSwitchOff01	Turn-off delay	USINT				•
334	BrakeConfig01	Configuration of the brake output	USINT				•
Incremental encoders							
130	PosVal03	Encoder position	INT	•		•	
134	LatchVal03	Latch of encoder position	INT	•		•	
154	StatusOutput15	**Control register for encoder**	USINT		•		
	ActivateReferencing03	Bit 0: Enables referencing on encoder 1	BOOL				
155	ConfigOutput11	Configuration of the encoder	USINT				•
158	ConfigOutput13	Extended encoder configuration	USINT				•
159	ABRLatchSource01	Reference source for encoder	USINT				•
160	TempEnc01	Encoder temperature	SINT			•	
162	TempEncLimit01	Encoder temperature limit	SINT				•
Additional digital inputs/outputs							
192	Digital_in_do_rb	**Status of digital inputs and outputs**	USINT	•		•	
	DigitalInput03	Bit 0: Digital input 1	BOOL				
	DigitalInput04	Bit 1: Digital input 2	BOOL				
	DigitalInput05	Bit 2: Digital input 3	BOOL				
	DigitalInput06	Bit 3: Digital input 4	BOOL				
	DigitalOutputReadBack02	Bit 4: Digital output 1	BOOL				
	DigitalOutputReadBack03	Bit 5: Digital output 2	BOOL				
	CounterOverflow01	Bit 6: Counter overflow	BOOL				
	CounterLatchDone01	Bit 7: Successful latching of the counter	BOOL				

Table 193: 80SD100XS.C04X-13 - Register in function model "Standard" with SDC

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
193	StatusOutput16	**Set digital outputs / Counter control register**	USINT		•		
	CounterOverflowDetectEnable0	Bit 0: Enables/Disables overflow detection for counter	BOOL				
	ActivateRefCounter01	Bit 2: Configures digital input 3 as R input	BOOL				
	CounterEnable01	Bit 3: Configures digital input 1 as counter	BOOL				
	DigitalOutput02	Bit 6: Writes to digital output 1	BOOL				
	DigitalOutput03	Bit 7: Writes to digital output 2	BOOL				
194	Counter01	Counter	INT	•			
196	CounterLatched01	Counter latch	INT	•			
198	ConfigOutput12	Counter configuration	UINT				•

Table 193: 80SD100XS.C04X-13 - Register in function model "Standard" with SDC

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.9 80SD100XS.C0XX-01 - Register in function model "Standard" with SDC

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	ActPos01	Position	INT	•		•	
10	Error	**Errors causes and status information**	UINT	•		•	
	OvertemperatureError01	Bit 1: Overtemperature on channel 1	BOOL				
	CurrentError01	Bit 2: Current setpoint on motor 1 not reached	BOOL				
	OvercurrentError01	Bit 3: Overcurrent motor 1	BOOL				
	DrvOk01	Bit 8: Drive status of motor 1	BOOL				
	ModulePowerSupplyError	Bit 13: Module power supply not within the required range	BOOL				
	Enable	Bit 14: Status of the enable input	BOOL				
	UZKStatus	Bit 15: Power supply status of the power unit	BOOL				
12	Motor identification	Motor identification	UINT			•	
16	MotorStep0	MotorStep1 motor configuration	INT		•		
33	ConfigOutput03	Holding current	USINT				•
34	ConfigOutput04	Nominal current	USINT				•
35	ConfigOutput05	Maximum current	USINT				•
46	ConfigOutput02	Module configuration	UINT				•
54	StatusOutput14	**Error acknowledgment / Digital output of motor brake**	USINT		•		
	ClearError01	Bit 0: Acknowledges errors from motor 1	BOOL				
	DigitalOutput01	Bit 7: Digital output for motor brake	BOOL				
72		**Latch trigger status**	USINT	•			
	DigitalInput01	Bit 4: Logical state of the digital input	BOOL				
	DigitalInput02	Bit 5: Logical state of the digital input	BOOL				
73	LifeCnt	Lifecycle counter	SINT	•			
76	StepperLatchConfig	Latch configuration	USINT				•
77	StepperLatchSource01	Reference source for internal position counter	USINT				•
78	TriggerConfig	Trigger configuration	USINT				•
80	Temperature	Temperature	SINT			•	
81	MotorIdentTrigger	Motor ID trigger	USINT				•
84	ConfigOutput09	Full step threshold	UINT				•
88	CoolerTemperature	Heat sink temperature	SINT			•	
90	UZKVoltage	DC bus voltage	UINT			•	
300	RefPulsePos01	Position latched	INT	•			
308	RefPulseCnt01	Reference pulse counter	SINT	•			
312	TriggerTime01	Trigger moment	INT	•			
318	StatusOutput17	**Current settings**	USINT		•		
	DriveEnable01	Bit 0: Enables drive 1	BOOL				
	BoostCurrent01	Bit 1: Uses acceleration current for motor 1	BOOL				
	StandstillCurrent01	Bit 2: Uses stall current for motor 1	BOOL				
320	ConfigOutput14	Motor settling time	USINT				•
322	ConfigOutput16	Trigger configuration	USINT				•
323	ConfigOutput17	Latch configuration	USINT				•
324	ActTime01	NetTime of the last valid position value	INT	•			
326	TriggerCnt01	Trigger counter	SINT	•			
328	SetTime01	SDC life sign monitoring	INT		•		
332	DelayedCurrentSwitchOff01	Turn-off delay	USINT				•
334	BrakeConfig01	Configuration of the brake output	USINT				•

Table 194: 80SD100XS.C0XX-01 - Register in function model "Standard" with SDC

DT Data type of the register
Cycl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

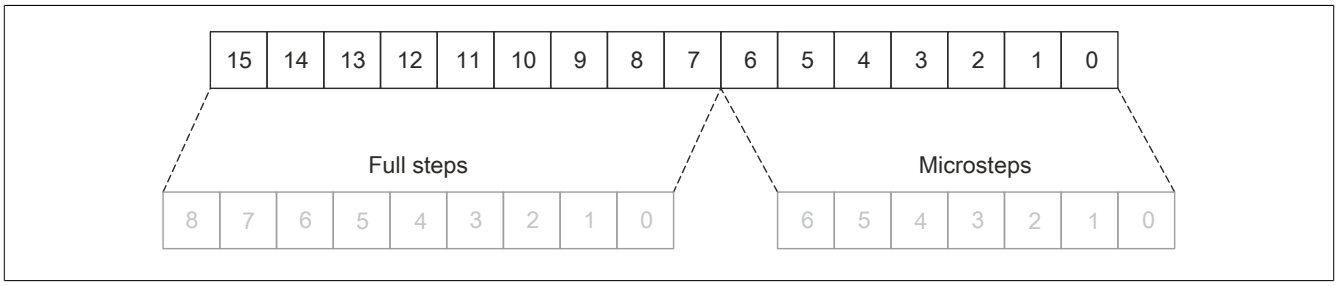
7.4.2 Registers for stepper motor control

7.4.2.1 Position

This register is used to read the internal position counter of a motor axis. This corresponds to the position calculated by the ACOPOSmicro (position setpoint). Each of these is a cyclic 16-bit counter for each channel.

The lowest 5-8 bits represent microsteps, while the highest 8-11 bits represent full steps (depending on bits 5 and 6 of the register "Module configuration" on page 305).

Example of the internal position counter format (7-bit micro-steps, i.e. set bit 5 + 6 of the module configuration to binary 10):



The contents of the ABR counter and the internal position counter can be exchanged on ACOPOSmicro variants with an incremental encoder by setting bits 3 and/or 7 in the Configuration of the incremental encoder register (see section "Configuration of the incremental encoder" on page 310).

Register	Incremental encoder configuration	
	Bit 3 (channel 1) / Bit 7 (channel 2) = 0	Bit 3 (channel 1) / Bit 7 (channel 2) = 1
Position	Internal position counter	Incremental encoder counter
Incremental encoder counter	Incremental encoder counter	Internal position counter

7.4.2.2 Errors causes and status information

Individual bits indicate either an error (E) or status information (S):

Bit	Description[1)]		
0		0 ... Reserved	
1	F	0 ... No error 1 ... Error: Overtemperature	Motor 1
2	F	0 ... No error 1 ... Error: Current setpoint not reached	
3	F	0 ... No error 1 ... Error: Overcurrent	
4		0 ... Reserved	
5	F	0 ... No error 1 ... Error: Overtemperature	Motor 2
6	F	0 ... No error 1 ... Error: Current setpoint not reached	
7	F	0 ... No error 1 ... Error: Overcurrent	
8	S	Status of drive 1: 0 ... Not ready for operation 1 ... Ready for operation	Motor 1
9	S	Status of drive 2: 0 ... Not ready for operation 1 ... Ready for operation	Motor 2

Bit	Description[1]		
10	S	Status of encoder 1: 0 ... Not ready for operation 1 ... Ready for operation	Encoder
11	F	Encoder power supply error 0 ... 24 VDC OK 1 ... Error: Encoder power supply not within required range	
12	S	Status of encoder 2: 0 ... Not ready for operation 1 ... Ready for operation	
13	F	Module power supply error 0 ... 24 VDC OK 1 ... Error: Undervoltage	
14	S	Enable status (corresponds to the enable input) 0 ... Disable 1 ... Enable OK	
15	S	Status of power supply for power unit (UZK ... DC bus voltage): 0 ... Power unit supply not within required range 1 ... Power unit supply OK (18 V ≤ DC bus voltage ≤ 80 V) This status only indicates the supply for the power unit if the enable input (bit 14) is set. If the enable input is not set, bit 15 is always 0, regardless of the power supply to the power unit.	

1) On ACOPOSmicro 1-channel variants, none of the bits that affect motor 2 have any function (0 ... Reserved).
Depending on the ACOPOSmicro variant, the bits that affect the encoder have no function (0 ... Reserved).

If an error (indicated by "E" in the table) is detected, the corresponding error bit remains set until the error is acknowledged (see 7.4.2.7 "Error acknowledgment / Digital output of motor brake" on page 305). Status bits (S) are not affected by the error acknowledgment.

Error "Current setpoint not reached" (bits 2 and 6)

This error bit is set if the required current cannot be applied to the motor windings. This can be (but does not have to be) caused by an open circuit. At higher speeds (depending on the motor), this error message can also occur even without an open circuit if the desired current can no longer be provided to the motor windings. Because of the back electromotive force on the motor, this bit is set at lower speeds if the motor is running at no load (as compared with full or partial loads).

Status of "drive X" (bits 8 and 9)

These bits have the value 0 if at least one of the following conditions exists:

- The supply voltage on the power unit is not in the required area.
- The module is not enabled (enable input).
- An overtemperature error is present.
- The corresponding motor is not powered.

Status "Status of encoder X" (bits 10 + 12)

These bits have the value 0 if at least one of the following conditions exists:

- The encoder power supply (bit 11) is not OK.
- There is an open circuit on the encoder (if encoder monitoring enabled).

7.4.2.3 Motor identification

This register is used to easily differentiate and identify connected motor types (for service purposes).

The value of this register equals the amount of time (in µs) needed to apply a current increase of ΔI = 1 A to a motor winding. This time depends on several factors:

- The amplitude of operating voltage (DC bus voltage)
- The inductance and resistance of the motor winding

Notes about motor identification		
1.	To achieve reproducible results, the measurement must be made under the following defined conditions: a) At standstill b) Motors must be in a half-step position (phase A with full current, phase B with no current). The internal step counter of the ACOPOSmicro (see 7.4.2.1 "Position" on page 302) must therefore look like this: ▪ Full steps are divisible by 4. ▪ Microsteps = 0	
2.	Condition 1.b is present after the ACOPOSmicro is reset or turned on. Immediately afterwards, when the holding current is applied to the motor for the first time (at standstill), the time it takes to apply the current is measured. This is therefore a suitable time to read the motor identification register in the application.	
3.	A current setting of at least 15% of the module's nominal current (10 A) is recommended for the nominal current register (see section 7.4.2.5 "Holding current, nominal current, maximum current" on page 304) as the operating range for determining the motor ID due to the lower relative inaccuracy at higher currents.	
4.	Range of values for the motor ID register	
	Motor ID register	**Explanation**
	0	No motor identifier available (after turning on for as long as the measurement conditions are not met)
	1 ... 32767	Valid range of values for the motor ID register
	65504 ... 65519	Ground fault: Measurement not possible
	65531	Overcurrent: Measurement not possible
	65532	Open circuit: Measurement not possible
	65533	Incorrect motor position: Measurement not possible
	65534	Invalid value: Overflow
	65535	Busy: Measurement in progress

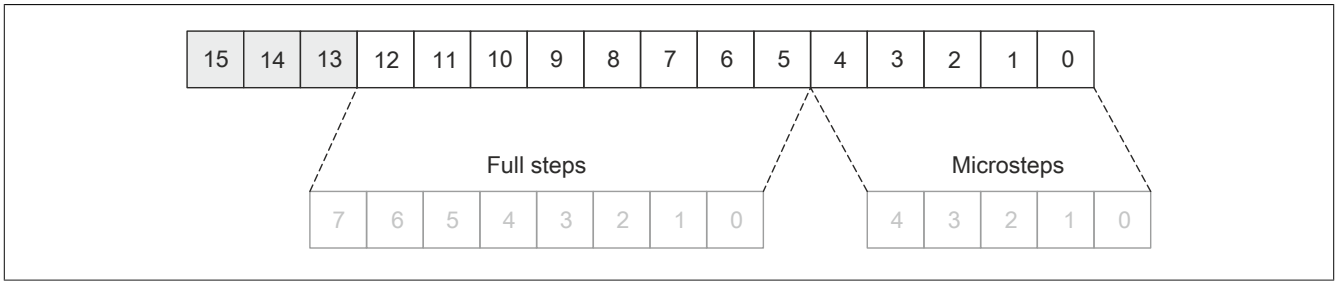
Table 195: Notes about motor identification

7.4.2.4 Motor configuration

These four registers (MotorStep1 to MotorStep4) are used to specify the amount and direction of steps that must be carried out by the module during the next X2X cycle in addition to selecting motor current (see also 7.4.2.5 "Holding current, nominal current, maximum current" on page 304). Depending on the required resolution and maximum configurable speed, the module configuration can be used to specify which bit position is used as the 1s position for full steps (see bits 5 and 6 of the "Module configuration" on page 305 register).

Bit	Description
0 - 12	Number of steps for the module to move during the next X2X cycle
13	Direction of movement: 0 ... Direction = Positive 1 ... Direction = Negative
14 - 15	Motor current selection: 00 ... Motor not powered 01 ... Holding current 10 ... Nominal current 11 ... Maximum current

Example for 5-bit microsteps (setting bits 5 and 6 of the module configuration to binary 00):



The number of transfer values per X2X cycle is specified in the module configuration by bits 3 + 4 (see "Module configuration" on page 305). If only one transfer value (bits 3 + 4 = 00) is specified, then the motor is advanced by MotorStep1 until the next X2X cycle. If 2 or 4 transfer values are specified, then the X2X cycle is divided accordingly.

Example: X2X cycle = 1 ms (1000 µs)

Time	Number of transfer values (see "Module configuration" on page 305)		
	1 (bits 3 - 4 = 00)	2 (bits 3 - 4 = 01)	4 (bits 3 - 4 = 10)
0 - 250 µs)	MotorStep1	MotorStep1	MotorStep1
250 - 500 µs)			MotorStep2
500 - 750 µs)		MotorStep2	MotorStep3
750 - 1000 µs)			MotorStep4

7.4.2.5 Holding current, nominal current, maximum current

The holding current, nominal current and maximum current registers are used to configure the desired motor current. The value set here corresponds to the amplitude of the motor current.

- Unit: Percent of the module's nominal current (100% is equal to 10 A)

During runtime, it is possible to switch between the preconfigured current values using bits 14 and15 in the "MotorStepX" registers (see"Motor configuration" on page 304).

As expected:

- Holding current < Nominal current < Maximum current

The motor's nominal current is entered in the nominal current register according to the motor's data sheet.

Register	Description
Holding current	The holding current should be selected in situations when less torque is required (e.g. at standstill). This reduces the heating of the motor.
Nominal current	Current during "normal operation". A current setting of at least 15% of the module's nominal current (10 A) is recommended for the nominal current register (see section) due to the lower relative inaccuracy at higher currents.
Maximum current	Maximum current should be selected if a higher motor torque is required during acceleration phases (short-term).

Energizing the motor:

In order to operate the motor, the DriveEnable bit must be set (evaluation is edge-sensitive).

The module energizes the motor and sets bit "DrvOk01" after the motor settling time expires as long as no errors occur. If bit "DriveEnable" is reset or an error occurs during operation, the motor is switched off and "DrvOk" is set to FALSE.

The motor can be energized again with a rising edge.

Information:

If the switch-on command is issued due to a rising edge on DriveEnable while an error is present (e.g. DC bus voltage not OK, "UZKStatus" = FALSE), then the motor is not switched on by the module. The edge-sensitive evaluation of DriveEnable prevents the motor from being switched on again automatically if an error that occurred is no longer pending later on. For this reason, the application must ensure that DriveEnable is only set if all conditions for switching on the motor are met. Otherwise, DrvOk remains set to FALSE.

7.4.2.6 Module configuration

Bit	Description
0 - 2	0 ... Reserved
3 - 4	Number of values transferred per X2X cycle (see registers MotorStep1 - MotorStep4 in section "Motor configuration" on page 304): 00 ... 1 x Δs / Δt (transfer values: MotorStep1) 01 ... 2 x Δs / Δt (transfer values: MotorStep1 - MotorStep2) 10 ... 4 x Δs / Δt (transfer values: MotorStep1 - MotorStep4) 11 ... Reserved **Information: This setting applies to both channels on 2-channel variants.**
5 - 6	Resolution of microsteps for "MotorStepX" and "Position". 00 ... 5 bits (bits 0 - 4) 01 ... 6 bits (bits 0 - 5) 10 ... 7 bits (bits 0 - 6) 11 ... 8 bits (bits 0 - 7) See "Motor configuration" on page 304 and "Position" on page 302.
7 - 13	0 ... Reserved
14	0 ... SDC life sign monitoring on 1 ... SDC life sign monitoring off
15	0 ... SDC information on 1 ... SDC information off

Neither SDC life sign monitoring nor SDC information is permitted to be changed at runtime. Settings are only permitted to be made via the I/O configuration (causes cyclic registers to be shown/hidden).

If SDC information is enabled, the number of transfer values is permanently set at 1 x Δs / Δt per X2X Link cycle. The resolution of the microsteps is 8 bits.

7.4.2.7 Error acknowledgment / Digital output of motor brake

Bit	Description
0	Error acknowledgment for motor 1
1	Error acknowledgment for Motor 2
2 - 6	0 ... Reserved
7	Status of digital output / motor brake 0 ... Motor brake off 1 ... Motor brake on

7.4.2.8 Position latch

The position counter (internal position counter) is applied to this register when a latch event occurs (see "Latch trigger status" on page 306).

On ACOPOSmicro variants with an incremental encoder, setting bits 3 and/or 7 in the register Configuration of the incremental encoder (see page 310) exchanges the contents of this register with the register Latch of the incremental encoder (see page 310).

Register	Incremental encoder configuration	
	Bit 3 (channel 1) / Bit 7 (channel 2) = 0	Bit 3 (channel 1) / Bit 7 (channel 2) = 1
Position latch	Internal position counter latch	Incremental encoder counter latch
Incremental encoder counter latch	Incremental encoder counter latch	Internal position counter latch

7.4.2.9 usSinceTrigger

This register indicates the time (in µs) that has passed since the trigger event occurred (see "Latch trigger status" on page 306).

7.4.2.10 Latch trigger status

Bit	Description[1)]	
0	LatchInput: Digital input for the latch event (level)	Stepper motor 1
1	LatchDone: Changes its state each time the counter state is successfully latched (reset value = 0)	
2	LatchInput: Digital input for the latch event (level)	Stepper motor 2
3	LatchDone: Changes its state each time the counter state is successfully latched (reset value = 0)	
4	Trigger 1: Trigger input (level)	
5	Trigger 2: Trigger input (level)	
6	LatchDone: Changes its state each time incremental encoder counter 1 is successfully latched (reset value = 0) See Control register for incremental encoder (see 310) and register Configuration of the incremental encoder (see 310)	Incremental encoder counter 1
7	LatchDone: Changes its state each time incremental encoder counter 2 is successfully latched (reset value = 0) See Control register for incremental encoder (see 310) and register Configuration of the incremental encoder (see 310)	Incremental encoder counter 2

1) On ACOPOSmicro 1-channel variants, none of the bits that affect stepper motor 2 and trigger 2 have any function (0 ... Reserved).
For some ACOPOSmicro variants, the bits that affect the encoder have no function (0 ... Reserved).

7.4.2.11 Lifecycle counter

This value is incremented with each X2X cycle (the counter starts back at zero if an overflow occurs) and is used to detect a module error, module failure or network failure.

7.4.2.12 Latch configuration

Bit	Description[1)]	
0	Switch the latch function on/off for the position register 0 ... Negative edge: Switch off the latch function off for the position register 1 ... Positive edge: Switch on the latch function off for the position register	Channel 1
1-2	Configure the latch function for the position register 00 ... Unconditional latch position 01 ... Latch position on positive edge of trigger input 1 10 ... Latch position on negative edge of trigger input 1 11 ... Reserved	
3	0 ... Reserved	
4	Switch the latch function on/off for the position register 0 ... Negative edge: Switch off the latch function off for the position register 1 ... Positive edge: Switch on the latch function off for the position register	Channel 2
5-6	Configure the latch function for the position register 00 ... Unconditional latch position 01 ... Latch position on positive edge of trigger input 2 10 ... Latch position on negative edge of trigger input 2 11 ... Reserved	
7	0 ... Reserved	

1) On ACOPOSmicro 1-channel variants, the bits for channel 2 have no function (0 ... Reserved).

7.4.2.13 Reference source for internal position counter

Bit	Description
0 - 3	Reference source for internal position counter 1: 0 ... Digital input 1 1 ... Digital input 2 2 - 14 ... Reserved 15 ... R input of incremental encoder counter 1[1)]
4 - 7	Reference source for internal position counter 2: 0 ... Digital input 1 1 ... Digital input 2 2 - 13 ... Reserved 14 ... R input of incremental encoder counter 2[1)] 15 ... Reserved

1) Encoder-specific states can be reserved depending on the ACOPOSmicro variants (x ... Reserved).

7.4.2.14 Trigger configuration

Bit	Description[1)]
0	0 ... Trigger 1: Trigger edge = Positive 1 ... Trigger 1: Trigger edge = Negative
1	Enable trigger 1 (when a change occurs)
2	0 ... Trigger 2: Trigger edge = Positive 1 ... Trigger 2: Trigger edge = Negative
3	Enable trigger 2 (when a change occurs)
4 - 7	0 ... Reserved

1) On ACOPOSmicro 1-channel variants, the bits for trigger 2 have no function (0 ... Reserved).

Trigger function procedure:

- Select the desired trigger edge using bit 0 (trigger 1) or bit 2 (trigger 1).
- Enable the trigger function by changing the state of bit 1 (trigger 1) or bit 3 (trigger 1). When this bit changes, usSinceTrigger (µs counter) is cleared.
- When the trigger event occurs, the µs counter usSinceTrigger is started.
- The counter usSinceTrigger cannot overflow, i.e. the counter is stopped at 2^{16} - 1 and retains this value until the next time the trigger function is enabled.

The trigger function can be re-enabled at any time by changing the state of bit 1 or bit 3, regardless of whether a trigger event has occurred or if usSinceTrigger has reached the maximum value.

7.4.2.15 Temperature

The internal module temperature (on the controller board) is output in °C.

Measurement range: -40 to +125°C

Overtemperature cutoff (starting at +85°C)

If the module temperature reaches or exceeds +85°C...

- ...The application is notified via the "Overtemperature" error bit.
- ...All of the module's outputs are disabled (turned off).

Once the module temperature sinks to +83°C, the error bit is automatically cleared by the module and the outputs are re-enabled again (powered).

The module temperature will not reach the cutoff limit when operating the module within the specified ambient conditions and the permissible output current range. The temperature cutoff serves only to protect the module hardware and is not permitted to be misused for operating the module beyond the specified range as this reduces its service life.

7.4.2.16 Motor ID trigger

This register is used to asynchronously measure the motor ID. The application must ensure that the conditions for measurement are fulfilled (see Tab. 193 "Notes about motor identification" on page 304).

Bit	Description[1)]
0	0 ... No effect 1 ... Positive edge triggers motor ID measurement for motor 1
1	0 ... No effect 1 ... Positive edge triggers motor ID measurement for motor 2
2 - 7	0 ... Reserved

1) On ACOPOSmicro 1-channel variants, the bits for motor 2 have no function (0 ... Reserved).

7.4.2.17 Full step threshold

This register configures angular velocity (unit: steps/second). When this defined speed has been reached, the drive will automatically change from microsteps to full step mode. This makes it possible to optimize torque at higher speeds, while microstep mode ensures optimal radial runout at lower speeds.

It does not make sense to change to full step mode when at a standstill because fine positioning would then no longer be possible. This is why value "0" does not make sense in the full step threshold register and is interpreted as disabling full step mode (i.e. the motor will always be operated in microstep mode).

Example

Microstep mode should change to full step mode at 500 steps/second. On a motor with 200 steps per revolution, this would be equal to a speed of:

$$T^{-1} = \frac{500\ \text{Steps/second}}{200\ \text{Steps/revolution}} = 2.5 \cdot \frac{\text{Revolutions}}{\text{Second}} = 150\ \text{Min}^{-1}$$

7.4.2.18 Heat sink temperature

This register indicates the temperature of the power board.

- Unit: °C
- Measurement range: +10 to +125°C

7.4.2.19 DC bus voltage

Contains the supply voltage in the power unit (in volts).

7.4.2.20 Motor settling time

This register determines the motor setting time. The motor settling time determines the minimum time between when the motor is powered on to when the drive bit is set. The setting is made in steps of 10 ms.

Unit: ms

Range of values: 1 to 255, 10 ms to 2.55 s

Default: 10 ms

7.4.2.21 Configuration of the brake output

Bit	Description
0 - 1	Brake output 00 ... Digital output 01 ... Brake output for motor 1 10 ... Brake output for motor 2 11 ... Reserved
2 - 7	0 ... Reserved

7.4.2.22 SDC life sign monitoring

Name:
SetTime01

The module uses SDC life sign monitoring to check whether valid values have been received for the speed setpoint.

SDC life sign monitoring is enabled in register "SDC configuration" on page by setting bit 6 (SDCSetTime = On).

If the specified NetTime timestamp is in the past, then an error is triggered for the motor axis (only when the motor is switched on). The module performs the following steps:

1) The CPU is informed of the error using the Drive bit (DrvOk) = 0

2) Braking at configured nominal current with speed setpoint = 0

3) Wait for configured turn-off delay to expire

4) Power off motor

When the timestamp is back within the valid range, the motor can be operated again by a rising edge on bit "DriveEnable" (see "Motor current" on page) .

Data type	Values
INT	-32768 to 32767

7.4.2.23 Turn-off delay

Name:
DelayedCurrentSwitchOff01

If SDC life sign monitoring is triggered (i.e. the NetTime timestamp is in the past), the motor is decelerated at nominal current if speed setpoint = 0.

Then the motor is switched off after the delay configured with this register.

Data type	Values	Information
USINT	0 to 255	0 to 25.5 ms in steps of 100 ms (default: 100 ms)

7.4.3 Registers for ACOPOSmicro with an encoder

7.4.3.1 Counter of the incremental encoder

This counter is a cyclic 16-bit counter for each encoder input. The relationship between this counter and the internal position counter depends on the resolution of the ABR encoder and the defined microsteps of the internal position counter.

The contents of the ABR counter and the internal position counter can be exchanged on ACOPOSmicro variants with an incremental encoder by setting bits 3 and/or 7 in the Configuration of the incremental encoder register (see page 310).

Register	ABR configuration	
	Bit 3 (channel 1) / Bit 7 (channel 2) = 0	Bit 3 (channel 1) / Bit 7 (channel 2) = 1
Position	Internal position counter latch	ABR counter latch
ABR counter	ABR counter latch	Internal position counter latch

7.4.3.2 Latch of the incremental encoder

The ABR counter is applied to this register when a latch event occurs (see "Latch trigger status" on page 306).

The contents of this register can be exchanged with the ABR counter latch register on ACOPOSmicro variants with an incremental encoder by setting bits 3 and/or 7 in the register Configuration of the incremental encoder (see page 310).

	ABR configuration	
Register	Bit 3 (channel 1) / Bit 7 (channel 2) = 0	Bit 3 (channel 1) / Bit 7 (channel 2) = 1
Position latch	Internal position counter latch	ABR counter latch
ABR counter latch	ABR counter latch	Internal position counter latch

7.4.3.3 Control register for incremental encoder

Bit	Description[1)]
0	0 ... Disables referencing of ABR counter 1 1 ... Enables referencing of ABR counter 1 (positive edge enables referencing)
1 - 3	0 ... Reserved
4	0 ... Disables referencing of ABR counter 2 1 ... Enables referencing of ABR counter 2 (positive edge enables referencing)
5 - 7	0 ... Reserved

1) On ACOPOSmicro variants with one encoder, bit 4 for ABR counter 2 has no function (0 ... Reserved)

7.4.3.4 Configuration of the incremental encoder

Bit	Description		
0 - 1	Configures referencing of ABR counter 1:		Encoder 1
	00	No referencing	
	01	Referencing on positive edge of the R signal	
	10	Referencing on negative edge of the R signal	
	11	Referencing immediately on rising edge of bit 0 of Control register for incremental encoder (see 310)	
2	Referencing mode:		
	0	Copies ABR counter to ABR counter latch	
	1	Sets ABR counter to zero	
3	0	No effect	
	1	Exchanges the contents of the following registers of channel 1: ▪ Position ↔ ABR counter ▪ Position latch ↔ ABR counter latch	
4 - 5	Configures referencing of ABR counter 2		Encoder 2[1)]
	00	No referencing	
	01	Referencing on positive edge of the R signal	
	10	Referencing on negative edge of the R signal	
	11	Referencing immediately on rising edge of bit 0 of Control register for incremental encoder (see 310)	
6	Referencing mode:		
	0	Copies ABR counter to ABR counter latch	
	1	Sets ABR counter to zero	
7	0	No effect	
	1	Exchanges the contents of the following registers of channel 2: ▪ Position ↔ ABR counter ▪ Position latch ↔ ABR counter latch	

1) On ACOPOSmicro variants with one encoder, bits 4-7 for ABR counter 2 have no function (0 ... Reserved)

Register	ABR configuration	
	Bit 3 (channel 1) / Bit 7 (channel 2) = 0	Bit 3 (channel 1) / Bit 7 (channel 2) = 1
Position	Internal position counter	ABR counter
Position latch	Internal position counter latch	ABR counter latch
ABR counter	ABR counter	Internal position counter
ABR counter latch	ABR counter latch	Internal position counter latch

The following applies regardless of the configuration (bit 3 or bit 7):

The referencing of the ABR counters is always configured with bits 0 - 2 or 4 - 6 of register ABR Configuration and is activated with the positive edge of bit 0 or bit 4 in the ABR control register.

The latch function for the internal position counter (for the drive) will always be checked and enabled using bits 0 - 2 or 4 - 6 of the latch configuration register.

7.4.3.5 Extended incremental encoder configuration

Bit	Description[1]	
0 - 1	Encoder monitoring[2] of ABR encoder 1:	
	00	No encoder monitoring
	01	Encoder monitoring of signals A and B
	10	Encoder monitoring of signals A, B and R
	11	Reserved
2 - 3	00	Reserved
4 - 5	Encoder monitoring[2] of ABR encoder 2:	
	00	No encoder monitoring
	01	Encoder monitoring of signals A and B
	10	Encoder monitoring of signals A, B and R
	11	Reserved
6 - 7	00	Reserved

1) On ACOPOSmicro variants with one (1) encoder, bits 4 and 5 for ABR encoder 2 have no function (reserved).
2) Important: Encoder monitoring is only available beginning with a specific hardware revision and firmware version:
80SD100XD.C044-01: Hardware revision B0 and firmware version 6
80SD100XS.C04X-01: Hardware revision B0 and firmware version 6
80SD100XD.C04X-13: Hardware revision B0 and firmware version 4

7.4.4 Registers for ACOPOSmicro variants with additional digital inputs/outputs

7.4.4.1 Status of digital inputs and outputs

Bit	Description			
0	Status of digital input 1		A	Counter input 1
1	Status of digital input 2		B	Counter input 1
2	Status of digital input 3		R	External counter frequency for counter input 1
3	Status of digital input 4			Reference for enable input
4	Status of digital output 1			
5	Status of digital output 2			
6	Overflow of counter 1 (only valid if gate or period measurement is set in the counter configuration with bits 3 - 6):			
	0	Counter value within the counting range (0 to $7FFF) This value is only valid if bit 0 of the counter control register is set.		
	1	Counter overflow This bit is reset with bit 0 of the counter control register.		
7	LatchDone: Changes its state each time the counter state is successfully latched (reset value = 0)			

7.4.4.2 Set digital outputs / Counter control register

Bit	Description	
0	0	Disable detection of counter overflow and resets the overflow bit of counter 1
	1	Enable detection of counter overflow
1	0	Reserved
2	Referencing (only applies in AB(R) mode, see bits 8 and 9 in the counter configuration)	
	0	Disable referencing
	1	Enable referencing
3	0	Reset the counter (to zero)
	1	Start the counter
	Note: Only set after the counter configuration is completed!	
4 - 5	0	Reserved
6	Set digital output 1	
7	Set digital output 2	

7.4.4.3 Counter

This register contains the current counter state. Different counters (event counter, ABR counter, etc.) are available depending on the configuration.

7.4.4.4 Counter latch

The counter is applied to this register when the next latch event occurs (see ABR mode in "Counter configuration" on page 312).

7.4.4.5 Counter configuration

Bit	Description	
0 - 1	Counter frequency (only valid if set in gate or period measurement):	
	00	Internal counter frequency 4 MHz
	01	Internal counter frequency 31.25 kHz
	10	External counter frequency (digital input 3)
	11	Reserved
2	0	Reserved

Bit	Description	
3 - 6	Counter mode:	
	0000	No counter
	0001	Event counter, positive edge
	0010	Event counter, negative edge
	0011	Event counter, both edges
	0100	Period measurement between two consecutive negative edges
	0101	Period measurement between two consecutive positive edges
	0110	Gate measurement of the LOW level
	0111	Gate measurement of the HIGH level
	1000	AB counter without referencing
	1001	ABR counter with referencing Counter set to zero on positive edge of R
	1010	ABR counter with referencing Counter set to zero on negative edge of R
	1011	ABR counter with immediate referencing Counter set to zero on positive edge of bit 2 of the counter control register
	1100	AB counter without referencing
	1101	ABR counter with referencing Counter state applied to the counter latch register on positive edge of R
	1110	ABR counter with referencing Counter state applied to the counter latch register on negative edge of R
	1111	ABR counter with immediate referencing Counter state applied to the counter latch register on positive edge of bit 2 of the counter control register
7	0	Reserved
8 - 9	Configuration of the reference for the enable input (digital input 4)	
	00	Digital input 4 (reference enable input) does not affect the R input. The R input is always enabled.
	01	Reserved
	10	R input active if the reference for the enable input is LOW
	11	R input active if the reference for the enable input is HIGH
10 - 15	0	Reserved

7.4.5 Registers for ACOPOSmicro variants with additional analog inputs

7.4.5.1 Status of the analog inputs

Bit	Description	
0	Analog input 1	0 ... OK 1 ... Outside valid range or open circuit
1	Analog input 2	
2-7	0 ... Reserved	

In addition to the status information, the analog value of the corresponding input will also be set if an error occurs (status bit = 1):

Error	Analog value (dec.)	Analog value (hex.)
Open circuit	+32,767	0x7FFF
Input voltage > +10 V	+32,767	0x7FFF
Input voltage < -10 V	-32,767	0x8001
Invalid value	-32,768	0x8000

7.4.5.2 Analog input 1 / Analog input 2

These two registers contain the analog value of the corresponding input.

Relationship between input voltage and register value:

Input voltage	Value of the register
+10 V	+32,767
:	:
-10 V	-32,768

7.4.6 Trace functionality for ACOPOSmicro variants with analog inputs

7.4.6.1 Trace registers

7.4.6.1.1 Trace control word

Bit 0 of the trace control word is used to turn trace functionality on/off for the corresponding analog input.

Bit	Description
0	0 ... Trace function disabled 1 ... Trace function enabled
1-15	0 ... Reserved

A buffer overflow error can be cleared by resetting bit 0.

7.4.6.1.2 Trace status information

Bit	Description
0	0 ... Trace function switched off 1 ... Trace function switched on
1	0 ... Reserved
2	0 ... Trace data recording inactive 1 ... Trace data recording active
3	0 ... Trace data reading inactive 1 ... Trace data reading active
4	0 ... Not ready for trigger 1 ... Ready for trigger
5	Trigger active 0 ... No trigger active, trace recording stopped 1 ... Processing trigger, recording trace data
6	Trace OK 0 ... Buffer overflow or trace function turned off for analog input 1 ... No buffer overflow error
7	Trace error 0 ... No buffer overflow or trace function turned off for analog input 1 ... Buffer overflow error

7.4.6.1.3 Trace buffer status

This register contains the amount of buffer memory (in bytes) available for a trace recording. The buffer must be large enough for the configured number of sampled values to be recorded.

If "Infinite trace" has been selected, then the buffer must be read fast enough for analog values to be recorded at the configured sampling rate.

7.4.6.1.4 Number of triggers executed

This register contains the number of successfully executed trigger events (trace recordings).

7.4.6.1.5 Number of failed triggers

This register contains the number of failed trigger events (trace recordings).

This register is increased by one whenever a trigger event occurs under the following conditions:

- The trace function is not enabled.
- The trace buffer is full (two trigger events in short succession).
- Pre-trigger function: If the configured number of recordings has not yet been reached before the trigger event.

7.4.6.1.6 Trace trigger

You can use this register to start recording separately for each trace instance. This is only possible if the trigger function has been enabled for the corresponding analog input.

Bit	Description	
0	Trigger for trace instance 1	The trigger event is triggered on a positive edge (bit changes from 0 → 1).
1	Trigger for trace instance 2	
2-7	0 ... Reserved	

7.4.6.2 Trace runtime configuration

This section specifies how the trace runtime configuration is made in Automation Studio:

7.4.6.2.1 Turning trace on/off for analog input X (Trace AnalogInput01/02 = on/off)

The trace function must first be turned on/off for the respective analog channel.

If the trace function was turned on for both analog inputs, then the recorded trace data will be provided by the AsIoTrc library in the following order:

Sampling	Array index	Channel
1	0	Analog input 1
	1	Analog input 2
2	2	Analog input 1
	3	Analog input 2
:	:	:

Table 196: Order of trace data from two analog channels

7.4.6.2.2 Number of trace buffers

The number of local trace buffers must also be set on the CPU.

This number specifies how many trace recordings the CPU can save. If a trigger event occurs, even though all configured trace buffers are full, then the corresponding sampled values will be lost.

The recorded trace data buffers are read out with the AsIoTrc library.

7.4.6.2.3 Number of samples

The number of sampled values to be recorded on the ACOPOSmicro module must then be set. It is important to make sure that the trace buffer is large enough for the trace data on the module to be recorded.

If "Infinite trace" has been selected, then the buffer must be read fast enough for analog values to be recorded at the configured sampling rate.

The total number of samples from all channels (channel 1 and 2 for trace 1 and 2) is not permitted to be greater than 8192.

7.4.6.2.4 Block sizes for asynchronous data transfer (AsynSize)

A higher value here will result in faster data transfer from the module to the CPU.

7.4.6.2.5 Number of data blocks sent before repetition (AsynForward)

Each data block transferred must be acknowledged by the X2X Link master. If an acknowledgment has not been received after the number of data blocks defined here, then all non-confirmed data blocks will be sent again.

7.4.6.2.6 Trace mode

Trace mode	Description
Triggered	Trace recording will start after the trigger event (see bit 0/1 of the register "Trace trigger" on page 315).
Infinite	Infinite trace can be started with bit 0/1 of the register Trace trigger (see page 315). X2X must be configured in such a way as to ensure that the amount of data generated can be transferred quickly enough. The trace buffer must be read quickly to prevent an overflow in the module's local memory and to ensure that the samples can be recorded at the configured sampling rate.

7.4.6.2.7 Recording range of trace data (trace start/stop position)

This defines the number of samples that should be recorded before/after the trigger event.

Trigger type	Start position	Stop position	Beginning of recording	End of recording
Post-trigger	x ≥ 0	y > 0	x samples after trigger event	y samples after start position
Pre-trigger	x < 0	y > 0	x samples before trigger event	y samples after trigger event

7.4.6.3 Trace library

Library AsIoTrc must be used to read the recorded trace data (see **Automation Help** for more information).

The ACOPOSmicro module with additional analog inputs has two separate trace instances that can be triggered at different times independently of one another.

Each trace instance has a device name:

- <Hardware address of the module>.<Trace instance>

This device name is used by the AsIoTrcGet library function to read the trace data from the desired instance.

Examples:

- Trace for trace instance 1: "SS1.IF1.ST1.TRC1"
- Trace for trace instance 2: "SS1.IF1.ST1.TRC2"

7.5 Function model "Ramp" and CANIOBusController

Function model "Ramp" is based on CANopen communication profile DS402

If an ACOPOSmicro module is operated on a bus controller, then the CANIOBusController function model is used. Apart from a few minor differences (see footnotes in the register overview), function model "Ramp" CANIOBus-Controller is identical to function model "Ramp".

7.5.1 Register overviews

7.5.1.1 80SD100XD.C011-01 - Register in function model "Ramp"

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	8	AbsPos01	AbsPos02	Target position / Speed	DINT		•		
4	12	MpGenControl01	MpGenControl02	Control word	UINT		•		
6	14	MpGenMode01	MpGenMode02	Mode	SINT		•		
7	15			**Control of motor brakes**	USINT		•		
		MpGenBrake01	MpGenBrake02	Bit 0: Motor brake	BOOL				
0	8	AbsPos01ActVal	AbsPos02ActVal	Current position (cyclic)	DINT	•		•	
4	12	MpGenStatus01	MpGenStatus02	Status word	UINT	•		•	
6		InputStatus		Digital input status	USINT	•		•	
42		UZKVoltage		DC bus voltage	UINT			•	
44		CoolerTemperature		Temperature of the power output stage	SINT			•	
46		Temperature		Temperature	SINT			•	
48	112	ConfigOutput03a	ConfigOutput06a	Holding current	USINT				•
49	113	ConfigOutput04a	ConfigOutput07a	Nominal current	USINT				•
50	114	ConfigOutput05a	ConfigOutput08a	Maximum current	USINT				•
52	116	MaxSpeed01pos	MaxSpeed02pos	Maximum speed	UINT				•
54	118	MaxAcc01	MaxAcc02	Maximum acceleration	UINT				•
56	120	MaxDec01	MaxDec02	Maximum deceleration	UINT				•
58	122	RevLoop01	RevLoop02	Reversing loop	INT				•
60	124	FixedPos01a	FixedPos02a	Fixed position A	DINT				•
64	128	FixedPos01b	FixedPos02b	Fixed position B	DINT				•
68	132	RefSpeed01	RefSpeed02	Homing speed	UINT				•
70	134	RefConfig01	RefConfig02	Homing configuration	SINT				•
72	136	FullStepThreshold01	FullStepThreshold02	Full step threshold	UINT				•
75	139	JoltTime01	JoltTime02	Jerk time limitation	USINT				•
80	144	ControlReadback01	ControlReadback02	Control word (read back)	UINT			•	
82	146	ModeReadback01	ModeReadback02	Mode (read back)	SINT			•	
84	148	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
86	150	RefPos01CyclicCounter	RefPos02CyclicCounter	Homed zero position for cyclic counter	DINT			•	
98	162	ErrorCode01	ErrorCode02	Error code	UINT			•	
208		GeneralConfig01		General configuration	USINT				•
209	210	LimitSwitchConfig01	LimitSwitchConfig02	Limit switch configuration	USINT				•
211		BrakeConfig01		Configuration of the brake output	USINT				•
212	216	PositionLimitMin01	PositionLimitMin02	Minimum software limit	DINT				•
220	224	PositionLimitMax01	PositionLimitMax02	Maximum software limit	DINT				•
HIPERFACE encoder									
90	154	AbsPos1ActValAcyclic	AbsPos2ActValAcyclic	Current position (acyclic)	DINT			•	
1034	5130	Hf01SinCosVssMin	Hf02SinCosVssMin	Vss minimum	UINT				•
1038	5134	Hf01SinCosVssMax	Hf02SinCosVssMax	Vss maximum	UINT				•
1044	5140	Hf01SinCosQuitTime	Hf02SinCosQuitTime	Vss acknowledge time	UDINT				•
2053	6149	Hf01Parity	Hf02Parity	Parity	USINT				•
2055	6151	Hf01CharTimout	Hf02CharTimout	Timeout for HIPERFACE communication	USINT				•
2060	6156	Hf01Baud	Hf02Baud	Baud rate	UDINT				•
2073	6169	Hf01RefAdr	Hf02RefAdr	Reference station address	USINT				•
2075	6171	Hf01RefWidth	Hf02RefWidth	Position width for reference station	USINT				•
2113	6209	Hf01ErrorCounter	Hf02ErrorCounter	Error counter	USINT			•	
2115	6211	Hf01ErrorStationAdress	Hf02ErrorStationAdress	Node number of last error	USINT			•	
2117	6213	Hf01ErrorCommand	Hf02ErrorCommand	HIPERFACE command of last error	USINT			•	
2119	6215	Hf01ErrorCode	Hf02ErrorCode	Error code: 0x00 to 0xFE: Encoder status 0xFF: Command timeout	USINT			•	
2561	6657	Hf01AdrIdent	Hf02AdrIdent	Ident station	USINT				•
2563	6659	Hf01SelectionIdent	Hf02SelectionIdent	Extension selection	USINT				•
2631	6727	Hf01IdentOk	Hf02IdentOk	Ident OK	USINT			•	
2688	6784	Hf01Rs485Settings	Hf02Rs485Settings	Ident for RS485 settings	USINT			•	
2689	6785	Hf01EncoderType	Hf02EncoderType	Ident encoder type	USINT			•	
2690	6786	Hf01EepromSize	Hf02EepromSize	Ident for EEPROM size	USINT			•	
2691	6787	Hf01OptionFlags	Hf02OptionFlags	Ident for option flags	USINT			•	

Table 197: 80SD100XD.C011-01 - Register in function model "Ramp"

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
2692	6788	Hf01FreeMemory	Hf02FreeMemory	Ident free memory	USINT			•	
2693	6789	Hf01DataFields	Hf02DataFields	Ident valid data fields	USINT			•	
2694	6790	Hf01ExtByte01	Hf02ExtByte01	Ident extension byte 1	USINT			•	
2695	6791	Hf01ExtByte02	Hf02ExtByte02	Ident extension byte 2	USINT			•	
2696	6792	Hf01ExtByte03	Hf02ExtByte03	Ident extension byte 3	USINT			•	
2697	6793	Hf01ExtByte04	Hf02ExtByte04	Ident extension byte 4	USINT			•	
2698	6794	Hf01ExtByte05	Hf02ExtByte05	Ident extension byte 5	USINT			•	
2699	6795	Hf01ExtByte06	Hf02ExtByte06	Ident extension byte 6	USINT			•	
2700	6796	Hf01ExtByte07	Hf02ExtByte07	Ident extension byte 7	USINT			•	
2701	6797	Hf01ExtByte08	Hf02ExtByte08	Ident extension byte 8	USINT			•	
2702	6798	Hf01ExtByte09	Hf02ExtByte09	Ident extension byte 9	USINT			•	
2703	6799	Hf01ExtByte10	Hf02ExtByte10	Ident extension byte 10	USINT			•	
2817	6913	Hf01AddPosAdr01	Hf02AddPosAdr01	Additional position 1 address	USINT				•
2825	6921	Hf01AddPosAdr02	Hf02AddPosAdr02	Additional position 2 address	USINT				•
2887	6983	Hf01AddPosOk	Hf02AddPosOk	Additional position OK	USINT			•	
2948	7044	Hf01AddPosTime01	Hf02AddPosTime01	Additional position time 1	UDINT			•	
2956	7052	Hf01AddPosition01	Hf02AddPosition01	Additional position 1	UDINT			•	
2964	7060	Hf01AddPosTime02	Hf02AddPosTime02	Additional position time 2	UDINT			•	
2972	7068	Hf01AddPosition02	Hf02AddPosition02	Additional position 2	UDINT			•	
3073	7169	Hf01AnalogAdrCh01	Hf02AnalogAdrCh01	Analog channel 1 address	USINT				•
3075	7171	Hf01AnalogCh01	Hf02AnalogCh01	Analog channel 1 channel	USINT				•
3081	7177	Hf01AnalogAdrCh02	Hf02AnalogAdrCh02	Analog channel 2 address	USINT				•
3083	7179	Hf01AnalogCh02	Hf02AnalogCh02	Analog channel 2 channel	USINT				•
3089	7185	Hf01AnalogAdrCh03	Hf02AnalogAdrCh03	Analog channel 3 address	USINT				•
3091	7187	Hf01AnalogCh03	Hf02AnalogCh03	Analog channel 3 channel	USINT				•
3097	7193	Hf01AnalogAdrCh04	Hf02AnalogAdrCh04	Analog channel 4 address	USINT				•
3099	7195	Hf01AnalogCh04	Hf02AnalogCh04	Analog channel 4 channel	USINT				•
3143	7239	Hf01AnalogChOk	Hf02AnalogChOk	Analog channel OK	USINT			•	
3204	7300	Hf01AnalogChTime01	Hf02AnalogChTime01	Analog channel 1 time	UDINT			•	
3210	7306	Hf01AnalogChValue01	Hf02AnalogChValue01	Analog channel 1 value	UINT			•	
3220	7316	Hf01AnalogChTime02	Hf02AnalogChTime02	Analog channel 2 time	UDINT			•	
3226	7322	Hf01AnalogChValue02	Hf02AnalogChValue02	Analog channel 2 value	UINT			•	
3236	7332	Hf01AnalogChTime03	Hf02AnalogChTime03	Analog channel 3 time	UDINT			•	
3242	7338	Hf01AnalogChValue03	Hf02AnalogChValue03	Analog channel 3 value	UINT			•	
3252	7348	Hf01AnalogChTime04	Hf02AnalogChTime04	Analog channel 4 time	UDINT			•	
3258	7354	Hf01AnalogChValue04	Hf02AnalogChValue04	Analog channel 4 value	UINT			•	

Table 197: 80SD100XD.C011-01 - Register in function model "Ramp"

DT Data type of the register
Cycl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.5.1.2 80SD100XD.C033-01 - Register in function model "Ramp"

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	8	AbsPos01	AbsPos02	Target position / Speed	DINT		●		
4	12	MpGenControl01	MpGenControl02	Control word	UINT		●		
6	14	MpGenMode01	MpGenMode02	Mode	SINT		●		
7	15			**Control of motor brakes**	USINT		●		
		MpGenBrake01	MpGenBrake02	Bit 0: Motor brake	BOOL				
0	8	AbsPos01ActVal	AbsPos02ActVal	Current position (cyclic)	DINT	●		●	
4	12	MpGenStatus01	MpGenStatus02	Status word	UINT	●		●	
6		InputStatus		Digital input status	USINT	●		●	
42		UZKVoltage		DC bus voltage	UINT			●	
44		CoolerTemperature		Temperature of the power output stage	SINT			●	
46		Temperature		Temperature	SINT			●	
48	112	ConfigOutput03a	ConfigOutput06a	Holding current	USINT				●
49	113	ConfigOutput04a	ConfigOutput07a	Nominal current	USINT				●
50	114	ConfigOutput05a	ConfigOutput08a	Maximum current	USINT				●
52	116	MaxSpeed01pos	MaxSpeed02pos	Maximum speed	UINT				●
54	118	MaxAcc01	MaxAcc02	Maximum acceleration	UINT				●
56	120	MaxDec01	MaxDec02	Maximum deceleration	UINT				●
58	122	RevLoop01	RevLoop02	Reversing loop	INT				●
60	124	FixedPos01a	FixedPos02a	Fixed position A	DINT				●
64	128	FixedPos01b	FixedPos02b	Fixed position B	DINT				●
68	132	RefSpeed01	RefSpeed02	Homing speed	UINT				●
70	134	RefConfig01	RefConfig02	Homing configuration	SINT				●
72	136	FullStepThreshold01	FullStepThreshold02	Full step threshold	UINT				●
75	139	JoltTime01	JoltTime02	Jerk time limitation	USINT				●
80	144	ControlReadback01	ControlReadback02	Control word (read back)	UINT			●	
82	146	ModeReadback01	ModeReadback02	Mode (read back)	SINT			●	
84	148	Motoridentification01	Motoridentification02	Motor identification	UINT			●	
86	150	RefPos01CyclicCounter	RefPos02CyclicCounter	Homed zero position for cyclic counter	DINT			●	
98	162	ErrorCode01	ErrorCode02	Error code	UINT			●	
208		GeneralConfig01		General configuration	USINT				●
209	210	LimitSwitchConfig01	LimitSwitchConfig02	Limit switch configuration	USINT				●
211		BrakeConfig01		Configuration of the brake output	USINT				●
212	216	PositionLimitMin01	PositionLimitMin02	Minimum software limit	DINT				●
220	224	PositionLimitMax01	PositionLimitMax02	Maximum software limit	DINT				●
SSI absolute encoder									
90	154	AbsPos1ActValAcyclic	AbsPos2ActValAcyclic	Current position (acyclic)	DINT			●	
1281	1793	TempEnc01	TempEnc02	Encoder temperature	SINT			●	
1281	1793	ValidSSIBitLength01	ValidSSIBitLength02	Valid bits	USINT				●
1286	1798	EncoderConfiguration01	EncoderConfiguration02	Configuration	UINT				●
1289	1801	TotalSSIBitLength01	TotalSSIBitLength02	Total bits	USINT				●
1290	1802	SSI01HwVer	SSI02HwVer	Hardware revision	UINT			●	
1294	1806	SSI01FwVer	SSI02FwVer	Firmware version	UINT			●	
1294	1806	SSISystemCyclePrescaler01	SSISystemCyclePrescaler02	Prescaler	UINT				●
1298	1810	EncoderType01	EncoderType02	Encoder type	UINT				●
1300	1812	SSI01SerNr	SSI02SerNr	Serial number	UDINT			●	
1305	1817	SSI01NominalCurrent	SSI02NominalCurrent	Nominal current	USINT			●	
1310	1822	SSI01MotorID	SSI02MotorID	Motor identification	UINT			●	

Table 198: 80SD100XD.C033-01 - Register in function model "Ramp"

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.5.1.3 80SD100XD.C044-01, 80SD100XD.W044-01 - Register in function model "Ramp"

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	8	AbsPos01	AbsPos02	Target position / Speed	DINT		●		
4	12	MpGenControl01	MpGenControl02	Control word	UINT		●		
6	14	MpGenMode01	MpGenMode02	Mode	SINT		●		
7	15			**Control of motor brakes**	USINT		●		
		MpGenBrake01	MpGenBrake02	Bit 0: Motor brake	BOOL				
0	8	AbsPos01ActVal	AbsPos02ActVal	Current position (cyclic)	DINT	●		●	
4	12	MpGenStatus01	MpGenStatus02	Status word	UINT	●		●	
6		InputStatus		Digital input status	USINT	●		●	
42		UZKVoltage		DC bus voltage	UINT			●	
44		CoolerTemperature		Temperature of the power output stage	SINT			●	
46		Temperature		Temperature	SINT			●	
48	112	ConfigOutput03a	ConfigOutput06a	Holding current	USINT				●
49	113	ConfigOutput04a	ConfigOutput07a	Nominal current	USINT				●
50	114	ConfigOutput05a	ConfigOutput08a	Maximum current	USINT				●
52	116	MaxSpeed01pos	MaxSpeed02pos	Maximum speed	UINT				●
54	118	MaxAcc01	MaxAcc02	Maximum acceleration	UINT				●
56	120	MaxDec01	MaxDec02	Maximum deceleration	UINT				●
58	122	RevLoop01	RevLoop02	Reversing loop	INT				●
60	124	FixedPos01a	FixedPos02a	Fixed position A	DINT				●
64	128	FixedPos01b	FixedPos02b	Fixed position B	DINT				●
68	132	RefSpeed01	RefSpeed02	Homing speed	UINT				●
70	134	RefConfig01	RefConfig02	Homing configuration	SINT				●
72	136	FullStepThreshold01	FullStepThreshold02	Full step threshold	UINT				●
75	139	JoltTime01	JoltTime02	Jerk time limitation	USINT				●
80	144	ControlReadback01	ControlReadback02	Control word (read back)	UINT			●	
82	146	ModeReadback01	ModeReadback02	Mode (read back)	SINT			●	
84	148	Motoridentification01	Motoridentification02	Motor identification	UINT			●	
86	150	RefPos01CyclicCounter	RefPos02CyclicCounter	Homed zero position for cyclic counter	DINT			●	
98	162	ErrorCode01	ErrorCode02	Error code	UINT			●	
208		GeneralConfig01		General configuration	USINT				●
209	210	LimitSwitchConfig01	LimitSwitchConfig02	Limit switch configuration	USINT				●
211		BrakeConfig01		Configuration of the brake output	USINT				●
212	216	PositionLimitMin01	PositionLimitMin02	Minimum software limit	DINT				●
220	224	PositionLimitMax01	PositionLimitMax02	Maximum software limit	DINT				●
Incremental encoders									
76	140	TempEncLimit01	TempEncLimit02	Encoder temperature limit	SINT				●
90	154	AbsPos1ActValAcyclic	AbsPos2ActValAcyclic	Current position (acyclic)	DINT			●	
94	158	RefPos01AcyclicCounter	RefPos02AcyclicCounter	Homed zero position for acyclic counter	DINT			●	
100	164	TempEnc01	TempEnc02	Encoder temperature	SINT			●	

Table 199: 80SD100XD.C044-01, 80SD100XD.W044-01 - Register in function model "Ramp"

DT Data type of the register
Cycl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.5.1.4 80SD100XD.C04X-13 - Register in function model "Ramp"

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	8	AbsPos01	AbsPos02	Target position / Speed	DINT		●		
4	12	MpGenControl01	MpGenControl02	Control word	UINT		●		
6	14	MpGenMode01	MpGenMode02	Mode	SINT		●		
7	15			**Control of motor brakes**	USINT		●		
		MpGenBrake01	MpGenBrake02	Bit 0: Motor brake	BOOL				
0	8	AbsPos01ActVal	AbsPos02ActVal	Current position (cyclic)	DINT	●		●	
4	12	MpGenStatus01	MpGenStatus02	Status word	UINT	●		●	
6		InputStatus		Digital input status	USINT	●		●	
42		UZKVoltage		DC bus voltage	UINT			●	
44		CoolerTemperature		Temperature of the power output stage	SINT			●	
46		Temperature		Temperature	SINT			●	
48	112	ConfigOutput03a	ConfigOutput06a	Holding current	USINT				●
49	113	ConfigOutput04a	ConfigOutput07a	Nominal current	USINT				●
50	114	ConfigOutput05a	ConfigOutput08a	Maximum current	USINT				●
52	116	MaxSpeed01pos	MaxSpeed02pos	Maximum speed	UINT				●
54	118	MaxAcc01	MaxAcc02	Maximum acceleration	UINT				●
56	120	MaxDec01	MaxDec02	Maximum deceleration	UINT				●
58	122	RevLoop01	RevLoop02	Reversing loop	INT				●
60	124	FixedPos01a	FixedPos02a	Fixed position A	DINT				●
64	128	FixedPos01b	FixedPos02b	Fixed position B	DINT				●
68	132	RefSpeed01	RefSpeed02	Homing speed	UINT				●
70	134	RefConfig01	RefConfig02	Homing configuration	SINT				●
72	136	FullStepThreshold01	FullStepThreshold02	Full step threshold	UINT				●
75	139	JoltTime01	JoltTime02	Jerk time limitation	USINT				●
80	144	ControlReadback01	ControlReadback02	Control word (read back)	UINT			●	
82	146	ModeReadback01	ModeReadback02	Mode (read back)	SINT			●	
84	148	Motoridentification01	Motoridentification02	Motor identification	UINT			●	
86	150	RefPos01CyclicCounter	RefPos02CyclicCounter	Homed zero position for cyclic counter	DINT			●	
98	162	ErrorCode01	ErrorCode02	Error code	UINT			●	
208		GeneralConfig01		General configuration	USINT				●
209	210	LimitSwitchConfig01	LimitSwitchConfig02	Limit switch configuration	USINT				●
211		BrakeConfig01		Configuration of the brake output	USINT				●
212	216	PositionLimitMin01	PositionLimitMin02	Minimum software limit	DINT				●
220	224	PositionLimitMax01	PositionLimitMax02	Maximum software limit	DINT				●
Incremental encoders									
76		TempEncLimit01		Encoder temperature limit	SINT				●
90		AbsPos1ActValAcyclic	AbsPos2ActValAcyclic	Current position (acyclic)	DINT			●	
94		RefPos01AcyclicCounter		Homed zero position for acyclic counter	DINT			●	
100		TempEnc01		Encoder temperature	SINT			●	
Additional digital inputs/outputs									
16		Counter01		Counter	INT	●			
18		CounterLatched01		Counter latch	INT	●			
20		Digital_in_do_rb		Status of digital inputs and outputs	USINT	●		●	
32 (16)		OptionsBoardControl		Sets counter control registers, digital outputs	USINT		●		
200		ConfigOutput12		Counter configuration	UINT				●

Table 200: 80SD100XD.C04X-13 - Register in function model "Ramp"

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register
(x) Some registers in function model CANIOBusController fall within a different range (see values in parentheses).

7.5.1.5 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Register in function model "Ramp"

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	8	AbsPos01	AbsPos02	Target position / Speed	DINT		●		
4	12	MpGenControl01	MpGenControl02	Control word	UINT		●		
6	14	MpGenMode01	MpGenMode02	Mode	SINT		●		
7	15			**Control of motor brakes**	USINT		●		
		MpGenBrake01	MpGenBrake02	Bit 0: Motor brake	BOOL				
0	8	AbsPos01ActVal	AbsPos02ActVal	Current position (cyclic)	DINT	●		●	
4	12	MpGenStatus01	MpGenStatus02	Status word	UINT	●		●	
6		InputStatus		Digital input status	USINT	●		●	
42		UZKVoltage		DC bus voltage	UINT			●	
44		CoolerTemperature		Temperature of the power output stage	SINT			●	
46		Temperature		Temperature	SINT			●	
48	112	ConfigOutput03a	ConfigOutput06a	Holding current	USINT				●
49	113	ConfigOutput04a	ConfigOutput07a	Nominal current	USINT				●
50	114	ConfigOutput05a	ConfigOutput08a	Maximum current	USINT				●
52	116	MaxSpeed01pos	MaxSpeed02pos	Maximum speed	UINT				●
54	118	MaxAcc01	MaxAcc02	Maximum acceleration	UINT				●
56	120	MaxDec01	MaxDec02	Maximum deceleration	UINT				●
58	122	RevLoop01	RevLoop02	Reversing loop	INT				●
60	124	FixedPos01a	FixedPos02a	Fixed position A	DINT				●
64	128	FixedPos01b	FixedPos02b	Fixed position B	DINT				●
68	132	RefSpeed01	RefSpeed02	Homing speed	UINT				●
70	134	RefConfig01	RefConfig02	Homing configuration	SINT				●
72	136	FullStepThreshold01	FullStepThreshold02	Full step threshold	UINT				●
75	139	JoltTime01	JoltTime02	Jerk time limitation	USINT				●
80	144	ControlReadback01	ControlReadback02	Control word (read back)	UINT			●	
82	146	ModeReadback01	ModeReadback02	Mode (read back)	SINT			●	
84	148	Motoridentification01	Motoridentification02	Motor identification	UINT			●	
86	150	RefPos01CyclicCounter	RefPos02CyclicCounter	Homed zero position for cyclic counter	DINT			●	
98	162	ErrorCode01	ErrorCode02	Error code	UINT			●	
208		GeneralConfig01		General configuration	USINT				●
209	210	LimitSwitchConfig01	LimitSwitchConfig02	Limit switch configuration	USINT				●
211		BrakeConfig01		Configuration of the brake output	USINT				●
212	216	PositionLimitMin01	PositionLimitMin02	Minimum software limit	DINT				●
220	224	PositionLimitMax01	PositionLimitMax02	Maximum software limit	DINT				●

Table 201: 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Register in function model "Ramp"

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.5.1.6 80SD100XD.C0XX-21 - Register in function model "Ramp"

Register (dec.)		Name				Cycl.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
0	8	AbsPos01	AbsPos02	Target position / Speed	DINT		•		
4	12	MpGenControl01	MpGenControl02	Control word	UINT		•		
6	14	MpGenMode01	MpGenMode02	Mode	SINT		•		
7	15			**Control of motor brakes**	USINT		•		
		MpGenBrake01	MpGenBrake02	Bit 0: Motor brake	BOOL				
0	8	AbsPos01ActVal	AbsPos02ActVal	Current position (cyclic)	DINT	•		•	
4	12	MpGenStatus01	MpGenStatus02	Status word	UINT	•		•	
6		InputStatus		Digital input status	USINT	•		•	
42		UZKVoltage		DC bus voltage	UINT			•	
44		CoolerTemperature		Temperature of the power output stage	SINT			•	
46		Temperature		Temperature	SINT			•	
48	112	ConfigOutput03a	ConfigOutput06a	Holding current	USINT				•
49	113	ConfigOutput04a	ConfigOutput07a	Nominal current	USINT				•
50	114	ConfigOutput05a	ConfigOutput08a	Maximum current	USINT				•
52	116	MaxSpeed01pos	MaxSpeed02pos	Maximum speed	UINT				•
54	118	MaxAcc01	MaxAcc02	Maximum acceleration	UINT				•
56	120	MaxDec01	MaxDec02	Maximum deceleration	UINT				•
58	122	RevLoop01	RevLoop02	Reversing loop	INT				•
60	124	FixedPos01a	FixedPos02a	Fixed position A	DINT				•
64	128	FixedPos01b	FixedPos02b	Fixed position B	DINT				•
68	132	RefSpeed01	RefSpeed02	Homing speed	UINT				•
70	134	RefConfig01	RefConfig02	Homing configuration	SINT				•
72	136	FullStepThreshold01	FullStepThreshold02	Full step threshold	UINT				•
75	139	JoltTime01	JoltTime02	Jerk time limitation	USINT				•
80	144	ControlReadback01	ControlReadback02	Control word (read back)	UINT			•	
82	146	ModeReadback01	ModeReadback02	Mode (read back)	SINT			•	
84	148	Motoridentification01	Motoridentification02	Motor identification	UINT			•	
86	150	RefPos01CyclicCounter	RefPos02CyclicCounter	Homed zero position for cyclic counter	DINT			•	
98	162	ErrorCode01	ErrorCode02	Error code	UINT			•	
208		GeneralConfig01		General configuration	USINT				•
209	210	LimitSwitchConfig01	LimitSwitchConfig02	Limit switch configuration	USINT				•
211		BrakeConfig01		Configuration of the brake output	USINT				•
212	216	PositionLimitMin01	PositionLimitMin02	Minimum software limit	DINT				•
220	224	PositionLimitMax01	PositionLimitMax02	Maximum software limit	DINT				•
Additional analog inputs									
1409 (16)				**Status of the analog inputs**	USINT	•			
		AnalogInput01OK		Bit 0: Status of analog input 1	BOOL				
		AnalogInput02OK		Bit 1: Status of analog input 2	BOOL				
1414 (18)		AnalogInput01		Analog input 1	INT	•			
1418 (20)		AnalogInput02		Analog input 2	INT	•			
Trace register									
1039 (-)	1167 (-)			**Trace control word**	USINT		•		
		TraceEnable01	TraceEnable02	Bit 0: Enables/Disables the trace function	BOOL				
1091 (-)	1219 (-)			**Trace status information**	USINT	•			
		TraceEnabled01	TraceEnabled02	Bit 0: Trace function enabled/disabled	BOOL				
		TraceWriteActive01	TraceWriteActive02	Bit 2: Trace data recording active/inactive	BOOL				
		TraceReadActive01	TraceReadActive02	Bit 3: Trace data reading active/inactive	BOOL				
		ReadyForTrigger01	ReadyForTrigger02	Bit 4: Trigger readiness	BOOL				
		TriggerActive01	TriggerActive02	Bit 5: Trigger active/inactive	BOOL				
		TraceOK01	TraceOK02	Bit 6: Trace OK	BOOL				
		TraceError01	TraceError02	Bit 7: Trace error	BOOL				
1094 (-)	1222 (-)	FreeBufferSize01	FreeBufferSize02	Trace buffer status	UINT	•		•	
1098 (-)	1226 (-)	TriggerCount01	TriggerCount02	Number of triggers executed	UINT	•		•	
1102 (-)	1230 (-)	TriggerFailCount01	TriggerFailCount02	Number of failed triggers	UINT	•		•	
1345 (-)				**Trace trigger**	USINT		•		
		TraceTrigger01		Bit 0: Activates trigger for analog input 1	BOOL				
		TraceTrigger02		Bit 1: Activates trigger for analog input 2	BOOL				

Table 202: 80SD100XD.C0XX-21 - Register in function model "Ramp"

DT Data type of the register
Cycl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register
(x) Some registers in function model CANIOBusController fall within a different range (see values in parentheses).
(-) Some registers in function model CANIOBusController are not available and marked as such.

7.5.1.7 80SD100XS.C04X-01 - Register in function model "Ramp"

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	AbsPos01	Target position / Speed	DINT		●		
4	MpGenControl01	Control word	UINT		●		
6	MpGenMode01	Mode	SINT		●		
7		**Control of motor brakes**	USINT		●		
	MpGenBrake01	Bit 0: Motor brake	BOOL				
0	AbsPos01ActVal	Current position (cyclic)	DINT	●		●	
4	MpGenStatus01	Status word	UINT	●		●	
6	InputStatus	Digital input status	USINT	●		●	
42	UZKVoltage	DC bus voltage	UINT			●	
44	CoolerTemperature	Temperature of the power output stage	SINT			●	
46	Temperature	Temperature	SINT			●	
48	ConfigOutput03a	Holding current	USINT				●
49	ConfigOutput04a	Nominal current	USINT				●
50	ConfigOutput05a	Maximum current	USINT				●
52	MaxSpeed01pos	Maximum speed	UINT				●
54	MaxAcc01	Maximum acceleration	UINT				●
56	MaxDec01	Maximum deceleration	UINT				●
58	RevLoop01	Reversing loop	INT				●
60	FixedPos01a	Fixed position A	DINT				●
64	FixedPos01b	Fixed position B	DINT				●
68	RefSpeed01	Homing speed	UINT				●
70	RefConfig01	Homing configuration	SINT				●
72	FullStepThreshold01	Full step threshold	UINT				●
75	JoltTime01	Jerk time limitation	USINT				●
80	ControlReadback01	Control word (read back)	UINT			●	
82	ModeReadback01	Mode (read back)	SINT			●	
84	Motoridentification01	Motor identification	UINT			●	
86	RefPos01CyclicCounter	Homed zero position for cyclic counter	DINT			●	
98	ErrorCode01	Error code	UINT			●	
208	GeneralConfig01	General configuration	USINT				●
209	LimitSwitchConfig01	Limit switch configuration	USINT				●
211	BrakeConfig01	Configuration of the brake output	USINT				●
212	PositionLimitMin01	Minimum software limit	DINT				●
220	PositionLimitMax01	Maximum software limit	DINT				●
Incremental encoders							
76	TempEncLimit01	Encoder temperature limit	SINT				●
90	AbsPos1ActValAcyclic	Current position (acyclic)	DINT			●	
94	RefPos01AcyclicCounter	Homed zero position for acyclic counter	DINT			●	
100	TempEnc01	Encoder temperature	SINT			●	

Table 203: 80SD100XS.C04X-01 - Register in function model "Ramp"

DT Data type of the register
Cycl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.5.1.8 80SD100XS.C04X-13 - Register in function model "Ramp"

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	AbsPos01	Target position / Speed	DINT		●		
4	MpGenControl01	Control word	UINT		●		
6	MpGenMode01	Mode	SINT		●		
7		**Control of motor brakes**	USINT		●		
	MpGenBrake01	Bit 0: Motor brake	BOOL				
0	AbsPos01ActVal	Current position (cyclic)	DINT	●		●	
4	MpGenStatus01	Status word	UINT	●		●	
6	InputStatus	Digital input status	USINT	●		●	
42	UZKVoltage	DC bus voltage	UINT			●	
44	CoolerTemperature	Temperature of the power output stage	SINT			●	
46	Temperature	Temperature	SINT			●	
48	ConfigOutput03a	Holding current	USINT				●
49	ConfigOutput04a	Nominal current	USINT				●
50	ConfigOutput05a	Maximum current	USINT				●
52	MaxSpeed01pos	Maximum speed	UINT				●
54	MaxAcc01	Maximum acceleration	UINT				●
56	MaxDec01	Maximum deceleration	UINT				●
58	RevLoop01	Reversing loop	INT				●
60	FixedPos01a	Fixed position A	DINT				●
64	FixedPos01b	Fixed position B	DINT				●
68	RefSpeed01	Homing speed	UINT				●
70	RefConfig01	Homing configuration	SINT				●
72	FullStepThreshold01	Full step threshold	UINT				●
75	JoltTime01	Jerk time limitation	USINT				●
80	ControlReadback01	Control word (read back)	UINT			●	
82	ModeReadback01	Mode (read back)	SINT			●	
84	Motoridentification01	Motor identification	UINT			●	
86	RefPos01CyclicCounter	Homed zero position for cyclic counter	DINT			●	
98	ErrorCode01	Error code	UINT			●	
208	GeneralConfig01	General configuration	USINT				●
209	LimitSwitchConfig01	Limit switch configuration	USINT				●
211	BrakeConfig01	Configuration of the brake output	USINT				●
212	PositionLimitMin01	Minimum software limit	DINT				●
220	PositionLimitMax01	Maximum software limit	DINT				●
Incremental encoders							
76	TempEncLimit01	Encoder temperature limit	SINT				●
90	AbsPos1ActValAcyclic	Current position (acyclic)	DINT			●	
94	RefPos01AcyclicCounter	Homed zero position for acyclic counter	DINT			●	
100	TempEnc01	Encoder temperature	SINT			●	
Additional digital inputs/outputs							
32 (8)	Counter01	Counter	INT	●			
34 (10)	CounterLatched01	Counter latch	INT	●			
36 (12)	Digital_in_do_rb	Status of digital inputs and outputs	USINT	●		●	
32 (8)	OptionsBoardControl	Sets counter control registers, digital outputs	USINT		●		
200	ConfigOutput12	Counter configuration	UINT				●

Table 204: 80SD100XS.C04X-13 - Register in function model "Ramp"

DT Data type of the register
Cy-cl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register
(x) Some registers in function model CANIOBusController fall within a different range (see values in parentheses).

7.5.1.9 80SD100XS.C0XX-01 - Register in function model "Ramp"

Register (dec.)	Name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	AbsPos01	Target position / Speed	DINT		●		
4	MpGenControl01	Control word	UINT		●		
6	MpGenMode01	Mode	SINT		●		
7		**Control of motor brakes**	USINT		●		
	MpGenBrake01	Bit 0: Motor brake	BOOL				
0	AbsPos01ActVal	Current position (cyclic)	DINT	●		●	
4	MpGenStatus01	Status word	UINT	●		●	
6	InputStatus	Digital input status	USINT	●		●	
42	UZKVoltage	DC bus voltage	UINT			●	
44	CoolerTemperature	Temperature of the power output stage	SINT			●	
46	Temperature	Temperature	SINT			●	
48	ConfigOutput03a	Holding current	USINT				●
49	ConfigOutput04a	Nominal current	USINT				●
50	ConfigOutput05a	Maximum current	USINT				●
52	MaxSpeed01pos	Maximum speed	UINT				●
54	MaxAcc01	Maximum acceleration	UINT				●
56	MaxDec01	Maximum deceleration	UINT				●
58	RevLoop01	Reversing loop	INT				●
60	FixedPos01a	Fixed position A	DINT				●
64	FixedPos01b	Fixed position B	DINT				●
68	RefSpeed01	Homing speed	UINT				●
70	RefConfig01	Homing configuration	SINT				●
72	FullStepThreshold01	Full step threshold	UINT				●
75	JoltTime01	Jerk time limitation	USINT				●
80	ControlReadback01	Control word (read back)	UINT			●	
82	ModeReadback01	Mode (read back)	SINT			●	
84	Motoridentification01	Motor identification	UINT			●	
86	RefPos01CyclicCounter	Homed zero position for cyclic counter	DINT			●	
98	ErrorCode01	Error code	UINT			●	
208	GeneralConfig01	General configuration	USINT				●
209	LimitSwitchConfig01	Limit switch configuration	USINT				●
211	BrakeConfig01	Configuration of the brake output	USINT				●
212	PositionLimitMin01	Minimum software limit	DINT				●
220	PositionLimitMax01	Maximum software limit	DINT				●

Table 205: 80SD100XS.C0XX-01 - Register in function model "Ramp"

DT Data type of the register
Cycl. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.5.2 Register for all ACOPOSmicro

7.5.2.1 Target position / Speed

This synchronous register is used to set the position or speed depending on the operating mode (see section "Mode" on page 329).

- **Position mode:** Cyclic setting of the position setpoint in microsteps.
  In ramp mode, one microstep is always 1/256 of a full step.
- **Speed mode:** Cyclic setting of the speed setpoint (signed value).
  Unit: Microsteps/cycle

7.5.2.2 Current position (cyclic)

This synchronous register contains the current position of the internal position counter in microsteps.

On variants with an encoder, this register can be toggled to the current encoder position (see bit 14 in the "Control word" on page 328 register).

7.5.2.3 General configuration

Bit	Description
0	Extended control word: 0 ... Off 1 ... On Setting this bit enables mode-specific bits in *Control word* and *Status word*. In addition, the behavior of the position mode is changed (see Mode 1: Position mode with extended control word).
1 - 2	Cycle time[1)] of the movement profile generator: 00 ... 25 ms 01 ... 10 ms 10 ... 5 ms 11 ... Reserved The cycle time for the movement profile generator is configured with this *cycle*. This cycle time affects the unit for specifying the speed and acceleration: • Unit for speed: Microsteps/Cycle • Unit for speed: Microsteps/Cycle²
3 - 7	0 ... Reserved

1) Firmware version 100 or later. Older firmware versions have the cycle time for the movement profile generator set fixed to 25 ms.

7.5.2.4 Control word

Depending on the state of the module, commands can be sent using this register (see section "Operating function model "Ramp"" on page 360).

Bit	Description[1)]	
0		Switch on
1		Enable voltage
2		Quick stop
3		Enable operation
4 - 6		Mode-specific[2)]
7		Fault reset
8		Halt[2)] 0 ... Execute positioning 1 ... Stop axis with deceleration
9 - 10		0 ... Reserved (only permitted to be written to with 0)
11		Motor ID trigger[3)] 0 ... No effect 1 ... Rising edge: Starts measurement of the motor ID.

Bit	Description[1]	
12		Warning reset 0 ... No effect. 1 ... Rising edge: Resets any warnings.
13		Undercurrent detection 0 ... Disables current error detection (default). 1 ... Enables current error detection.
14	G	Contents of the *Current position (cyclic/acyclic)* registers: Value: 0 — Register *Current position (cyclic)*: Internal position counter — *Current position (acyclic)* register: Encoder position Value: 1 — Register *Current position (cyclic)*: Encoder position — *Current position (acyclic)* register: Internal position counter Default setting: 0
15		0 ... Reserved

1) Some bits are only available for certain variants:
G ... This bit is only available if there is also an encoder for the respective channel.
2) Mode-specific bit: Mode-specific bits are only available if bit 0 of the *General configuration* register is set.
Mode-specified bits are generally only available in certain modes (see section "Mode" on page 329).

Mode-specific bit 8 is available in all modes.
3) This bit can be used to trigger a measurement of the motor ID (Motor identification register). The application must ensure that the conditions for measurement are fulfilled (see note in section "Motor identification" on page 336).
4) For a description of register *Current position (acyclic)*, see the corresponding encoder section:

- "Registers for incremental encoder" on page 346
- "Registers for HIPERFACE encoders" on page 347
- "Registers for SSI absolute encoders" on page 357

7.5.2.5 Status word

The bits in the *status word* represent the status of the *State machine* (see section "Operating function model "Ramp"" on page 360).

Bit	Description	
0	Ready to switch on	
1	Switched on	
2	Operation enabled	
3	Fault (error bit)	
4	Voltage enabled	
5	Quick stop	
6	Switch on disabled	
7	Warning	
8	Reserved	
9	Remote (always 1 since there is no local mode)	
10	Target reached This bit has one of the following meanings depending on the *mode*[1]: ▪ Position reached ▪ Referencing complete ▪ Speed reached If bit 0 in the *General configuration* register is set, then *Target reached* has the following meaning depending on bit 8 (Stop) in the control word:	
	If Stop = 0	**If Stop = 1**
	0 ... Target position not reached 1 ... Target position reached	0 ... Axis decelerating 1 ... Axis speed = 0
11	Internal limit active 0 ... Current position within software limits. 1 ... Software limit overflow or underflow	
12	Setpoint acknowledge[1] 0 ... Ramp generator did not apply the position value 1 ... Ramp generator applied the position value	
13 - 15	Reserved	

1) Mode-specific bit: Mode-specific bits are only available if bit 0 of the *General configuration* register is set.
The different modes are described in section "Mode" on page 329.

Validity of mode-specific bits

Mode-specific bits can only be used if the extended status word is enabled. These bits are available in the following modes:

Bit	Mode 1: Position mode	All other modes
12	Setpoint acknowledge	-

7.5.2.6 Mode

The operating **mode** determines the behavior of the drive. The following modes are available:

Value (dec.)	Description
0	No mode selected
1	Depending on bit 0 in the *General configuration* register (see page 328), the position mode behaves as follows: • Position mode without extended control word: Move to target position as soon as the target position is changed (see "Mode 1: Position mode without extended control word" on page 330). • "Position mode with extended control word" on page 330: Move to target position as explained in corresponding section "Position mode with extended control word" on page 330.
2	Speed mode: Constant speed
-120	Set home position
-121	Remaining distance mode
-122	Set actual position
-123	Move to target position when external input set
-124	Two-position mode
-125	Move to fixed position A (position set asynchronously)
-126	Move to fixed position B (position set asynchronously)
-127	Positive homing (see also "Homing configuration" on page 336)
-128	Negative homing (see also "Homing configuration" on page 336)

Information:

For all modes: The *Target reached* bit is set in *Status word* when the current action is finished (i.e. when the position or speed is reached, depending on the mode) (see section "Status word" on page 329).

A new position or speed can be specified even before the current action is finished.

7.5.2.6.1 Mode 1: Position mode without extended control word

This section describes the processing of the target position if bit 0 is set to 0 in the *General configuration* register (see page 328).

The target position is specified in the *Target position* register.

The target position from the *Target position* register is applied as soon as it does not equal the current position. Positioning with the new target position is then started. This is done with a ramp function that accounts for the defined maximum speed and acceleration values.

The target position can be changed during an active positioning procedure.

The absolute target position value is valid in the following range:

- -2,147,483,648 to 2,147,483,647 microsteps (1 microstep = 1/256 full step)

7.5.2.6.2 Mode 1: Position mode with extended control word

This section describes the processing of the target position if bit 0 is set to 1 in the *General configuration* register (see page 328).

The target position is specified in the *Target position* register.

The content of the *Target position* register is interpreted in either absolute or relative terms. This is selected in Control word using the *abs / rel* bit before or when starting a new positioning sequence.

If a relative positioning value is selected, then the target position is increased or decreased by this value on each rising edge of *New setpoint*.

If the mode changes between the position settings, relative movement will then proceed starting at the last specified position. The position setpoint mode is initialized with 0 when the module is started.

The positioning mode with extended *control word* behaves similarly to the *positioning mode without extended control word* described earlier. The difference is that the new target position from the *Target position* register is controlled by the following bits:

- *New setpoint* (bit 4 in the extended *control word*)
- *Change set immediately* (bit 5 in the *control word*)
- *abs / rel* (bit 6 in the extended *control word*)
- *Target reached* (bit 10 in *Status word*)
- *Setpoint acknowledge* (bit 12 in the extended *status word*)

7.5.2.6.2.1 Extended control word

The functionality of the *control word* can be extended using the *General configuration* register. Bits 4, 5 and 6 in the extended control word have additional mode-specific functions:

Bit	Description
0 - 3	Corresponds to the default *Control word*, see page 328
4	New setpoint 0 ... Do not apply target position. 1 ... Apply target position.
5	Change set immediately 0 ... Fully complete current positioning movement and then start next positioning movement 1 ... Interrupt current positioning movement and then start next positioning movement
6	abs / rel
7 - 15	Corresponds to the default *Control word*, see page 328

7.5.2.6.2.2 Extended status word

The functionality of the *status word* can be extended using the *General configuration* register. Bit 12 has an additional function in the extended status word:

Bit	Description
1 - 11	Corresponds to the default *Status word*, see page 329.
12	Setpoint acknowledge 0 ... Ramp generator did not apply the position value 1 ... Ramp generator applied the position value
13 - 15	Corresponds to the default *Status word*, see page 329.

7.5.2.6.2.3 Position setting

There are basically two ways of specifying the target position:

- **Single setpoint**
  Once the target position is reached, the drive sets the *Target reached* bit in the *Status word* register. A new target position is then specified. When the respective target position is reached, the speed is reduced to 0 before a new positioning sequence is started.
- **Set of setpoints**
  A new target position can be set while a positioning sequence is ongoing. This new target position is temporarily saved to a buffer until the target position for the ongoing positioning sequence has been reached. Movement towards the next target position then begins immediately.

The two ways of specifying the position result from the timing of the *New setpoint*, *Change set immediately* and *Setpoint acknowledge* bits. This bits can be used to implement a mechanism that allows an additional target position to be set up while the previous positioning sequence is still running.

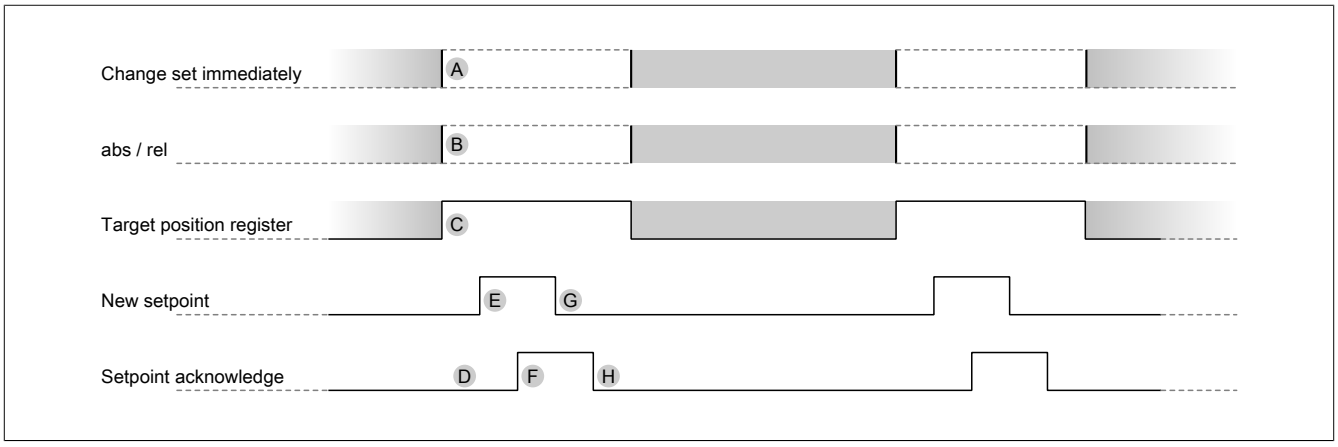
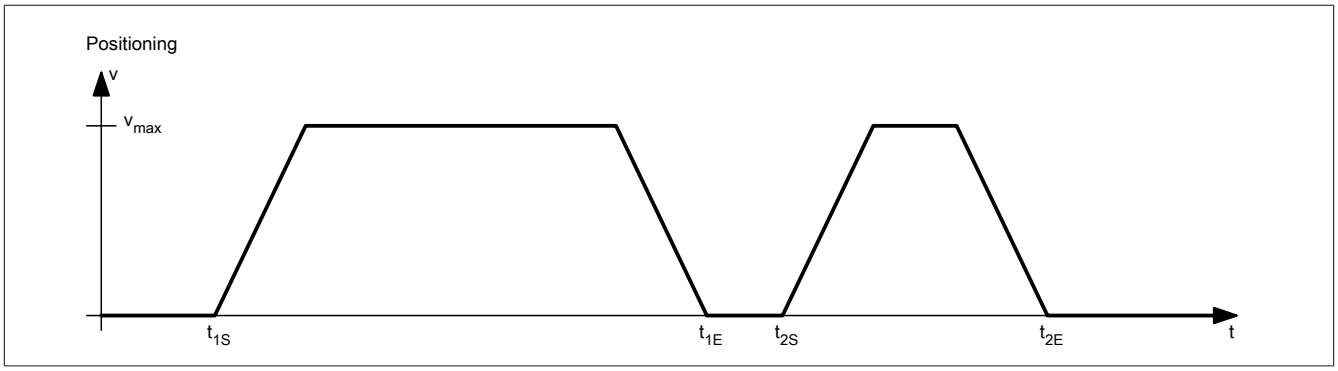


Figure 53: Specifying the target position

A The *Change set immediately* bit must take on a defined state and is usually set to 0. This bit is used to cancel and overwrite an ongoing positioning sequence.
B The *abs / rel* bit selects whether the position is specified absolutely or relatively.
C The new target position is set in the *Target position* register.
D Before a new position can be specified, *Setpoint acknowledge* must equal 0. The indicates that the drive is ready to process a new specified position.
E Setting *New setpoint* to 1 instructs the drive to apply the value in the *Target position* register as the new target position.
F The drive applies the value from register *Target position* to the buffer, starts positioning if necessary and reports that the specified position is applied by setting *Setpoint acknowledge* to 1.
G The application must then set *New setpoint* back to 0.
H If *Setpoint acknowledge* is also set by the drive to 0, it is again ready to take on a new target position.

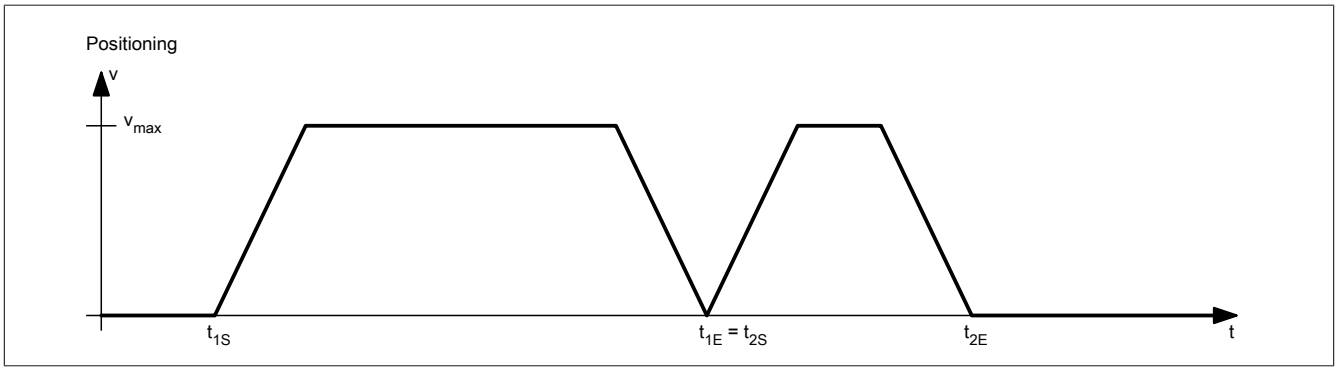
7.5.2.6.2.4 Examples of position specifications

"Single setpoint" and *Change set immediately* = 0



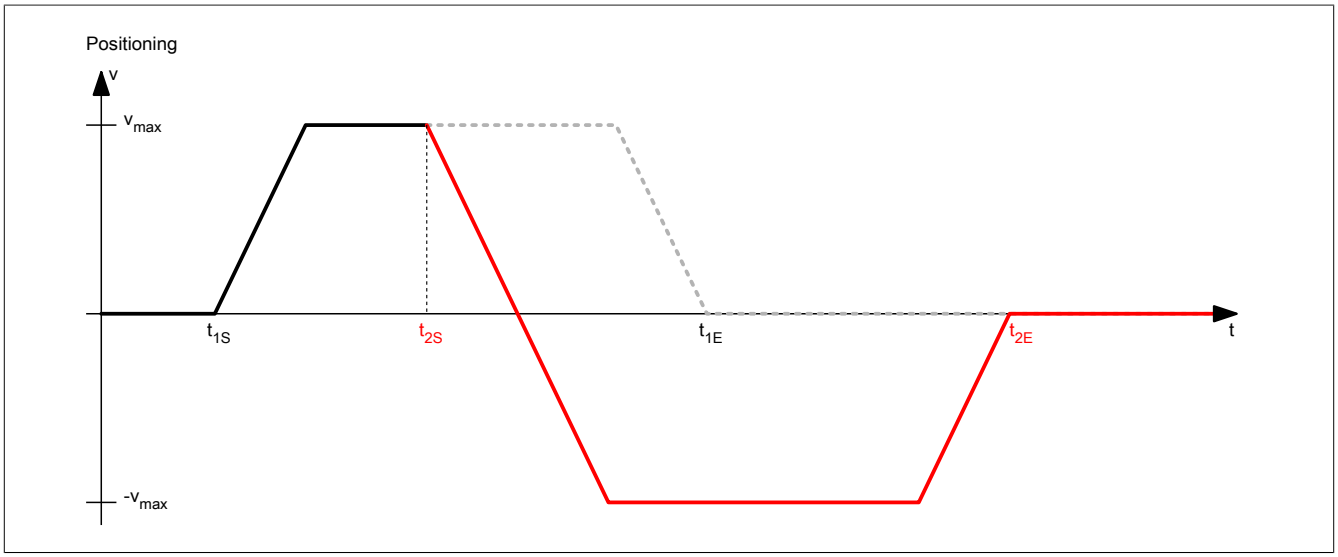
Two target positions are specified in this example. The application only specifies the second position after the first positioning sequence is completed (*Target reached* = 1).

"Set of setpoints" and *Change set immediately* = 0



Two target positions are specified in this example. The application specifies the second position before the first positioning sequence is fully completed. In this case, the second positioning sequence begins immediately after the first.

Usage of *Change set immediately* = 1



If a second positioning sequence is specified while the first positioning sequence is still ongoing – where the *Change set immediately* bit is set to 1 – then the new target position is applied immediately for the ongoing positioning sequence, with the positioning sequence being adjusted accordingly. All target positions specified beforehand are discarded. In this example, this results in the immediate deceleration of the motor since a change in direction has been initiated.

7.5.2.6.3 Mode 2: Speed mode - Constant speed (pos./neg.)

The value in register *Target position / Speed* is now interpreted as the speed setpoint (Microsteps/cycle).

Observing the maximum permissible acceleration, the motor moves with a ramp to the desired speed setpoint and maintains this speed until a new speed setpoint is specified.

Values are allowed within the range -65535 to 65535. When a value is entered outside of this range, it is readjusted to these limits.

7.5.2.6.4 Mode -120: Sets the home position[4)]

The current actual position is changed so that the position specified in register *Target position* is the home position. If you then move to this position, the motor is at the home position.

The home position of the internal position counter in register *Referenced home position* is also set to this value.

Before this mode is called, the motor must be at a standstill and.the home position must have been determined using one of the *Positive/Negative homing* modes. In order to set the position, the *State machine* must be in the "Operation enable" state.

7.5.2.6.5 Mode -121: Remaining distance mode (like mode 1)

On a rising/falling edge of the corresponding digital input, the number of steps set in register "Fixed position A" are added to the current position, and movement towards the resulting position takes place.

> **Note:**
>
> **Steps are not added to the target position, but rather to the current position at the moment the trigger occurs.**

Negative values are also allowed for the offset defined in "Fixed position A".

New position setpoints are no longer accepted in the "Target position / Speed" register after the trigger event. There must first be a switch made to mode 0 and then back to mode -121.

The *Target reached* bit in the *Status word* register is not set to 1 until the end position (after the trigger event) has been reached.

The reversing loop is not enabled in this mode (i.e. any configured values not equal to 0 are ignored).

The *Homing configuration* (see page 336) determines whether a rising or falling edge of the digital input is used as the trigger.

7.5.2.6.6 Mode -122: Set actual position

The target position set in the *Target position / Speed* register is accepted as the current actual position if the State machine is in the "Operation enable" state.

Before this mode is started, the motor must be at a standstill and physically located at the point for which the position being set should be applied.

7.5.2.6.7 Mode -123: Move to the target position when the external input is set

Movement takes place towards the position setpoint configured in the *Target position / Speed* register when a rising edge occurs on the corresponding digital input.

A new position setpoint is not accepted until another edge occurs on the corresponding digital input. This can also occur during the active positioning procedure and will be applied immediately.

7.5.2.6.8 Mode -124: Two-position mode

The positions *Fixed position A* and *Fixed position B* are defined in the asynchronous registers. 1 on the corresponding digital input moves towards *Fixed position A*; 0 moves towards *Fixed position B*.

Switching is possible during an active positioning procedure.

7.5.2.6.9 Mode -125/-126: Move to fixed position A/B

These modes are used to move towards a preconfigured fixed position on the following asynchronous registers:

4) Firmware version 100 and later.

- Mode -125: *Fixed position A*
- Mode -126: *Fixed position B*

7.5.2.6.10 Mode -127/-128: Positive/Negative homing

Mode -127 and -128 are used to select which direction to move.

The motor must be at a standstill before switching from another mode to one of the homing modes.

If the referencing condition occurs, then the motor stops and the values of the position counters valid at the moment when the referencing condition occurs are written to the *Referenced zero position* register. Which condition should be used for referencing must be configured in the *Homing configuration*.

Homing via digital input

Case 1: Active referencing level not yet reached → Motor not yet at end position:

Movement continues at homing speed in the homing direction until the active level for "Stop referencing" is on the input.

Case 2: Active referencing level already reached → Motor at end position:

Movement continues at the referencing speed against the referencing direction until the active level for "Stop referencing" is no longer on the input. Then, movement continues at the referencing speed in the referencing direction until the active level for "Stop referencing" is at the input again.

Unconditional referencing (immediate)

Immediate referencing:

- The current values for the position counter and encoder position are applied immediately to the *Referenced zero position* register.
- The motor does not move.

7.5.2.7 Motor brake

Bit	Description
0	Controls "24 VDC brake output" 0 ... Brake output not set. This means the holding brake is blocked (closed). 1 ... Brake output set. This means that the holding brake is released (open).
1-7	0 ... Reserved

The *Motor break* register controls the module's brake output (X2/6: 24 VDC brake output).

On 2-channel variants, bit 0 of the two registers *Motor brake 1/2* are linked with an OR operator. This means that the brake output is set if the bit is set for one or both motors.

7.5.2.8 Digital input status

This register indicates the logical states of digital inputs.

Bit	Description
0	Digital input 1 (X2 connection, pin 1)
1	Digital input 2 (X2 connection, pin 3)
2-7	0 ... Reserved

Depending on the ACOPOSmicro variant, these digital inputs are used as a trigger input.

7.5.2.9 U_{DC} DC bus voltage

This register contains the current supply voltage of the power unit (DC bus voltage).

Unit: V

7.5.2.10 Temperature of the power output stage

This register contains the current temperature of the power output stage.

Unit: °C

7.5.2.11 Temperature

This register contains the current module temperature.

Unit: °C

7.5.2.12 Holding current, nominal current, maximum current

The holding current, nominal current and maximum current registers are used to configure the desired motor current. The value set here corresponds to the amplitude of the motor current.

- Unit: Percent of the module's nominal current (100% is equal to 10 A)

As expected:

- Holding current < Nominal current < Maximum current

The motor's nominal current is entered in the nominal current register according to the motor's data sheet.

Register	Description
Holding current	The holding current should be selected in situations when less torque is required (e.g. at a standstill). This reduces the heating of the motor.
Nominal current	Current during "normal operation". A current setting of at least 15% of the module's nominal current (10 A) is recommended for the nominal current register due to the lower relative inaccuracy at higher currents.
Maximum current	Maximum current should be selected if a higher motor torque is required during acceleration phases (short-term).

When the current changes to a weaker value (e.g. when transitioning from the acceleration phase to the constant speed mode), the stronger current is maintained for an additional 100 ms. The following priority applies regardless of the values actually set: maximum current before nominal current before holding current.

7.5.2.13 Maximum speed

Maximum speed for the absolute positioning modes (1, -123, -124, -125, -126).

Does not apply to the speed and referencing modes (2, -127, -128).

Unit: Microsteps/cycle

7.5.2.14 Maximum acceleration

Maximum acceleration (also applies to referencing modes).

Unit: Microsteps/cycle²

7.5.2.15 Maximum deceleration

Maximum deceleration (also applies to referencing modes).

Unit: Microsteps/cycle²

7.5.2.16 Reversing loop

This parameter is only used in modes 1, -123, -124, -125 and -126 (absolute positioning modes).

If the value for the reversing loop is not 0, then one of the following actions is performed:

- The target position will be approached from the one direction.
- Coming from the other direction, the target position will initially be passed by the configured number of steps and then approached from the opposite direction.

This ensures that the target position is always approached from the same direction (to avoid mechanical backlash).

The sign of the defined value determines the direction in which the reversing loop runs.

7.5.2.17 Fixed position A

Position to move to in modes -124 (when the digital input is set to 1) and -125.

7.5.2.18 Fixed position B

Position to move to in modes -124 (when 0 is set at the digital input) and -126.

7.5.2.19 Homing speed

Speed for referencing modes (-127 and -128).

Unit: Microsteps/cycle

7.5.2.20 Homing configuration

Value (dec.)	Description
-121	Referencing on positive edge of the digital input[1)]
-122	Referencing on negative edge of the digital input[1)]
-123	Referencing on positive edge of the R input[2)]
-124	Referencing on negative edge of the R input[2)]
-125	Referencing on positive edge of the digital input[3)]
-126	Referencing on negative edge of the digital input[3)]
-127	Reserved
-128	Immediate referencing
All others	Reserved

1) For motor 1: Digital input 2 (connector X2, pin 3)
For motor 2: Digital input 1 (connector X2, pin 1)
2) The two modes -123 and -124 are only available for variants with an incremental encoder.
3) For motor 1: Digital input 1 (connector X2, pin 1)
For motor 2: Digital input 2 (connector X2, pin 3)

7.5.2.21 Full step threshold

This register configures angular velocity (unit: Microsteps/cycle). When this defined speed has been reached, the drive will automatically change from microsteps to full step mode. This makes it possible to optimize torque at higher speeds, while microstep mode ensures optimal radial runout at lower speeds.

The value 65,535 causes full step mode to be deactivated and the motor to always be run in microstep mode.

Example

A configured value of 3,200 microsteps per 25 ms is equal to 128,000 microsteps per second. In the ramp function model, one full step consists of 256 micro steps, so that the configured value is equal to 500 full steps per second. On a motor with 200 steps per revolution this corresponds to the following speed:

$$T^{-1} = \frac{500\ \text{Steps/second}}{200\ \text{Steps/revolution}} = 2.5 \cdot \frac{\text{Revolutions}}{\text{Second}} = 150\ \text{Min}^{-1}$$

7.5.2.22 Jerk time limitation

If a value other than 0 is assigned to this register, then jerk time limiting takes place by averaging the values for the steps to be carried out (speed setpoint) in each cycle using FIFO memory. The value of this register corresponds to the number of FIFO elements (0 to 80[5)]). If a value greater than 80 is entered, then it will be limited internally to 80.

Changes made while the motor is running are applied under one of the following conditions:

- The motor has reached the configured position (only in positioning modes).
- The motor has stopped (all modes).

7.5.2.23 Control word (read back)

Reads back the register Control word register (see page 328).

7.5.2.24 Mode (read back)

Reads back the register Mode register (see page 329).

7.5.2.25 Motor identification

This register is used to identify the connected motor types (for service purposes) and to differentiate between the motor types in the application.

Following measurement, this register contains the time [µs] needed to apply a current increase of ΔI = 1 A to a motor winding. This time depends on several factors:

- The amplitude of operating voltage (DC bus voltage)
- The inductance and resistance of the motor winding

5) Firmware version 100 and later. Older firmware versions can only use max. 16 FIFO elements.

Notes	
1)	To achieve reproducible results, the measurement must be made under the following defined conditions: a) Motor is at standstill. b) The motor must be in a half-step position (phase A fully powered, phase B not powered). This means the internal position counter on the SM1436 (see section "Current position (cyclic)" on page 328) must correspond to a value that fulfills the following conditions: ▪ Full steps are divisible by 4. ▪ Microsteps = 0
2)	Condition 1b is present after the ACOPOSmicro is reset or turned on. Immediately after the holding current is applied to the motor for the first time (at standstill), the duration for applying the current is measured. This is a suitable time to read the motor identification register into the application.
3)	A current setting of at least 15% of the module's nominal current (10 A) is recommended for the nominal current register (see section "Holding current, nominal current, maximum current" on page 335) as the operating range for determining the motor ID due to the lower relative inaccuracy at higher currents.

Range of values for the motor identification register

Measured values (motor identification register)	Description
0	No motor identifier available (after turning on for as long as the measurement conditions are not met)
1 ... 32767	Valid range of values for the *Motor identification* register (in µs):
65504 ... 65519	Ground fault: Motor identification not possible
65528	*Motor ID trigger* not possible Possible causes: • Motor not supplied with current • Motor in movement • Nominal current set to 0 A • Ground fault • Enable input = 0 • DC bus voltage too low
65529	Invalid value: *Underflow*.
65530	Overtemperature: Measurement not possible.
65531	Overcurrent: Measurement not possible.
65532	Open circuit: Measurement not possible.
65533	Incorrect motor position: Measurement not possible.
65534	Invalid value: *Overflow*.
65535	Measurement in progress.

Ground fault detection

When the motor is powered on, a ground fault check is performed before motor identification. Error numbers are output in the motor identification register for the event of a ground fault error (see values 65504 to 65519 in the table above).

7.5.2.26 Homed zero position for cyclic counter

After a referencing procedure, the reference point of the internal step counter can be read back here.

In ACOPOSmicro variants where an encoder can also be connected to the motor, this register can be switched to the ABR counter (see bit 14 in the register "Control word" on page 328).

7.5.2.27 Error code

The cause of an error or warning can be read here:

Error code	Error type	Description
0x0000	-	No error
0xFF02	Error	Module not enabled (enable input=0)
0x3210	Error	Overvoltage on the DC bus
0x3100	Error	Module power supply voltage
0x4200	Error	Overtemperature
0xFF13	Error	Overtemperature encoder (only with ACOPOSmicro with incremental encoder)
0xFF20	Warning	Negative limit switch reached
0xFF21	Warning	Positive limit switch reached
0x2300	Warning	Overcurrent
0x3220	Error	Undervoltage on the DC bus
0xFF00	Warning	Undercurrent[1)]
0xFF10	Warning	Encoder power supply[2)]
0xFF11	Warning	Encoder open circuit[2)]

1) Undercurrent is only detected if bit 13 = 1 in the control word (undercurrent detection enabled).
2) Encoder error messages can only occur if the ACOPOSmicro variant is equipped with an encoder component.

7.5.2.28 Limit switch configuration 1/2

These two registers configure the two digital inputs 1 and 2 as negative or positive limit switches:

Bit	Description
0 - 1	Negative limit switch 00 ... Switched off 01 ... Active, if low 10 ... Reserved 11 ... Active, if high
2 - 3	Positive limit switch 00 ... Switched off 01 ... Active, if low 10 ... Reserved 11 ... Active, if high
4 - 6	0 ... Reserved
7	Direction monitoring 0 ... Off (default) 1 ... On

Negative/Positive limit switch:

When one of the limit switches is reached, a warning is triggered and the speed is decelerated to 0. There is no state change of "Device control state machine". This keeps current flowing to the motor.

The error that occurred can be read from the Error code register. Normal operation can be resumed by acknowledging the warning. This will not restrict motor movement to a specific direction and the limit switch will not be triggered until the next active edge.

Exceeding the limit switch while braking:

The limit switches are not linked with the corresponding direction of movement. If the limit switch is exceeded, another error will be triggered when reversing after acknowledging the initial error.

Direction control:

By default, limit switches are not tied to the corresponding direction of movement. If this function is enabled, then the two limit switches will be linked with the respective direction of movement. This means that the negative limit switch is only triggered in the negative and the positive limit switch only in the positive direction of movement (specified direction). This prevents specifying a movement in the wrong direction when direction monitoring is enabled and limit switches are active.

Warning!

If the motor is wired incorrectly with this configuration (wrong direction of movement), then the limit switch will not be triggered and the actual correct direction of movement will be denied. This will also be the case when the limit switch connections are reversed.

7.5.2.29 Configuration of the brake output

The brake output (X2/6: 24 VDC brake output) of the module can be configured with this register:

Bit	Description
0 - 1	Configuration of the brake output: 00 ... The brake output works as a digital output and is controlled exclusively using the *Motor brake* register. 01 ... Brake output for motor 1 10 ... Brake output for motor 2 11 ... Reserved
2 - 7	0 ... Reserved

If the brake output is configured as a motor brake for motor X, then the following errors from motor X cause the brake to be blocked (brake output set to 0):

- Overtemperature
- Overvoltage or undervoltage on DC bus
- Ground fault detected
- Module not enabled (enable input = 0)
  See section "X2 - Power supply for the CPU and digital inputs/outputs".

In the event of error, the motor is immediately shut down to protect the module from damage. For this reason, the brake output is immediately set to 0 (brake blocked).

If the *Motor brake* register is set to FALSE, the brake is blocked even if there is not a motor error.

7.5.2.30 Minimum/Maximum software limit

This register configures software limits. The function is enabled if at least one of the two registers is not equal to zero.

These limits are effective in all positioning modes. Position overflow of the position specification is not possible when this function is enabled. Movement is always contained within the two limits.

If a position is specified that exceeds the minimum/maximum software limit, the Internal limit active bit will be set in the "Status word" register. The motor movement will be stopped until a position is specified within the limits.

The "Internal limit active" bit will also be set in the "Status" register if incorrectly configured there is a configuration error (minimum > maximum).

Note:

Asynchronous DINT (32-bit) values are possible for the following old CANopen bus controllers:

- **X20BC0043**
- **X67BC4321**
- **X67BC4321-1**
- **X67BC4321.L08-1**

The following new bus controllers are needed for this:

- **X20BC0043-10**
- **X20BC0143-10**
- **X67BC4321-10**
- **X67BC4321.L08-10**
- **X67BC4321.L12-10**

7.5.3 Register for additional digital inputs/outputs

7.5.3.1 Counter

This register contains the current counter state. Different counters (event counter, ABR counter, etc.) are available depending on the configuration.

7.5.3.2 Counter latch

The counter is applied to this register when a latch event occurs (see counter mode in "Counter configuration" on page 341).

7.5.3.3 Status of digital inputs and outputs

Bit	Description		
0	Status of digital input 1	A	Counter input 1
1	Status of digital input 2	B	
2	Status of digital input 3	R	External counter frequency for counter input 1
3	Status of digital input 4		Reference enable input
4	Status of digital output 1		
5	Status of digital output 2		
6	Overflow of counter 1 (only valid if gate or period measurement is set in the counter configuration with bits 3 - 6): 0 ... Counter value within the counting range (0 to $7FFF) This value is only valid if bit 0 of the counter control register is set. 1 ... Counter overflow This bit is reset with bit 0 of the counter control register.		
7	LatchDone: Changes its state each time the counter state is successfully latched (reset value = 0)		

7.5.3.4 Set digital outputs, configure and control counters

Bit	Description
0	0 ... Disable detection of counter overflow and resets the overflow bit of counter 1 1 ... Enable detection of counter overflow
1	0 ... Reserved
2	Referencing (only applies in AB(R) mode, see bits 8 and 9 in the counter configuration): 0 ... Disable referencing 1 ... Enable referencing
3	0 ... Reset the counter (to zero) 1 ... Start the counter **Note:** Only set after the counter configuration is completed!
4-5	0 ... Reserved
6	Set digital output 1
7	Set digital output 2

7.5.3.5 Counter configuration

Bit	Description
0 - 1	Counter frequency (only valid if set in gate or period measurement): 00 ... Internal counter frequency 4 MHz 01 ... Internal counter frequency 3125 kHz 10 ... External counter frequency (digital input 3) 11 ... Reserved
2	0 ... Reserved
3 - 6	Counter mode: 0000 ... No counter 0001 ... Event counter, positive edge 0010 ... Event counter, negative edge 0011 ... Event counter, both edges 0100 ... Period measurement between two consecutive negative edges 0101 ... Period measurement between two consecutive positive edges 0110 ... Gate measurement of the LOW level 0111 ... Gate measurement of the HIGH level 1000 ... AB counter without referencing 1001 ... ABR counter with referencing Counter set to zero on positive edge of R 1010 ... ABR counter with referencing Counter set to zero on negative edge of R 1011 ... ABR counter with immediate referencing Counter set to zero on positive edge of bit 2 of the counter control register 1100 ... AB counter without referencing 1101 ... ABR counter with referencing Counter state applied to the counter latch register on positive edge of R 1110 ... ABR counter with referencing Counter state applied to the counter latch register on negative edge of R 1111 ... ABR counter with immediate referencing Counter state applied to the counter latch register on positive edge of bit 2 of the counter control register
7	0 ... Reserved
8 - 9	Configuration of the reference enable input (digital input 4): 00 ... Digital input 4 (reference enable input) does not affect the R input. The R input is always enabled. 01 ... Reserved 10 ... R input active if the reference for the enable input is LOW 11 ... R input active if the reference for the enable input is HIGH
10 - 15	0 ... Reserved

7.5.4 Registers for additional analog inputs

7.5.4.1 Status of the analog inputs

Bit	Description	
0	Status of analog input 1	0 ... OK 1 ... Outside valid range or open circuit
1	Status of analog input 2	
2-7	0 ... Reserved	

In addition to the status information, the analog value of the corresponding input is also set in the event of error (status bit = 1):

Error	Analog value (dec.)	Analog value (hex.)
Open circuit	+32,767	0x7FFF
Input voltage > +10 V	+32,767	0x7FFF
Input voltage < -10 V	-32,767	0x8001
Invalid value	-32,768	0x8000

7.5.4.2 Analog input 1 / Analog input 2

These registers contain the analog value of the corresponding input.

Measurement range:

Input voltage	Value of the register
+10 V	+32,767
:	:
-10 V	-32,768

7.5.5 Trace functions for additional analog inputs

The trace function is not available in the CANIOBusController function model.

7.5.5.1 Trace register

7.5.5.1.1 Trace control word

Bit 0 of the trace control word is used to turn trace functionality on/off for the corresponding analog input.

Bit	Description
0	0 ... Switches off the trace function 1 ... Switches on the trace function
1-15	0 ... Reserved

A buffer overflow error can be cleared by resetting bit 0.

7.5.5.1.2 Trace status information

Bit	Description
0	0 ... Trace function switched off 1 ... Trace function switched on
1	0 ... Reserved
2	0 ... Trace data recording inactive 1 ... Trace data recording active
3	0 ... Trace data reading inactive 1 ... Trace data reading active
4	0 ... Not ready for trigger 1 ... Ready for trigger
5	Trigger active 0 ... No trigger active, trace recording stopped 1 ... Processing trigger, recording trace data
6	Trace OK 0 ... Buffer overflow or trace function turned off for analog input 1 ... No buffer overflow error
7	Trace error 0 ... No buffer overflow or trace function turned off for analog input 1 ... Buffer overflow error

7.5.5.1.3 Trace buffer status

This register contains the amount of buffer memory (in bytes) available for a trace recording. The buffer must be large enough for the configured number of sampled values to be recorded.

If "Infinite trace" has been selected, then the buffer must be read fast enough for analog values to be recorded at the configured sampling rate.

7.5.5.1.4 Number of triggers executed

This register contains the number of successfully executed trigger events (trace recordings).

7.5.5.1.5 Number of failed triggers

This register contains the number of failed trigger events (trace recordings).

This register is increased by one whenever a trigger event occurs under the following conditions:

- The trace function is not enabled.
- The trace buffer is full (two trigger events in short succession).
- Pre-trigger function: If the configured number of recordings has not yet been reached before the trigger event.

7.5.5.1.6 Trace trigger

You can use this register to start recording separately for each analog input. This is only possible if the trigger function has been enabled for the corresponding analog input.

Bit	Description	
0	Trigger for analog input 1	The trigger event is triggered on a positive edge (bit changes from 0 → 1).
1	Trigger for analog input 2	
2-7	0 ... Reserved	

7.5.5.2 Trace runtime configuration

This section specifies how the trace runtime configuration is made in Automation Studio:

Turning trace on/off for analog input X (Trace AnalogInputXX = on/off)

The trace function must first be turned on/off for the respective analog channel. If the trace function was turned on for both analog inputs, then the recorded trace data will be provided by the AsIoTrc library in the following order:

Sampling	Array index	Channel
1	0	Analog input 1
	1	Analog input 2
2	2	Analog input 1
	3	Analog input 2
:	:	:

Table 206: Order of trace data from two analog channels

Number of trace buffers

The number of local trace buffers must also be set on the CPU.

This number specifies how many trace recordings the CPU can save. If a trigger event occurs, even though all configured trace buffers are full, then the corresponding sampled values will be lost.

The recorded trace data buffers are read out with the AsIoTrc library.

Number of samples

The number of sampled values to be recorded on the ACOPOSmicro module must then be set.

It is important to make sure that the trace buffer is large enough for the trace data on the module to be recorded.

If "Infinite trace" has been selected, then the buffer must be read fast enough for analog values to be recorded at the configured sampling rate.

Block sizes for asynchronous data transfer (AsynSize)

A higher value here will result in faster data transfer from the module to the CPU.

Number of data blocks sent before repetition (AsynForward)

Each data block transferred must be acknowledged by the X2X Link master. If an acknowledgment has not been received after the number of data blocks defined here, then all non-confirmed data blocks will be sent again.

Trace mode

Trace mode	Description
Triggered	Trace recording will start after the trigger event (see bit 0/1 of the register "Trace trigger" on page 343).
Infinite	Infinite trace can be started with bit 0/1 of the register Trace trigger(see 343). X2X must be configured in such a way as to ensure that the amount of data generated can be transferred quickly enough. The trace buffer must be read quickly to prevent an overflow in the module's local memory and to ensure that the samples can be recorded at the configured sampling rate.

Recording range of trace data (trace start/stop position)

This defines the number of samples that should be recorded before/after the trigger event.

Trigger type	Start position	Stop position	Beginning of recording	End of recording
Post-trigger	x ≥ 0	y > 0	x samples after trigger event	y samples after start position
Pre-trigger	x < 0	y > 0	x samples before trigger event	y samples after trigger event

7.5.5.3 Trace library

Library AsIoTrc must be used to read the recorded trace data (see **Automation Help** for more information).

The ACOPOSmicro module with additional analog inputs has two separate trace instances that can be triggered at different times independently of one another.

Each trace instance has a device name:

- <Hardware address of the module>.<Trace instance>

This device name is used by the AsIoTrcGet library function to read the trace data from the desired instance.

Examples:

- Trace for trace instance 1: "SS1.IF1.ST1.TRC1"
- Trace for trace instance 2: "SS1.IF1.ST1.TRC2"

7.5.6 Registers for incremental encoder

7.5.6.1 Encoder temperature limit

Temperature limit value of the encoder in °C. Monitoring is switched off at 0.

Setting range: 0 to 100°C

Cutoff at overtemperature if the encoder temperature exceeds the configured value:

- The "Overtemperature" error bit is set.
- All outputs of the respective motor connection are disabled (cut off).

If the encoder temperature falls 2°C below the configured limit, the module clears the error bit by itself and the outputs are re-enabled.

7.5.6.2 Current position (acyclic)

This asynchronous register contains the current encoder position.

This register is only available for variants where an encoder can be connected to the motor to detect the position.

This register can be switched to the internal step counter (see bit 14 in the register "Control word" on page 328).

7.5.6.3 Homed zero position for acyclic counter

This register is only available for ACOPOSmicro variants where an incremental encoder can be connected to the motor.

After a homing procedure, the homing point for the acyclic position counter can be read back here (depending on bit 14 of the Control word register, this is either the internal step counter or the counter value of the incremental encoder counter, see section "Control word" on page 328).

7.5.6.4 Encoder temperature

The temperature of the ABR encoder is output in °C.

Measurement range: 0 to +113°C

Encoder temperature measurement is implemented for the following variants of the ACOPOSmicro with incremental encoder beginning with the specified hardware revision:

ACOPOSmicro	80SD100XD.C044-01	80SD100XD.W044-01	80SD100XD.C04X-13	80SD100XS.C04X-01	80SD100XS.C04X-13
Hardware revision	K0	F0	-	L0	-

ACOPOSmicro variants without encoder temperature measurement (hardware revision = "-") return the value 127 in this register.

7.5.7 Registers for HIPERFACE encoders

7.5.7.1 Current position (acyclic)

This asynchronous register contains the current encoder position.

This register is only available for variants where an encoder can be connected to the motor to detect the position.

This register can be switched to the internal step counter (see bit 14 in the register "Control word" on page 328).

7.5.7.2 Sin/Cos - Analog interface configuration

In addition to the digital HIPERFACE interface, this module is also equipped with an analog interface for sampling a differential sine-cosine signal. To increase the resolution, the EnDat standard supports cooperation between the analog and digital data. This enables a highly dynamic representation of the position while maintaining high resolution.

7.5.7.2.1 SinCosVssMin

Names (pChannelName):
SinCosVssMin

This register specifies the lower limit value for the peak-to-peak voltage of the sine/cosine track. The incoming signal is monitored in this way. If the incoming value falls below this specified limit, then the module reports the corresponding error.

Data type	Values	Information
UINT	0 to 1500	Values in mV, bus controller default setting: 800

7.5.7.2.2 SinCosVssMax

Names (pChannelName):
SinCosVssMax

This register specifies the upper limit value for the peak-to-peak voltage of the sine/cosine track. The incoming signal is monitored in this way. If the incoming value exceeds this specified limit, then the module reports the corresponding error.

Data type	Values	Information
UINT	0 to 1500	Values in mV, bus controller default setting: 1200

7.5.7.2.3 SinCosQuitTime

Names (pChannelName):
SinCosQuitTime

If an error is detected on the analog interface, the last correctly read values remain valid. An interval can be set in this register at which the module begins receiving correct values again after the error state without processing them further internally. Only then will newly sampled correct analog values be recognized as valid.

Data type	Values	Information
UDINT	0 to 20,000,000	Values in µs, bus controller default setting: 100000

7.5.7.3 HIPERFACE - Digital interface configuration

HIPERFACE builds upon the RS-485 (EIA-485) specification and permits communication with multiple HIPERFACE slaves.

7.5.7.3.1 HfBaud

Name:
HfBaud

This register configures the baud rate (transfer rate) of the interface.
The module does not allow a transfer rate of 600 baud.

Data type	Values	Information
UDINT	1200, 2400, 4800, 9600, 19200, 38400	Baud Bus controller default setting: 9600

7.5.7.3.2 HfParity

Name:
HfParity

This register configures the parity bit for the interface.

Data type	Values	Information
USINT	69	E → even parity bit Bus controller default setting
	78	N → no parity bit
	79	O → odd parity bit

7.5.7.3.3 HfCharTimeout

Name:
HfCharTimeout

This register configures the time that the module waits after receiving the last data block to add additional data to the current data packet (frame). When this time expires, the data received thus far is saved in a frame. The transfer is complete and the data can be evaluated.

Information:

Time is specified as a char value in order to ensure identical behavior regardless of the baud rate setting.

Data type	Values	Information
USINT	1 to 255	Char Bus controller default setting: 55

7.5.7.3.4 HfRefAdr

Name:
HfRefAdr

This module can manage up to 32 HIPERFACE slaves via its digital interface. High-resolution position sampling, however, requires information from both the digital and analog interfaces. The HIPERFACE address of the station whose sine/cosine track is being read by the module is entered in this register. If there is only one slave on the network, the broadcast address (255) can also be used.

Data type	Values	Information
USINT	0	Operation without sine/cosine track
	64 to 95	Open address range for max. 32 HIPERFACE slaves. Bus controller default setting: 64
	255	Broadcast address

7.5.7.3.5 HfRefWidth

Name:
HfRefWidth

This register is used to set the absolute width for the sampled position. The number of bits must be taken from the data provided by the encoder manufacturer and usually consists of three values:

- 5-bit: Resolution of the digital absolute position
- 2^y-bit: Number of sine/cosine periods per revolution
- x-bit: HIPERFACE data format, number of bits per revolution

The sum of the sampled values results in the HfRefWidth (i.e. 5+x+y).

Data type	Values	Information
USINT	8 to 32	Bus controller default setting: 32

Example:

The position width of the reference station must be 21 when using the 80MPH4.600S111-02 motor. This is because the HIPERFACE encoder being used measures the absolute position with 21-bit data width (the x = 12 most significant bits encode the multi-turn information, the next y = 4 bits count the sin/cos period within a mechanical revolution and the z = 5 least significant bits encode the absolute position within a sin/cos period). If a value > 21 is set (e.g. 32), then the module firmware detects a supposed jump in the absolute position on each zero crossing of the absolute position (i.e. overflow of 21-bit position value of from 0x00000000 to 0x0001FFFF, or vice versa).

7.5.7.4 HIPERFACE - Typical diagnostics

Memory areas are provided in the HIPERFACE standard for error diagnostics. A register has been implemented in the module to prepare this area in the encoder's memory. This error memory is mirrored in the module's registers and can be interpreted by the user. Precise information about which errors are detected in this way must be looked up in the encoder manual.

7.5.7.4.1 HfErrorCounter

Name:
HfErrorCounter

Error counter: This register is increased by 1 for each error on the HIPERFACE interface.

7.5.7.4.2 HfErrorStationAdress

Name: HfErrorStationAdress

The station address of the HIPERFACE slave where the last error occurred is output in this register.

7.5.7.4.3 HfErrorCommand

Name:
HfErrorCommand

The command that caused the error on the slave is output in this register.

7.5.7.4.4 Error code

Name:
HfErrorCode

This register is used to store the error code that identifies the current problem with the HIPERFACE interface.

The error ID is not a standard value, however, and must be looked up in the manual for the HIPERFACE slave.

The module also diagnoses a timeout on the HIPERFACE interface. This triggers error ID 255.

7.5.7.5 HIPERFACE - Read ID

The digital interface provides the option of assigning a HIPERFACE slave a specific ID. Its parameter data can be queried when booting the PLC, for example. Any deviations from the previous hardware constellation can then be handled accordingly in the program.

Configuration

The parameter to be read is specified by 2 registers. One of the registers contains the address of the desired HIPERFACE slave; the other contains a code for the value to be read.

7.5.7.5.1 HfAdrIdent

Name:
HfAdrIdent

This register is used to set the HIPERFACE address of the slave with parameters that are to be processed in the module.

Data type	Values	Information
USINT	0	Identification deactivated Bus controller default setting
	64 to 95	Open address range for max. 32 HIPERFACE slaves
	255	Broadcast address (when operating with one slave)

7.5.7.5.2 HfSelectionIdent

Name:
HfSelectionIdent

This register defines the parameters that should be provided in the slave response and buffered in the module's "HfExtByte" on page 352 register.

Data type	Values	Values
USINT	0	Serial number Bus controller default setting
	1	Firmware date
	2	High part of firmware version
	3	Low part of firmware version

Call

After being configured correctly, the selected parameter is transmitted cyclically to the module. There are 8 registers that serve as temporary storage. The module confirms successful receipt by setting the HfIdentOkByte.

7.5.7.5.3 HfIdentOk

Name:
HfIdentOk

This register's bits provide information about the validity of the latest ID values in temporary storage.

Data type	Values
USINT	See the bit structure.

Bit structure:

Bit	Description	Value	Information
0	HfIdentOk01	0	Parameter 01 invalid
		1	Parameter 01 valid
1 - 7	Reserved	-	

7.5.7.5.4 HfRs485Settings

Name:
HfRs485Settings

This register is used to temporarily store the current network configuration expected by the slave. The register value is specifically structured for HIPERFACE.

Data type	Values
USINT	See the bit structure.

Bit structure:

Bit	Description	Value	Information
0 - 2	Speed code	001	1200 baud
		010	2400 baud
		011	4800 baud
		100	9600 baud; bus controller default setting
		101	19200 baud
		110	38400 baud
3	Reserved	-	
4	Number of parity bits	0	No parity bit
		1	One parity bit (default)
5	Type of parity bit	0	Even (default)
		1	Odd
6	Behavior if a timeout occurs	0	Timeout 11/baudrate
		1	Timeout 4*11/baud rate (default)
7	Network behavior	0	Bus
		1	Direct connection (default)

7.5.7.5.5 HfEncoderType

Name:
HfEncoderType

This register is used to temporarily store the ID of the current encoder. The register value is structured specifically for each slave and must be looked up in the encoder's data sheet.

Data type	Values
USINT	0 to 255

7.5.7.5.6 HfEepromSize

Name:
HfEepromSize

This register is used to store the size of the EEPROM being used. The number of 16-byte blocks is specified.

Data type	Values	Values
USINT	0 to 255	16-byte blocks

7.5.7.5.7 HfOptionFlags

Name:
HfOptionFlags

This register is used to store slave-specific hardware and software settings.

Data type	Values
USINT	0 to 255

7.5.7.5.8 HfFreeMemory

Name:
HfFreeMemory

This register is used to indicate the number of free 16-byte blocks remaining on the HIPERFACE slave.

Data type	Values	Information
USINT	0 to 255	16-byte blocks

7.5.7.5.9 HfDataFields

Name:
HfDataFields

This register is used to indicate the number of data fields that have been written thus far.

Data type	Values
USINT	0 to 255

7.5.7.5.10 HfExtByte

Name:
HfExtByte01 to HfExtByte10

These registers provide the respective parameters according to how the "HfSelectionIdent" on page 350 register is configured.

Data type	Values
USINT	0 to 255

7.5.7.6 HIPERFACE - Reading additional encoder positions

This module can read up to 2 additional position values via the HIPERFACE interface and provide them to the PLC. Each position value is accompanied by a timestamp.

Configuration

The address must be specified in order to read the position value from the respective HIPERFACE interface. One address register is provided for each position value.

7.5.7.6.1 AddPosAdr

Name:
AddPosAdr01 to AddPosAdr02

These registers are used to set the addresses of the HIPERFACE slaves with position values that should be processed in the module.

Data type	Values	Information
USINT	0	Additional encoder position disabled Bus controller default setting
	64 to 95	Open address range for max. 32 HIPERFACE slaves
	255	Broadcast address (when operating with one slave)

Call

After being configured correctly, the position value is transmitted cyclically to the module. Each slave has five registers that serve as temporary storage. The module automatically generates the timestamp and confirms successful transmission by setting the corresponding AddPosOk0x bit. The HIPERFACE specification does not specify in which format the parameters must be received. The module therefore provides the position value and time in two formats. Which of the position registers should be used for further processing depends on the HIPERFACE slave. The user is free to define the format of the timestamp.

7.5.7.6.2 AddPosOk (byte)

Name:
AddPosOk01 to AddPosOk02

This register's bits provide information about the validity of the last position values in temporary storage.

Data type	Values
USINT	See the bit structure.

Bit structure:

Bit	Description	Value	Information
0	AddPosOk01	0	Position value 01 invalid
		1	Position value 01 valid
1	AddPosOk02	0	Position value 02 invalid
		1	Position value 02 valid
2 - 7	Reserved	-	

7.5.7.6.3 AddPosition

Name:
AddPosition01 to AddPosition02

These registers provide the current position values, depending on the register address, as signed 2-byte or 4-byte values.

Data type	Values
DINT	-2,147,483,648 to 2,147,483,647
INT	-32768 to 32767

7.5.7.6.4 AddPosTime

Name:
AddPosTime01 to AddPosTime02

These registers provide the timestamp of the most recently received position values, depending on the register address, as signed 2-byte or 4-byte values.

Data type	Values	Information
DINT	-2,147,483,648 to 2,147,483,647	NetTime in µs
INT	-32768 to 32767	

7.5.7.7 HIPERFACE - Reading additional analog values

This module can read up to 4 analog values (16-bit) via the HIPERFACE interface and provide them to the PLC. Each analog value is accompanied by a timestamp.

Configuration

The analog value to be read is specified by 2 registers. One of them contains the address of the desired station, and the other the channel of the parameter to be read. An overview of analog values that can be read is provided in the data sheet for the respective slave.

7.5.7.7.1 AnalogAdrCh

Name:
AnalogAdrCh01 to AnalogAdrCh04

These registers are use to set the addresses of the HIPERFACE slaves with analog values that should be processed in the module. To query multiple values from one HIPERFACE slave, it may make sense to write the same address to different AnalogAdrCh registers.

Data type	Values	Information
USINT	0	Additional analog values disabled Bus controller default setting
	64 to 95	Open address range for max. 32 HIPERFACE slaves
	255	Broadcast address (when operating with one slave)

7.5.7.7.2 AnalogCh

Name:
AnalogCh01 to AnalogCh04

These registers define the channel to be read that is written by the bus station to the module's temporary storage.

Data type	Values	Information
USINT	See encoder data sheet	Bus controller default setting: 0

Call

After being configured correctly, the analog value is transmitted cyclically to the module. There are 5 registers that serve as temporary storage. The module automatically generates the timestamp and confirms successful transmission by setting the corresponding AnalogChOk0x bit. The HIPERFACE specification does not specify in which format the parameters must be received. The module therefore provides the value and time in two formats. Which of the value registers should be used for further processing depends on the peripheral equipment. The user is free to define the format of the timestamp.

7.5.7.7.3 AnalogChOk (byte)

Name:
AnalogChOk01 to AnalogChOk04

This register's bits provide information about the validity of the values in temporary storage.

Data type	Values
USINT	See the bit structure.

Bit structure:

Bit	Description	Value	Information
0	AnalogChOk01	0	Analog value 01 invalid
		1	Analog value 01 valid
...		...	
3	AnalogChOk04	0	Analog value 04 invalid
		1	Analog value 04 valid
4 - 7	Reserved	-	

7.5.7.7.4 AnalogChValue

Name:
AnalogChValue01 to AnalogChValue04

These registers provide the current analog values, depending on the register address, as signed or unsigned 2-byte values.

Data type	Values
UINT	0 to 65535
INT	-32768 to 32767

7.5.7.7.5 AnalogChTime

Name:
AnalogChTime01 to AnalogChTime04

These registers provide the timestamp of the most recently received analog values, depending on the register address, as signed 2-byte or 4-byte values.

Data type	Values	Information
DINT	-2,147,483,648 to 2,147,483,647	Time in µs
INT	-32768 to 32767	

7.5.8 Registers for SSI absolute encoders

7.5.8.1 Current position (acyclic)

This asynchronous register contains the current encoder position.

This register is only available for variants where an encoder can be connected to the motor to detect the position.

This register can be switched to the internal step counter (see bit 14 in the register "Control word" on page 328).

7.5.8.2 ValidSSIBitLength

Name:
ValidSSIBitLength

The SSI encoder value can be masked to the configured number of bits using this register. If 5 is configured here, for example, then only the lower 5 bits of the encoder value are transferred.

Maximum value: 32

7.5.8.3 EncoderConfiguration

Name:
EncoderConfiguration

Asynchronous configuration register for the SSI encoder input.

Bit	Description	Description
0	Reserved	Reserved
1-3	Clock rate	000 ... 100 kHz 001 ... 200 kHz 010 ... 400 kHz 011 ... 800 kHz 100 ... 1 MHz (default)
4	Data format	0 ... Binary (default) 1 ... Gray
5-6	Parity bit	00 ... Off, parity bit not added (default) 01 ... Even parity 10 ... Odd parity 11 ... Ignore
7-8	Monostable multivibrator check	00 ... Off (default) 01 ... Low level 10 ... High level
9-15	Reserved	Reserved

Information:

The clock rate must be set the same for both SSI channels.

7.5.8.4 TotalSSIBitLength

Name:
TotalSSIBitLength

Total number of bits to be sent in a frame, including leading zeros for SSI. Without parity bit.

Maximum value: 32

7.5.8.5 SSISystemCyclePrescaler

Name:
SSISystemCyclePrescaler

X2X cycle prescaler for SSI. The clock for the encoder can be scaled down using this register.

The value i = 1...15 of the register can be used to configure that each i-th X2X cycle executes data exchange between the encoder and module.

Information:

The prescaler must be set the same for both SSI channels.

7.5.8.6 EncoderType

Name:
EncoderType

This register is used to set whether it is a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) or an SSI encoder from another manufacturer.

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, only the clock rate and SSISystemCyclePrescaler must be set. The rest of the settings are detected and set automatically. In addition, a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) also has the ability to read out additional data, such as encoder temperature, firmware version, hardware version, serial number nominal current of the motor, module ID of the motor, etc.

Value	Description
0x0000	Reserved
0x0001	B&R stepper motor with SSI encoder (80MPXX.XXXX113-01)
0x0002	SSI encoder from another manufacturer
0x0003..0xFFFF	Reserved

7.5.8.7 TempEnc

Name:
TempEnc

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) with temperature support is used, this register can read the encoder temperature.

Information:

The temperature is specified in °C.

7.5.8.8 SSIHwVer

Name:
SSIHwVer

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can read the encoder hardware version of the encoder.

7.5.8.9 SSIFwVer

Name:
SSIFwVer

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can read the firmware version of the encoder.

7.5.8.10 SSISerNr

Name:
SSISerNr

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can read the serial number of the stepper motor with encoder.

7.5.8.11 SSINominalCurrent

Name:
SSINominalCurrent

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can read the nominal current of the stepper motor.

Information:

The nominal current is specified in 1/10 A.

7.5.8.12 SSIMotorID

Name:
SSIMotorID

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can read the module ID of the stepper motor with encoder.

7.5.9 Operating function model "Ramp"

Control for this model has been based on the CANopen communication profile DS402.

Commands are written to the control word for controlling the modules. The current module state is returned to the Status word register (see section "Status word" on page 329). The function mode (absolute position, constant speed, referencing, etc.) is set in the Mode register (see section "Mode" on page 329).

7.5.9.1 Control word

Control word bits and their state for the commands of the state machine:

Command	Reserved	Encoder position sync/async	Undercurrent detection	Warning reset	Motor ID trigger	Reserved	Reserved	Halt	Fault reset	Mode specific	Mode specific	Mode specific	Enable operation	Quick stop	Enable voltage	Switch on
Bit[1]	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Shutdown	x	x	x	x	x	x	x	x	0	x	x	x	x	1	1	0
Switch on	x	x	x	x	x	x	x	x	0	x	x	x	0	1	1	1
Disable voltage	x	x	x	x	x	x	x	x	0	x	x	x	x	x	0	x
Quick stop	x	x	x	x	x	x	x	x	0	x	x	x	x	0	1	x
Disable operation	x	x	x	x	x	x	x	x	0	x	x	x	0	1	1	1
Enable operation	x	x	x	x	x	x	x	x	0	x	x	x	1	1	1	1
Fault reset	x	x	x	x	x	x	x	x	↑	x	x	x	x	x	x	x
ACOPOSmicro variant[2]		G														

1) x ... Any, ↑ ... Rising edge
2) Some commands are only available for certain ACOPOSmicro variants:
G ... This command is only available if there is also an encoder for the respective channel.

Information about the control word:

Bits 0, 1, 2, 3 and 7 (light gray in the previous table)	These bits control the state of the state machine (see section "State machine" on page 362) according to the commands in the table above.
Bits 9-10 and 15	Reserved, only permitted to be written to with 0.
Motor ID trigger	A rising edge enables the motor ID measurement.
Warning reset	A rising edge resets warnings (no effect on errors, which are reset using "Fault reset"; the state machine is not affected by this bit).
Fault reset	A rising edge resets errors and warnings (see section "State machine" on page 362)
Undercurrent detection	0 ... Undercurrent detection disabled, active undercurrent warnings are reset 1 ... Undercurrent detection enabled/disabled
ABR counter sync/async[1]	0 ... Internal position counter of the ramp generator on cyclic registers 0/8 Value of the ABR counter on acyclic registers 90/154 1 ... Internal position counter of the ramp generator on acyclic registers 90/154 Value of the ABR counter on cyclic registers 0/8

1) This command is only available if there is also an encoder for the respective channel.

7.5.9.2 Status word

The individual bits of the Status word register (see section "Status word" on page 329) and its states depend on the currently enabled state of the state machine:

Status	Reserved	Reserved	Reserved	Reserved	Int. limit active	Target reached	Remote	Reserved	Warning	Switch on disabled	Quick stop	Voltage enabled	Fault	Operation enabled	Switched on	Ready to switch on
Bit	15	14	13	12	11	10	9	8	7	6	5	x	3	2	1	0
Not ready to switch on	x	x	x	x	x	x	x	x	x	0	x	x	0	0	0	0
Switch on disabled	x	x	x	x	x	x	x	x	x	1	x	x	0	0	0	0
Ready to switch on	x	x	x	x	x	x	x	x	x	0	1	x	0	0	0	1
Switched on	x	x	x	x	x	x	x	x	x	0	1	x	0	0	1	1
Operation enable	x	x	x	x	x	x	x	x	x	0	1	x	0	1	1	1
Quick stop active	x	x	x	x	x	x	x	x	x	0	0	x	0	1	1	1
Fault reaction active	x	x	x	x	x	x	x	x	x	0	x	x	1	1	1	1
Fault	x	x	x	x	x	x	x	x	x	0	x	x	1	0	0	0

Information about the status word:

Bits 0, 1, 2, 3, 5 and 6 (light gray in the previous table)	These bits are set according to the currently enabled state of the state machine (see section "State machine" on page 362).
Voltage enabled	Becomes 1 as soon as the motor is powered
Warning	Becomes 1 if a warning is detected ("Overcurrent", "Undercurrent"). The type of warning is listed in the "Error code" register (see table in section "Error code" on page 337). The highest priority error / warning is shown in each case, with the priority corresponding to the order in the respective table. Warnings can be reset with a rising edge on the "Warning reset" bit in the control word.
Remote	Always 1 since there is no local mode on the ACOPOSmicro
Target reached	**In modes 1, -123, -124, -125 and -126 (absolute positioning):** 0 ... Positioning begins 1 ... Target has been reached **In mode 2 (constant speed):** 0 ... Motor accelerates/brakes 1 ... Speed setpoint reached **In modes -127 and -128 (homing):** 0 ... Homing started 1 ... Homing ended **In mode -122 (set actual position):** The bit briefly becomes 0 and immediately becomes 1 again as soon as the position is set.
Internal limit active	Always 0 since the ACOPOSmicro has no position range limit

7.5.9.3 State machine

The motor is controlled according to the state machine illustrated below. After the module is started, the state machine automatically changes to state *"Not ready to switch on"*. The application then operates the state machine by writing commands to the control word (see section "Control word" on page 360).

The state machine successively reaches the states "*Ready to switch on*", "*Switched on*" and "*Operation enable*" by writing the consecutive commands "*Shutdown*", "*Switch on*" and "*Enable operation*".

Information:

Motor movements are not performed according to the setting in the Mode register (see section "Mode" on page 329) until the "*Operation enable*" state.

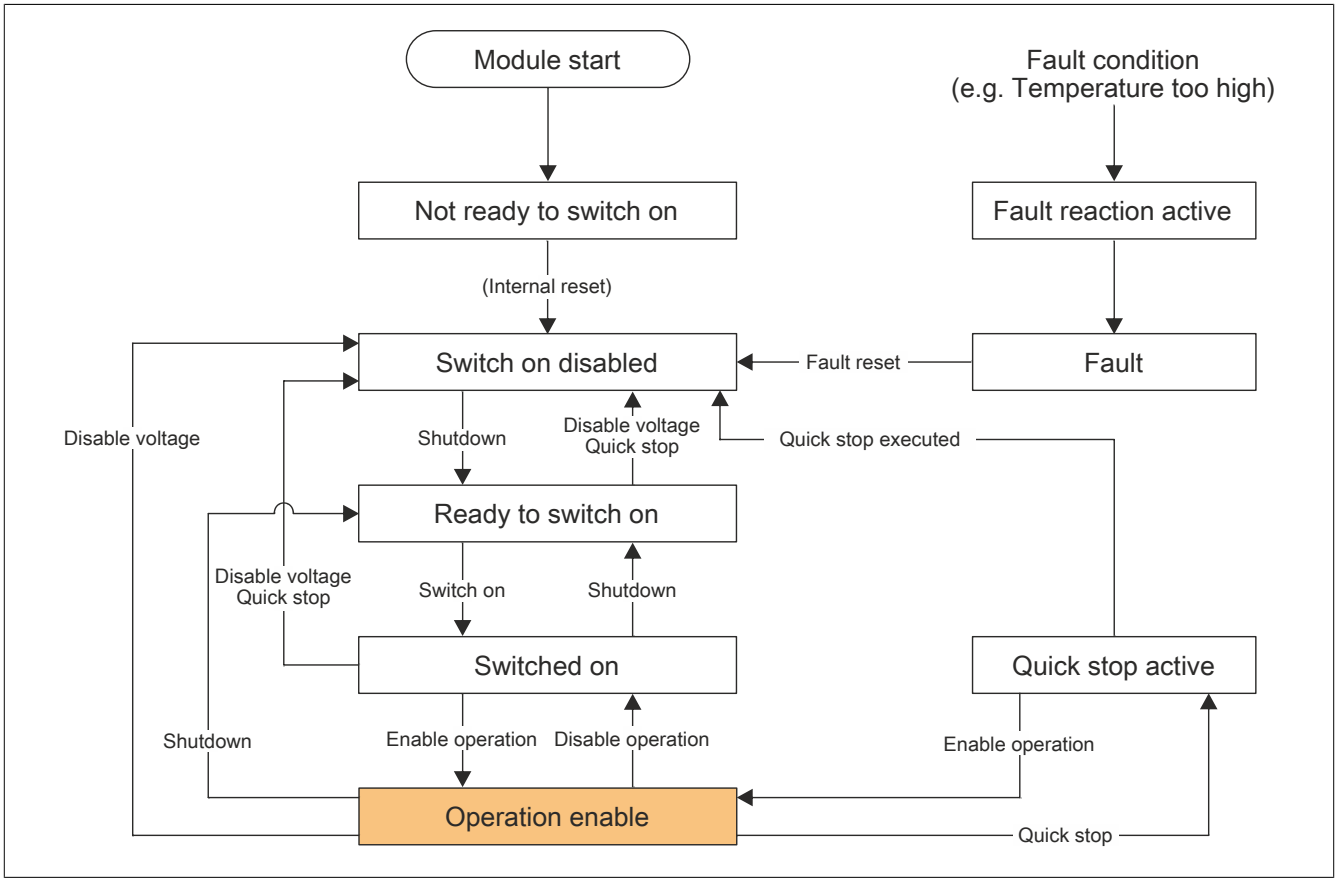


Figure 54: State machine - Flow chart

State change	Description
Not ready to switch on → Switch on disabled	This state change occurs automatically after starting the module and internal initialization has taken place.
Switch on disabled → Ready to switch on	This state change is initiated by command *Shutdown*. No others actions are performed.
Ready to switch on → Switch on disabled	This state change is brought on by the command *Disable voltage* or *Quick stop*. No others actions are performed.
Switched on → Switch on disabled	This state change is brought on by the command *Disable voltage* or *Quick stop*. The motor voltage is switched off immediately.
Ready to switch on → Switched on	This state change is brought on by the *Switch on* command. The motor voltage is switched on. When this state change occurs for the first time since the module is started, the motor ID measurement is performed before the *Switched on* state is achieved. This can take approximately 1 second.
Switched on → Ready to switch on	This state change is initiated by command *Shutdown*. The motor voltage is switched off immediately.
Switched on → Operation enable	This state change is brought on by the *Enable operation* command. Motor movements are now performed depending on the defined mode.
Operation enable → Switched on	This state change is brought on by the *Disable operation* command. If in motion, the motor is decelerated with the configured deceleration. Motor voltage remains on in the *Switched on* state.
Operation enable → Ready to switch on	This state change is initiated by command *Shutdown*. The motor voltage is switched off immediately.

Table 207: ACOPOSmicro - State machine - State changes

State change	Description
Operation enable → Switch on disabled	This state change is brought on by the *Disable voltage* command. Motor voltage switched off. It is strongly recommended to only make this state change on a stopped motor since regeneration on a motor running at no load can cause an overvoltage error on the DC bus (0x3210).
Operation enable → Quick stop active	This state change is brought on by the *Quick stop* command. If in motion, the motor is decelerated with the configured deceleration. During the deceleration, the state machine remains in state *Quick stop active*. If the motor comes to standstill, the switch to state *Switch on disabled* takes place automatically. While the state machine is in the *Quick stop active* state, the *Enable operation* command can be used to switch it back to the *Operation enable* state.
→ Fault reaction active	This state change is brought on when an error occurs and cannot be triggered by a command from the user. It can be triggered by error types classified as an "Error" (see section "Error code" on page 337). (Other error types listed as "Warning" only cause the "Warning" bit to be set in the status word and do not cause a state change in the state machine.) Motor voltage is switched off and the state machine then changes immediately to the *Fault* state. The type of error is listed in the error code register (see table in section "Error code" on page 337). The highest priority error is shown. The priority corresponds to the order in the error code table.
Fault → Switch on disabled	This state change is brought on by the *Fault reset* command. However, the state only changes if no more errors are present when the command is written. All errors and warnings are reset. The error code register contains 0 or the warning code if a warning is still present.

Table 207: ACOPOSmicro - State machine - State changes

8 Operation - Inverter modules

8.1 ACP10 software

ACOPOSmicro inverter modules are operated using the ACP10 software.

Requirements for ACOPOSmicro inverter modules:

ACOPOSmicro	Automation Studio	ACP10 software	40 kHz switching frequency possible
80VD100PD.C000-01	3.0.81.SP3 or later	2.250 or later	Starting with hardware revision F3 and ACP10 3.150
80VD100PD.C000-14	3.0.81 SP3 or later	2.380 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PD.C022-01	3.0.81 or later	2.240 or later	Starting with hardware revision F3 and ACP10 3.150
80VD100PD.C022-14	3.0.81 SP3 or later	2.380 or later	Starting with hardware revision E3 and ACP10 3.150
80VD100PD.C033-01	3.0.90 or later	2.440 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PD.C088-01	3.0.90 or later	2.45.00 or later	Starting with hardware revision D3 and ACP10 3.150
80VD100PD.C144-01	4.1.7.61 or later	3.13 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PD.C188-01	3.0.90 or later	2.391 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PS.C00X-01	3.0.81.26 or later	2.271 or later	Starting with hardware revision E3 and ACP10 3.150
80VD100PS.C02X-01	3.0.81.28 or 3.0.81.26 or later [1]	2.271 or later	Starting with hardware revision E3 and ACP10 3.150
80VD100PS.C03X-01	3.0.90 or later	2.440 or later	Starting with hardware revision C3 and ACP10 3.150
80VD100PS.C08X-01	3.0.90 or later	2.45.00 or later	Starting with hardware revision C3 and ACP10 3.150

1 If the parameter group is added manually, see "Adding parameter groups manually" on page 365.

Information:

For the configuration of the drives, their axes and encoder systems, see Automation Help under Drive technology ► mapp Motion ► Configuration ► Hardware ► ACOPOSmicro.

For valid encoder configuration values, see the technical data of the encoders. This technical data can also be found in the respective user's manual of the associated motors (8WS, 8LV, etc.).

Warning and error message <Cooler temperature sensor: Destroyed or not connected>

Information:

The ambient temperature for operating inverter modules is between 0 and 45°C.
At low temperatures, the cooler temperature sensor can show measurement inaccuracies of up to 2°C, which can lead to early termination of warning 41002 (cooler temperature sensor: destroyed or not connected) or error message 9003 (cooler temperature sensor: destroyed or not connected).

LinMot Tuning - Quick commissioning of the motor controller for testing purposes

Caution!

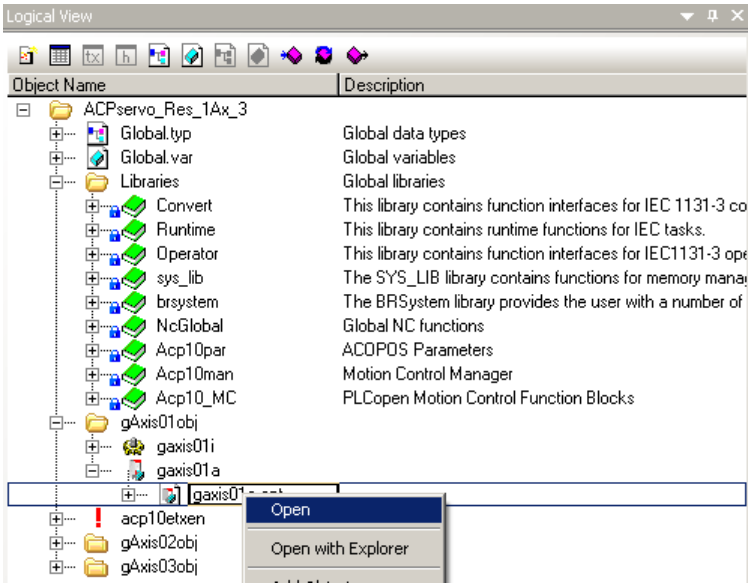
Quick commissioning of the motor controller by setting parameter IDs is only permitted for testing purposes under laboratory .

Setting	Parameter ID	Value
CTRL current: Mode	869	1
Inverter: Switching frequency	347	10000
CTRL current: Automatic configuration	1166	5

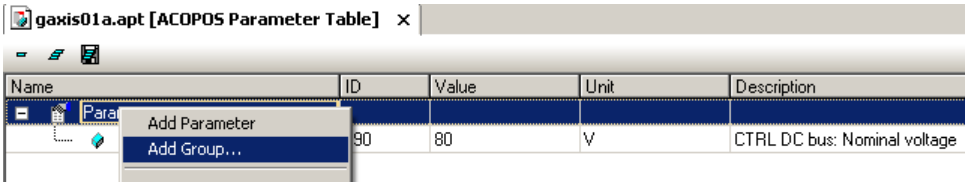
8.1.1 Adding parameter groups manually

It is only possible to use Automation Studio version 3.0.81.26 for the ACOPOSmicro inverter module 80VD100PS.C02X-01 if the following procedure is performed:

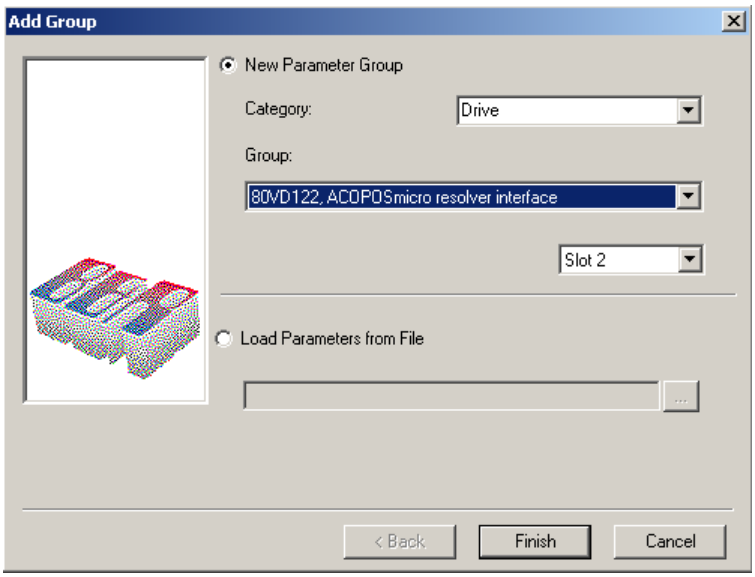
1. In the Logical View:
   Right-click on the respective axis parameter to open its shortcut menu, then select "Open":



2. In the [ACOPOS Parameter Table] window:
   Right-click on the "Parameter" entry in the list to open its shortcut menu, then select "Add group":



3. In dialog box "Add group":
   Make the settings as shown in the image below and click "Finish" to apply:



8.2 EnDat 2.2 interface

8.2.1 Parameter IDs

The parameter settings for the EnDat 2.2. encoder are shown for encoder 1 (ENCOD_).

Parameter ID name	Access	Data type	Range of values	Init value	Description
ENCOD_TYPE	RD, WR	UDINT	<ncENDAT>	ncENDAT	Encoder1 - Type
SCALE_ENCOD_INCR	RD, WR	UDINT	UDINT	10000	Encoder1 - Encoder scaling: • Increments per encoder revolution [incr]
ENCOD_ERROR_STATUS	RD	USINT	<0, 1>	-	Encoder 1 - Error status

8.2.2 Functions

EnDat 2.2 is a standard introduced by Dr. Johannes Heidenhain GmbH for transferring encoder data. Similar to SSI encoders, a clock and a data line transfer the absolute position – along with other data. Data can be transferred in both directions (bidirectional synchronous serial interface).

8.2.2.1 Serial data transfer

The transfer channel for serial communication is a bidirectional synchronous serial interface.

The protocol for communicating with the encoder is explained in the "EnDat Interface Description" document from Heidenhain.

8.2.2.2 Monitoring and error handling

Serial transfers are monitored for the following errors:

8.2.2.2.1 Timeout error during parameter transfer

Disturbances will trigger error 7015.

8.2.2.2.2 Error reading encoder parameters

An error occurred while reading data from the encoder.

Disturbances will trigger error 7017.

8.2.2.2.3 CRC error while transferring parameters

Disturbances will trigger error 7014.

8.2.2.2.4 Error reading encoder memory

Disturbances will trigger error 7048.

8.2.2.2.5 CRC error in EnDat 2.2 additional data

Disturbances will trigger error 39023.

8.2.2.2.6 Error in EnDat 2.2 additional data

Transfer error in EnDat 2.2 additional data (Type 3 error).

Disturbances will trigger error 39026.

8.2.2.3 Encoder errors and warnings

8.2.2.3.1 Warning bit

An event occurred on the encoder that set the warning bit.

Disturbances will trigger error 39022.

8.2.2.3.2 Alarm bit

An event occurred on the encoder, setting the alarm bit.

Disturbances will trigger error 39003.

8.2.2.3.3 Multi-turn overflow

The permissible range has been exceeded on an encoder where multi-turn overflow monitoring is enabled.

Disturbances will trigger error 39025.

8.2.2.3.4 Power failure

An error occurred in the power supply of a battery-backed encoder.

Disturbances will trigger error 39024.

8.2.2.3.5 Lighting failure

Disturbances will trigger error 39004.

8.2.2.3.6 Faulty signal amplitude

Disturbances will trigger error 39005.

8.2.2.3.7 Faulty position value

Disturbances will trigger error 39006.

8.2.2.3.8 Overvoltage

Disturbances will trigger error 39007.

8.2.2.3.9 Undervoltage

Disturbances will trigger error 39008.

8.2.2.3.10 Overcurrent

Disturbances will trigger error 39009.

8.2.2.3.11 Battery

Battery change required

Disturbances will trigger error 39010.

8.2.2.3.12 Frequency exceeded

Disturbances will trigger error 39011.

8.2.2.3.13 Temperature exceeded

Disturbances will trigger error 39012.

8.2.2.3.14 Lighting reserve reached

Disturbances will trigger error 39013.

8.2.2.3.15 Battery charge too low

Disturbances will trigger error 39014.

8.2.2.4 Initialization active

If initialization is not yet completed, then error 7022 is reported.

8.2.2.5 Position value not synchronous with absolute value

Disturbances will trigger error 7038.

The absolute position of the encoder is read via the serial connection at an interval of a few milliseconds and compared with the incremental position.

8.2.2.6 Error in the multi-turn position

Disturbances will trigger error 39028.

The absolute position of the encoder is read via the serial connection at an interval of a few milliseconds and compared with the incremental position. This monitoring can be disabled using ENCOD_LINE_CHK_IGNOR.

8.2.3 Encoder card functions

8.2.3.1 Parameter IDs

Parameter ID name	Access	Data type	Range of values	Default value	Description
ENCOD_TEMP	RD	REAL	REAL	-	Encoder1: Temperature [°C]
ENCOD_DIAG	RD	USINT	USINT	-	Encoder1: Diagnostic value
ENCOD_DIAG_ID	RD, WR	USINT	<0..16>	0	Encoder1: Diagnostic value ID
ENCOD_CMD	WR	USINT	<0, 1, 3>	-	Encoder1: Encoder command

8.2.3.2 Position measurement

Position measurement is based solely on serial data transfer; no analog signals are transferred. Pure serial data transfers allow for higher transfer speeds than are possible with mixed transfers.

Unlike encoders with analog signals, the encoder reference is not established in signal periods per revolution, but rather in increments per revolution. "Increments per revolution" refers to the resolution of a revolution provided by the encoder.

- SCALE_ENCOD_INCR = Encoder increments per revolution

For linear encoders:

- SCALE_ENCOD_INCR = (Number of pole pairs * Pole width) / Increment length

8.2.3.3 Diagnostic values

If supported by the encoder, diagnostic values can be read with parameter ENCOD_DIAG. ENCOD_DIAG_ID can be used to select the individual diagnostic values [1 ... 16]. The values are output as byte values [0 ... 255]. If ENCOD_DIAG_ID is set to 0, then ENCOD_DIAG specifies the diagnostic values (assessment values) supported and enabled by the encoder (see table).

Bit	Explanation	= 0	= 1	ENCOD_DIAG_ID	Comment
2^0	Diagnostic value 1	Not supported	Supported	1	Evaluation of incremental track
2^1	Diagnostic value 2	Not supported	Supported	2	
2^2	Diagnostic value 3	Not supported	Supported	3	Evaluation of absolute track
2^3	Diagnostic value 4	Not supported	Supported	4	Evaluation of code connection
...	....	...	...	...	
2^{15}	System-specific data	Not supported	Supported	16	

For more information about these assessment values, please refer to the documentation provided by the manufacturer of the measuring device.

8.2.3.4 Encoder temperature

If supported by the encoder, the ENCOD_TEMP parameter can be used to read the encoder temperature.

8.2.3.5 Example: Reading additional information

Reading which diagnostic values are supported by the encoder

```
ENCOD_DIAG_ID          <-- 0                    Encoder1: Diagnostic value ID
ENCOD_DIAG             --> 0x0D                 Encoder1: Supported diagnostic values (1, 3 and 4)
```

Reading diagnostic values

```
ENCOD_DIAG_ID          <-- 1                    Encoder1: Diagnostic value ID
ENCOD_DIAG             --> Evaluation number 1  Encoder1: Diagnostic value
ENCOD_DIAG_ID          <-- 3                    Encoder1: Diagnostic value ID
ENCOD_DIAG             --> Evaluation number 3  Encoder1: Diagnostic value
ENCOD_DIAG_ID          <-- 4                    Encoder1: Diagnostic value ID
ENCOD_DIAG             --> Evaluation number 4  Encoder1: Diagnostic value
```

8.2.3.6 Encoder status ENCOD_STATUS

Description	Bit	Encoder status (ENCOD_STATUS)
Initialization active	0	0x00000001
Timeout error during parameter transfer	4	0x00000010
Alarm bit	5	0x00000020

Description	Bit	Encoder status (ENCOD_STATUS)
CRC error while transferring parameters	6	0x00000040
CRC error in EnDat 2.2 additional information	7	0x00000080
Warning bit	8	0x00000100
Position measurement not ready	9	0x00000200
Error in EnDat 2.2 additional information	10	0x00000400
Power failure	11	0x00000800
Multi-turn overflow	12	0x00001000
Position value not synchronous with absolute value	21	0x00200000
Error reading encoder memory	22	0x00400000
Error reading encoder parameters	23	0x00800000

9 Operation - Power supply

9.1 Function models

The module is operated using function models. A function model specifies the registers on the module (storage model) used by the application to operate the module. Only these registers are processed each cycle on the module and transferred cyclically or acyclically via the bus.

9.1.1 Minimum cycle time

The minimum cycle time specifies how far the cycle time of the X2X Link bus can be minimized without communication errors or functional impairments occurring. Keep in mind that very fast cycles leave less idle time for monitoring, diagnostics and acyclic commands.

Function model	Minimum cycle time
Standard	250 µs
CANIOBusController	

Table 208: Power supply module - Minimum cycle time

9.2 Function model "Standard"

9.2.1 Overview of registers

Register (dec.)	Channel name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
2	StatusPacked01	Status information and error messages	UINT	●			
3	ControlPacked01	Error acknowledgment	USINT		●		
83	Voltage01	Voltage measured on the power output	SINT	●			
86	Current01	Current measured on the power output	INT	●			
129	Temperature01	Heat sink temperature	SINT			●	
131	Temperature02	Chopper temperature	SINT			●	
133	Temperature03	Transformer temperature	SINT			●	
1026	ConfigPacked01	Turn chopper and parallel operation on/off	UINT				●
1029	ChopperOffset01	Voltage offset for chopper control	SINT				●
1031	VoltageSet01	Set voltage for the power output	SINT				●
1034	CurrentSet01	Current limiting for the power output	INT				●
1038	TempLimitBleeder01	Limit value of temperature monitoring for the braking resistor (T_{Blim}).	INT				●
1042	TempAmbBleeder01	Ambient temperature of the braking resistor (T_{Amb})	INT				●
1046	TempInitBleeder01	Initial thermal load on the resistor (T_{B0}).	INT				●
1050	RBleeder01	Braking resistor (R_B)	INT				●
1060	RthBleeder01	Thermal resistance (R_{Bth})	DINT				●
1068	CthBleeder01	Thermal capacity (C_{Bth})	DINT				●
1073	ShortCircuitVoltageOffset01	Voltage offset for short-circuit detection at the power output	SINT				●
1282	TempBleeder01	Calculated braking resistor temperature (T_B)	INT			●	

Table 209: Register overview - Function model "Standard"

*) Legend: DT ... data type, cyclic ... cyclic, acyclic ... Acyclic, R ... Read; W ... Write

9.2.2 StatusPacked01

This register contains status and error bits for the module (data type of individual bits: BOOL).

Bit	Channel name	Description
0	ErrorOutput01	0 ... No error 1 ... The power output was shut off due to an error. After the error has been corrected and acknowledged, the power output can be enabled again. Possible causes of errors: ▪ Short circuit (OverloadError01) ▪ Overtemperature (StatusOvertemperature01) ▪ Output voltage of the power output >100 V
1	OverloadError01	0 ... No error 1 ... Short circuit or overload on the power output: ▪ When a short circuit occurs, the output is switched off and can be enabled again by acknowledging the error. ▪ When an overload occurs, the current is limited to 90% of the nominal current. Acknowledging the error allows overload operation to be re-enabled.
2	CurrentLimit01	0 ... Constant output voltage 1 ... Current limiting active
3	StatusOvervoltage01	0 ... No error. 1 ... Overvoltage on the power output. Voltage is 5 V higher than the chopper reference. No cutoff (not until 100 V).
4	StatusPhaseDetection01	0 ... No phase failure 1 ... At least one phase failed. No more power is delivered to the power output.
5	StatusOvertemperature01	0 ... Temperature within permissible range (T < 75°C) 1 ... Overtemperature error (T > 80°C). The power output is switched off and can be activated again by acknowledging the error.
6	ChopperActive01	0 ... Chopper inactive 1 ... Chopper active
7	StatusBleeder01	0 ... No error: T < (TempLimitBleeder01 - 5°C) 1 ... Temperature of the braking resistor exceeded: T > TempLimitBleeder01
8	StatusChopper01	0 ... No error: T < 75°C 1 ... Temperature of the chopper output exceeded: T > 80°C
9	StatusOutput02	0 ... No error 1 ... Short circuit or overload on power output. Output is switched off for 10 ms and then back on.
10 - 15	Reserved	

Information:

No more power is output during phase failure. Nevertheless, regeneration from the DC bus is still possible. This only supplies the power supply module for a brief time (i.e. the 24 VDC voltage output as well), to bridge temporary phase failures.

Information:

If the braking resistor or chopper output is overheated (see description of bits "StatusBleeder01" and "StatusChopper01"), then the chopper output will be temporarily disabled.

This can lead to an increase in the output voltage if braking energy is regenerated back into the DC bus.

9.2.3 ControlPacked01

This register contains the error acknowledgment bit (data type of bit: BOOL).

Bit	Channel name	Description
0	ClearError01	1 ... The rising edge of this bit acknowledges the following power output errors: ▪ ErrorOutput01 ▪ OverloadError01
1 - 7 (15)[1]	Reserved	0

1 In the CANIOBusController function model, the ControlPacked01 register has data type UINT, which corresponds to a size of 16 bits.

9.2.4 Voltage01

Analog voltage measurement at the power output

Resolution: 1 V / Digit

9.2.5 Current01

Analog current measurement at the power output

Resolution: 0.1 A / Digit

9.2.6 Temperature01-03

Measured value for the following temperatures:

Register	Description	Value of the register	Temperature
Temperature01	Heat sink temperature	-2 to 127	-2 to 127°C
Temperature02	Chopper temperature		
Temperature03	Transformer temperature		

9.2.7 ConfigPacked01

Bit	Channel name	Description
0	ParallelMode[1)]	0 ... Parallel operation off 1 ... Parallel operation on
1	ChopperEnable	0 ... Chopper off 1 ... Chopper on
2 - 15	Reserved	

1) The technical description of parallel operation is documented in section "Parallel operation" on page 114 section.

9.2.8 ChopperOffset01

Voltage offset for chopper control:

Chopper reference = Voltage reference + Voltage offset

The reference voltage is limited to a maximum value of 95 V.

Value of ChopperOffset01	Voltage
5 to 30	5 VDC to 30 VDC

Example:

⇨ VoltageSet01 = 80 V

⇨ ChopperOffset01 = 5 V

The brake chopper is activated at an output voltage of 85 V or later.

9.2.9 VoltageSet01

Voltage reference for the power output:

Value of VoltageSet01	Voltage
24 to 80	24 VDC to 80 VDC

Notice!

If multiple power supplies are connected to each other, they must first be configured for parallel operation. Only then is the output permitted to be switched on by writing the voltage configuration.

In parallel operation, all power supplies must always be set to the same voltage!

It is generally recommended to completely configure the power supply before setting this configuration.

9.2.10 CurrentSet01

Current limiting for the power output:

Value of CurrentSet01	Maximum nominal current
50 to 200	5.0 to 20.0 A

The maximum nominal output current also depends on the configured output voltage (see output current of the power unit in section "Technical data" on page 112).

9.2.11 TempLimitBleeder01

Limit value of temperature monitoring for the braking resistor (T_{Blim}):

Value of TempLimitBleeder01	Temperature
0 to 1000	0 to 1000°C

9.2.12 TempAmbBleeder01

Ambient temperature of the braking resistor (T_{Amb}):

Value of TempAmbBleeder01	Temperature
0 to 100	0 to 100°C

9.2.13 TempInitBleeder01

Initial value for the temperature model of the braking resistor: Initial thermal load on the resistor (T_{B0}).

Value of TempInitBleeder01	Temperature
0 to 1000	0 to 1000°C

9.2.14 RBleeder01

The ohmic value of the braking resistor (R_B) is used for the power calculation:

Value of RBleeder01	Temperature
10 to 1000	1 to 100 Ω

9.2.15 RthBleeder01

Thermal resistance (R_{Rth}):

Value of RthBleeder01	Thermal resistance
1 to 5000	0.001 to 5.000 K/W

9.2.16 CthBleeder01

Thermal capacity (C_{Bth}):

Value of CthBleeder01	Thermal capacity
1000 to 1,000,000	1 to 1000 Ws/K

9.2.17 TempBleeder01

The temperature model is used to calculate the temperature of the braking resistor (T_B):

Value of TempBleeder01	Temperature
0 to 1000	0 to 1000°C

9.2.18 ShortCircuitVoltageOffset01

The function is available starting with firmware version 1.4.0.0.

Negative voltage offset for short circuit detection at the power output:

Voltage threshold of short circuit detection = VoltageSet01 + ShortCircuitVoltageOffset01

The voltage threshold is limited to a minimum of 10 V and a maximum of 70 V.

Value of ShortCircuitVoltageOffset01	Voltage
-70 to -10	-70 VDC to -10 VDC

Example:

- ⇨ VoltageSet01 = 80 V
- ⇨ ShortCircuitVoltageOffset01 = -70 V
- ⇨ 80V + (-70V) = 10V

A short-circuit is detected at the power output when the measured output voltage is <= 10 V.

9.3 Function model: CANIOBusController

9.3.1 Overview of registers

Register (dec.)	Channel name	Description	DT	Cycl.		Acyc.	
				R	W	R	W
0	StatusPacked01	Status information and error messages	UINT	●			
0	ControlPacked01	Error acknowledgment	UINT		●		
2	Voltage01	Voltage measured on the power output	SINT	●			
4	Current01	Current measured on the power output	INT	●			
129	Temperature01	Heat sink temperature	SINT			●	
131	Temperature02	Chopper temperature	SINT			●	
133	Temperature03	Transformer temperature	SINT			●	
1026	ConfigPacked01	Turn chopper and parallel operation on/off	UINT				●
1029	ChopperOffset01	Voltage offset for chopper control	SINT				●
1031	VoltageSet01	Set voltage for the power output	SINT				●
1034	CurrentSet01	Current limiting for the power output	INT				●
1038	TempLimitBleeder01	Limit value of temperature monitoring for the braking resistor (T_{Blim}).	INT				●
1042	TempAmbBleeder01	Ambient temperature of the braking resistor (T_{Amb})	INT				●
1046	TempInitBleeder01	Initial thermal load on the resistor (T_{B0}).	INT				●
1050	RBleeder01	Braking resistor (R_B)	INT				●
1060	RthBleeder01	Thermal resistance (R_{Bth})	DINT				●
1068	CthBleeder01	Thermal capacity (C_{Bth})	DINT				●
1073	ShortCircuitVoltageOffset01	Voltage offset for short-circuit detection at the power output	SINT				●
1282	TempBleeder01	Calculated braking resistor temperature (T_B)	INT			●	

Table 210: Register overview - CANIOBusController function model

*) Legend: DT ... data type, cyclic ... cyclic, acyclic ... Acyclic, R ... Read; W ... Write

10 Safety technology [V1.22]

10.1 History of chapter ACOPOSmicro safety technology

Version	Date	Comment
1.22	March 2021	• Section STO, category 3 / SIL 2 / PL d: Additional example. • Updated section "Safety technology disclaimer".
1.21	February 2016	• Section "General information": Removed safety functions SS1, SS2, SLS and SOS from documentation. • Added section "Safety technology disclaimer". • Editorial changes
1.20	June 2015	• Section "General information": Content-related corrections. • Section "Principle - Implementing the safety function": Added images for stepper motor modules and updated "Additional inputs/outputs" for connector X7. • Section "Additional function": Modified danger warnings. • Section "Enable input connected in accordance with Safety Category 3 / SIL 2 / PL d": Removed danger warnings. • Removed section "STO, category 3 / SIL 2 / PL d (variant B)". • Removed section "Wiring the enable inputs per safety category 3 / SIL 2 / PL d and functionality (STO, SS1, SS2, SLS, SOS)" including subchapter. • Added section "B&R modules with safe outputs". • Editorial changes

10.2 Standard safety technology ("hardwired safety technology")

Danger!

Especially in the area of safety technology, always consult the latest version of this document on the B&R website for valid specifications (www.br-automation.com)! The specifications in this version of the document are not necessarily current. The user must verify the correctness of specifications before implementing safety functions!

10.2.1 Safety technology disclaimer

The proper use of all B&R products must be guaranteed by the customer through the implementation of suitable training, instruction and documentation measures. The guidelines set forth in system user's manuals must be taken into account here as well. B&R has no obligation to provide verification or warnings with regard to the customer's purpose of using the delivered product.

Changes to the devices are not permitted when using safety-related components. Only certified products are permitted to be used. Currently valid product versions in each case are listed in the corresponding certificates. Current certificates are available on the B&R website (www.br-automation.com) in the Downloads section for the respective product. The use of non-certified products or product versions is not permitted.

All relevant information regarding these safety products must be read in the latest version of the related data sheet and the corresponding safety notices observed before the safety products are permitted to be operated. Certified data sheets are available on the B&R website (www.br-automation.com) in the Downloads section for the respective product.

B&R and its employees are not liable for any damages or loss resulting from the incorrect use of these products. The same applies to misuse that may result from specifications or statements made by B&R in connection with sales, support or application activities. It is the sole responsibility of the user to check all specifications and statements made by B&R for proper application as it pertains to safety-related applications. In addition, the user assumes sole responsibility for the proper design of the safety function as it pertains to safety-related applications.

10.2.2 General information

ACOPOSmicro systems use integrated safe pulse disabling for secure shutdowns and to prevent unexpected startup. This is designed to satisfy the following safety classifications depending on the external circuit:

Criteria	Safety characteristic
Maximum safety category per EN ISO 13849-1:2008	Cat. 3
Maximum performance level per EN ISO 13849-1:2008	PL d
Maximum safety integrity level per IEC 62061:2010	SIL 2
Maximum safety integrity level per IEC 61508:2010	SIL 2
PFH (probability of dangerous failure per hour) per axis	$<1.77 \times 10^{-9}$
PFD (probability of dangerous failure on demand) per axis	$<1.55 \times 10^{-4}$ with a proof text interval of 10 years $<3.10 \times 10^{-4}$ with a proof text interval of 20 years
PTI (proof test interval) 1)	Max. 20 years
SFF (safe failure fraction)	99.75%
DC (diagnostic coverage)	99%
MTTFd (mean time to dangerous failure)	>140 years

Table 211: Safety classifications, criteria and characteristics for safe pulse disabling

1) Corresponds to the mission time of the module

The following table provides an overview of the individual safety functions that can be implemented:

Name according to standard		Short description
EN 61800-5-2	**EN 60204-1**	
STO (Safe Torque Off)	Stop category 0	Cuts off the power supply

Table 212: Overview of safety functions according to standards

Safe pulse disabling interrupts the power supply to the motor by preventing the pulses to the power semiconductors over one channel. In this way, a rotating field can no longer be created in stepper, synchronous and induction motors controlled by ACOPOSmicro systems.

Integrated safe pulse disabling therefore meets the requirements for preventing unexpected startup in accordance with EN 1037 as well as the requirements concerning the category 0 stop function per EN 60204-1. This stop function removes power to the machine actuators (immediately with stop category 0). The requirements concerning the STO are also met per EN 61800-5-2.

10.2.3 Principle - Implementing the safety function

Safe pulse disabling is achieved by removing the FET control logic supply from the ACOPOSmicro. The X2 terminal ("24 V Enable" and "COM Enable" connections) is used to supply an integrated DC-to-DC converter with 24 VDC. The converter creates the supply voltage for the FET control logic from this voltage.

If the 24 VDC power supply for the DC-to-DC converter is interrupted, the FET control logic is also no longer supplied. It is then no longer possible to transfer the pulse pattern needed to generate the rotating field to the power semiconductor. This cuts off the supply of power to the motor.

2-axis inverter module

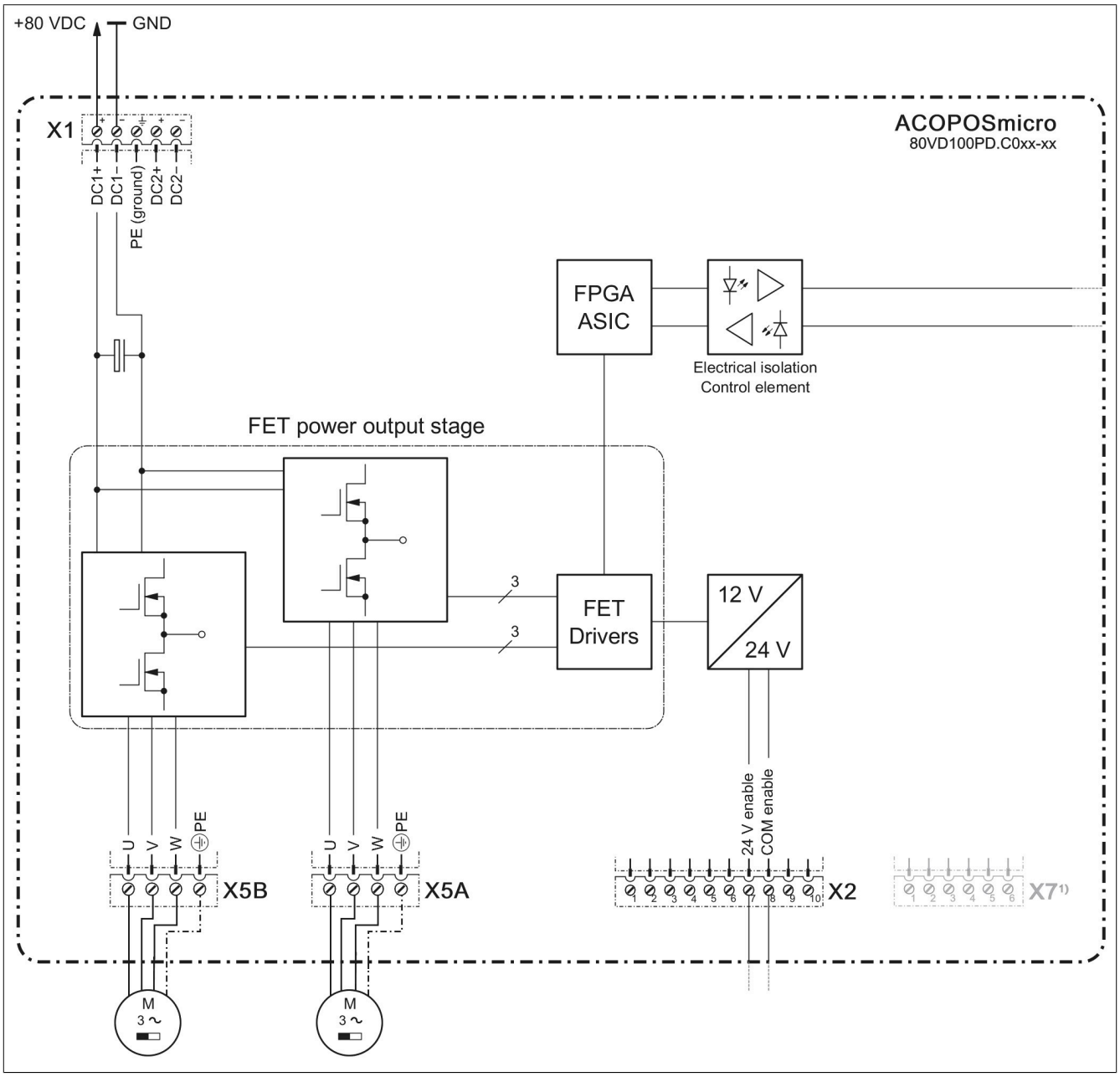


Figure 55: 2-axis inverter module - Block diagram for safe pulse disabling

1) The X7 connection is only relevant for 80VD100PD.C000-14 and 80VD100PD.C022-14 modules.

2-axis stepper motor modules

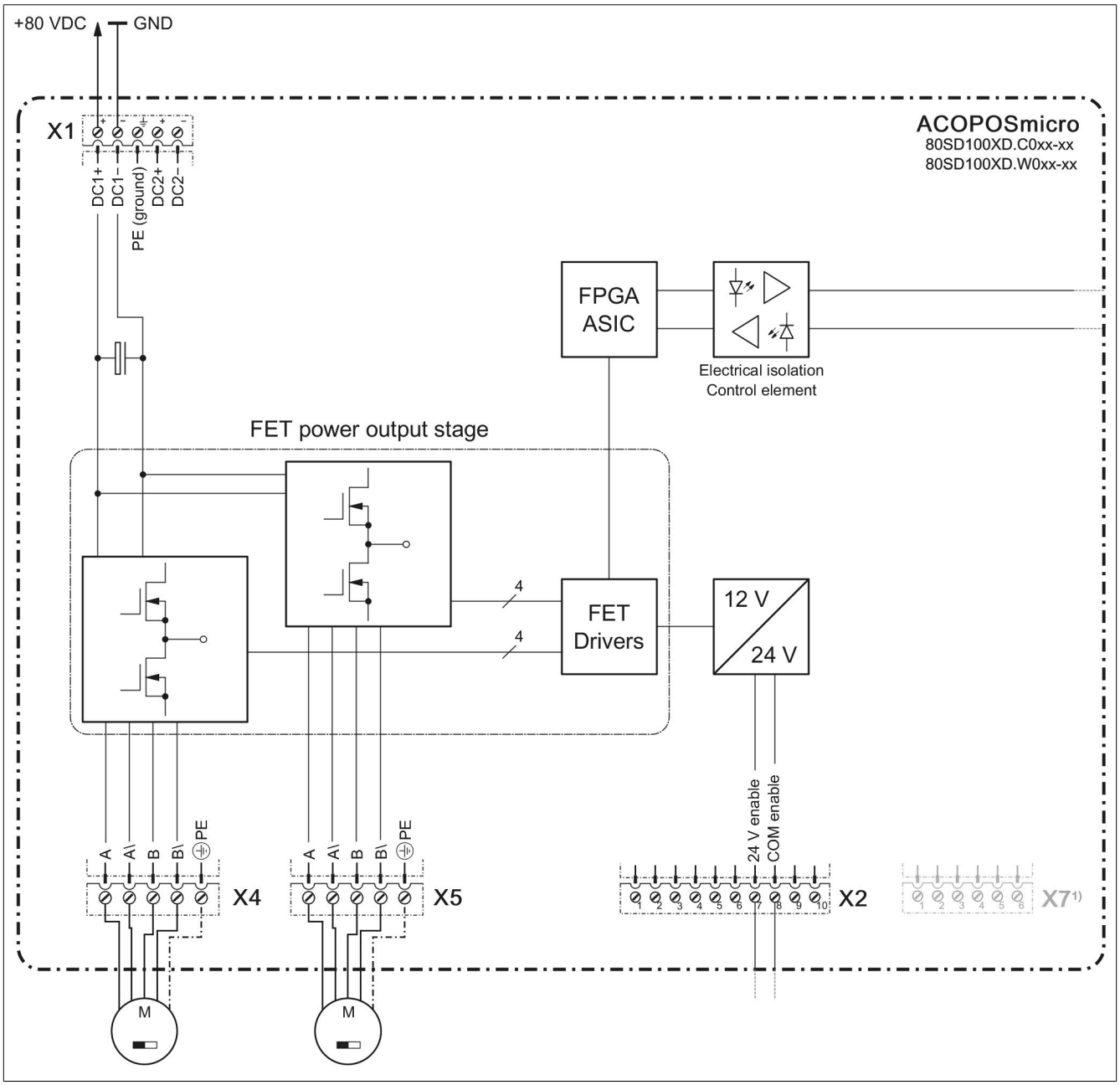


Figure 56: 2-axis stepper motor module - Block diagram for safe pulse disabling

1) The X7 connection is only relevant for 80SD100XD.C04X-13 and 80SD100XD.C0XX-21 modules.

1-axis inverter module

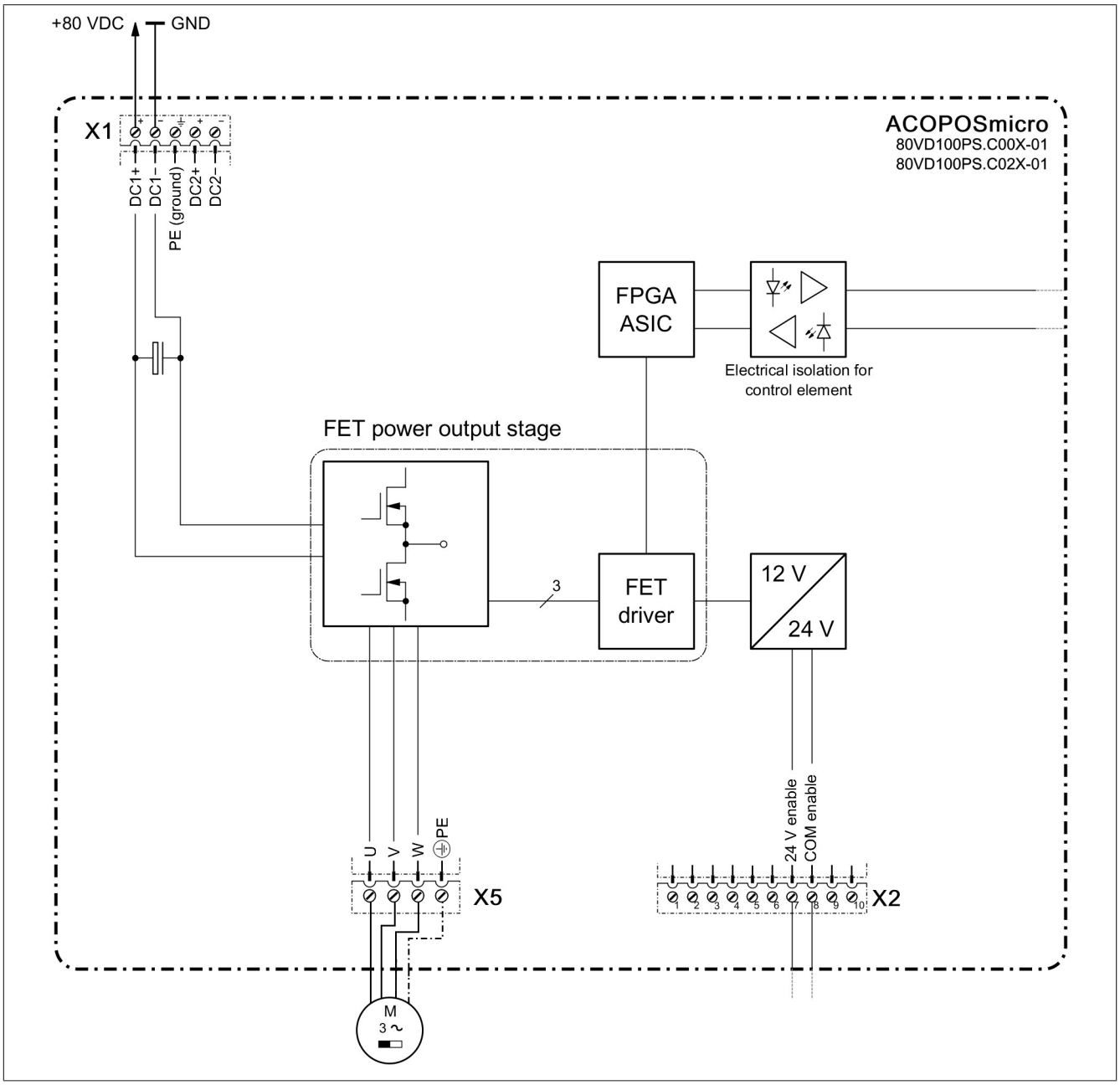


Figure 57: 1-axis inverter module - Block diagram for safe pulse disabling

1-axis stepper motor modules

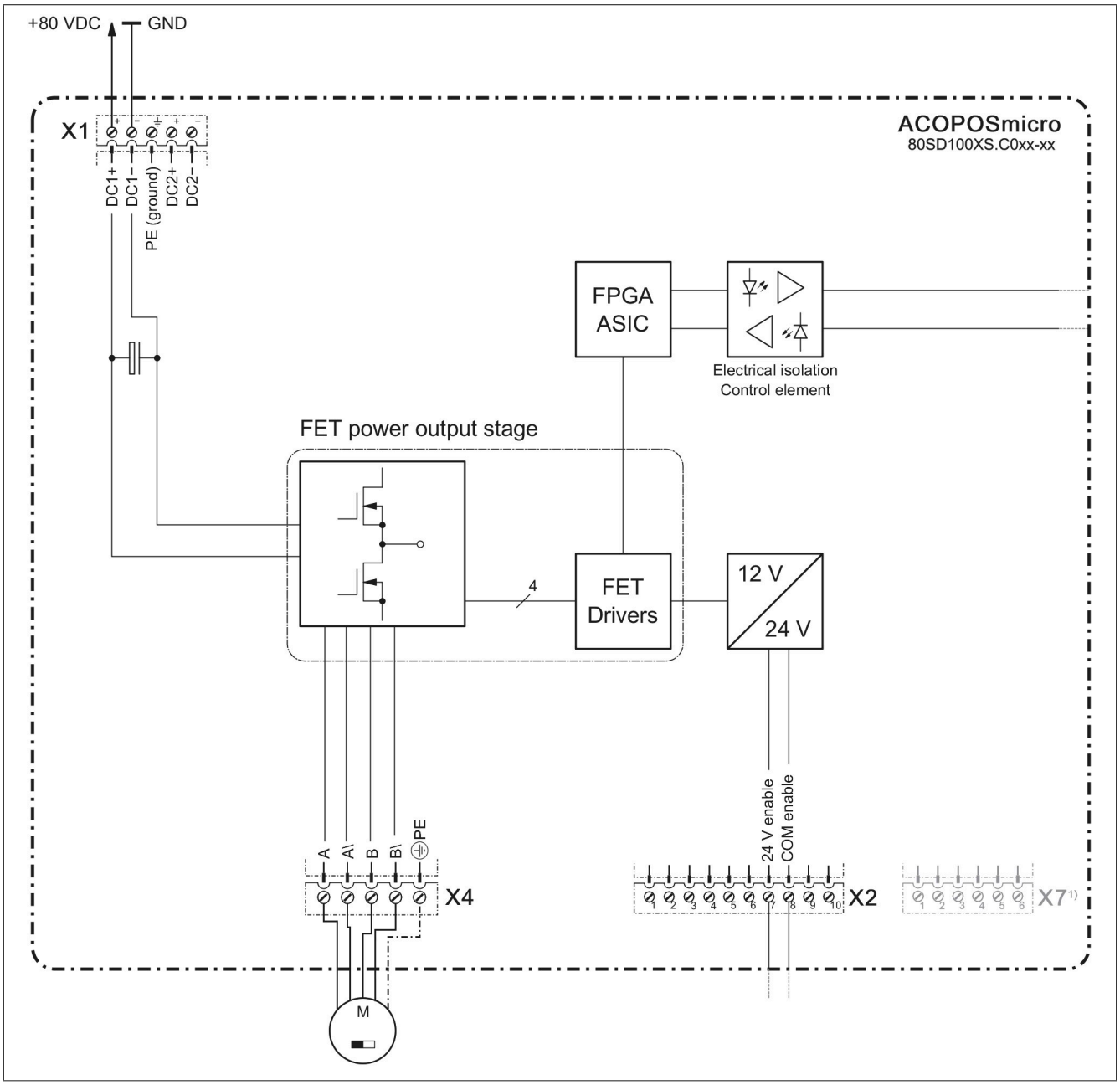


Figure 58: 1-axis stepper motor module - Block diagram for safe pulse disabling

1) The X7 connection is only relevant for the 80SD100XS.C04X-13 module.

10.2.3.1 Additional function

The availability of the DC-to-DC converter's output voltage is queried by the FPGA/ASIC. If voltage is not present on the output of the DC-to-DC converter, then the FPGA/ASIC suppresses generation of the pulse pattern.

Danger!

After safe pulse disabling is enabled, power is removed from the drive and the drive torque drops out. If the motor was moving before safe pulse disabling is activated, it is only stopped by a safe operational brake (if available) or by the friction of the complete system. The motor is therefore not able to hold suspended loads. Safe holding brakes must be used for this purpose.

For applications where this can be dangerous, the desired level of protection cannot be achieved.

Danger!

Operation outside the technical data is not permitted and can result in dangerous states.

Danger!

The switch-off time for the enable input must be taken into consideration since it has a substantial effect on the response time of the safety functions and therefore the remaining distances and times to be considered. In order to calculate the total safety response time, the user must validate the rundown time of the complete system!

The switch-off time for the enable inputs is listed in the technical data for the respective ACOPOS P3 module.

Danger!

Activating safe pulse disabling is not sufficient for achieving a voltage-free drive and therefore does not provide sufficient protection against electrical shock!

Danger!

Depending on the application, it is possible for the drive to restart after safe pulse disabling is deactivated.

Danger!

The brake controller integrated in ACOPOSmicro systems and the holding brake integrated in B&R standard motors fulfill the criteria up to Category B per EN ISO 13849-1:2008.

Additional measures are necessary to achieve higher safety categories.

Danger!

The C standards relevant to applications must be observed!

Information:

Note that multiple errors in the FET semiconductor bridge can cause a brief forward movement. The maximum angle of rotation φ of the motor shaft during this forward movement depends on the motor being used. For permanent magnet synchronous motors, φ = 360°/2p (for B&R standard motors, p = 3 so the angle is 60°). For three-phase induction motors, there is a relatively small angle of rotation (between 5° and 15°).

This short forward movement can be excluded as a fault in accordance with EN ISO 13849-1, among other things due to the improbability that this would occur and due to general technical experience.

10.2.4 Enable input connected in accordance with Safety Category 3 / SIL 2 / PL d

Using the example of the STO safety function, different a circuit variation for the enable input on the ACOPOSmicro is given here with regard to safety category 3 / SIL 2 / PL d.

Danger!

The ACOPOSmicro system itself has no error detection with regard to short circuits on the connection lines.

In order to exclude errors caused by short circuit between any two lines per EN ISO 13849-2:2012 Appendix D.2.4, Table D.4 as well as to achieve the required safety category, the following protective measures must be implemented:

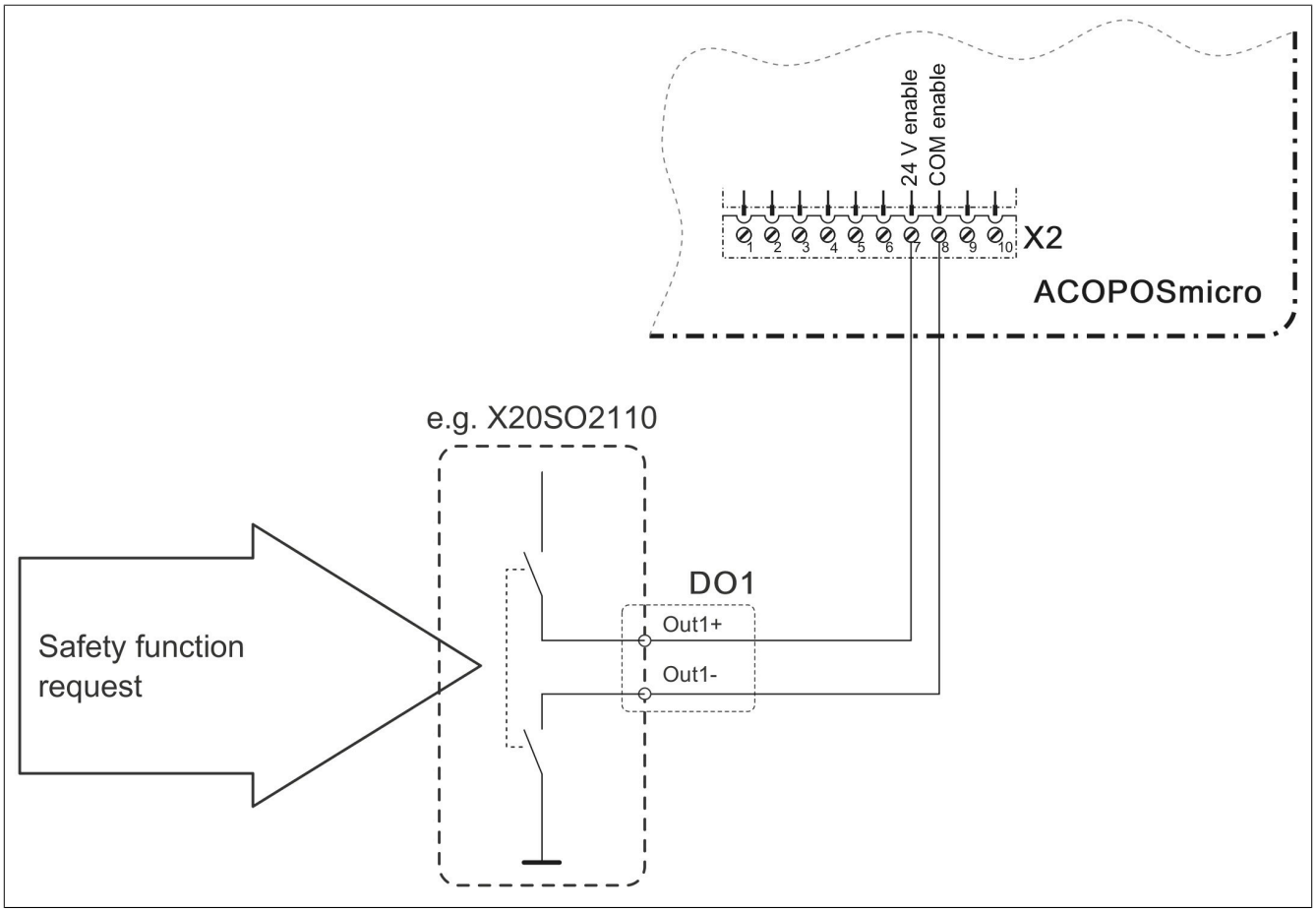
- **The wires are permanently installed and protected against external damage (e.g. using a cable duct or armored conduit).**
- **The wires are installed in different plastic-sheathed cables or within an area for electrical equipment[6].**
- **The wires are each individually protected by a ground connection.**

For more error exclusions, see EN ISO 13849-2:2012 appendix D.2.4, table D.4.

10.2.4.1 STO, category 3 / SIL 2 / PL d

The enable input on the X2 terminal of the ACOPOSmicro is supplied via a safe digital output (Out1+, Out1-). If the safety function is requested, then the safe digital output cuts off the enable input (pins 7 and 8 on the X2 terminal).

Example with high-side / low-side switch



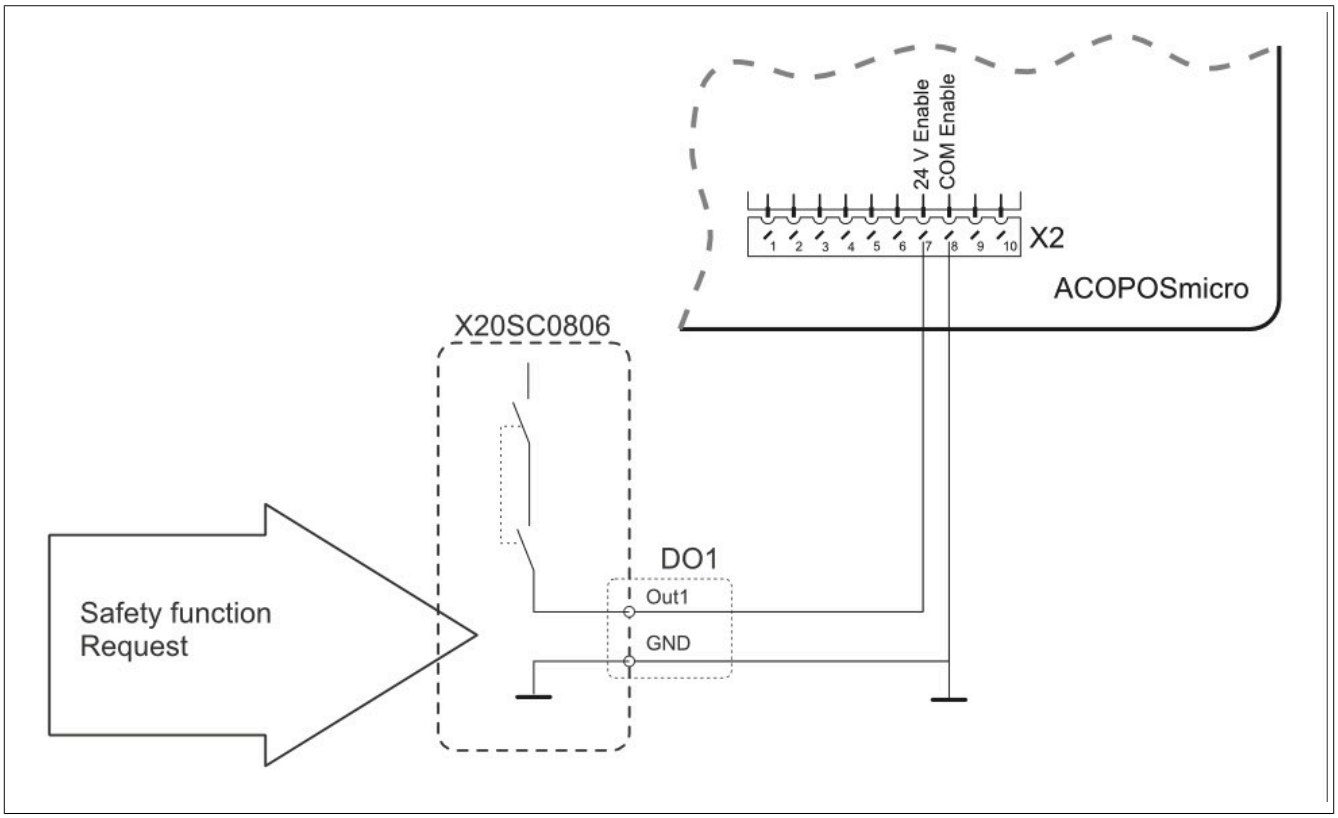
Danger!

At least one safe digital output module with Category 3 / SIL 2 / PL d must be used for the DO1 digital output shown.

The information in the user documentation for the safe digital output module must be observed!

[6] Prerequisite: Both the wires and the area for electrical equipment must meet the respective requirements (see IEC 60402-1).

Example with high-side switch



Observe short-circuit-proof cable routing!

Danger!

At least one safe digital output module with Category 3 / SIL 2 / PL d must be used for the DO1 digital output shown.

The information in the user documentation for the safe digital mixed module must be observed!

10.2.5 B&R modules with safe outputs

Modules that have been tested and approved for use with ACOPOSmicro STO are listed in the "Connection examples" chapter of the "Integrated safety technology" user's manual.

Danger!

It is important to note that disabling OSSD signals reduces error detection in accordance with the specifications listed in the data sheet of the module being used.

11 Standards and certifications

11.1 Applicable European directives

- EMC directive 89/336/EEC
- Low voltage directive 73/23/EEC
- Machinery directive 98/37/EC
- IFA EMC and functional safety for drive systems with integrated safety functions (2012)

11.2 Applicable standards

Standard	Description
IEC/EN 61800-2	Adjustable speed electrical power drive systems • Part 2: General requirements; Rating specifications for low voltage adjustable frequency AC power drive systems
IEC/EN 61800-3	Adjustable speed electrical power drive systems • Part 3: EMC requirements and specific test methods
IEC/EN 61800-5-1	Adjustable speed electrical power drive systems • Part 5-1: Safety requirements - Electrical, thermal and energy
IEC/EN 61131-2	Programmable logic controllers • Part 2: Equipment requirements and tests
UL 508 C	Industrial control equipment • Part 6: Solid-state motor controllers

Table 213: Applicable standards for the ACOPOSmicro

The limit values specified from section 11.3 "Environmental limits" to section 11.6 "Additional environmental limit values per EN 61800-2" are taken from product standard EN 61800 (or IEC 61800) for stepper motor and inverter modules in industrial environments (2nd environment). Stricter testing procedures and limit values are used during the type tests for ACOPOSmicro modules. Additional information is available from B&R.

11.3 Environmental limits

11.3.1 Mechanical conditions per EN 61800-2

11.3.1.1 Operation

IEC 60721-3-3, class 3M1	
	EN 61800-2
Vibration during operation 2 ≤ f < 9 Hz 9 ≤ f < 200 Hz	0.3 mm amplitude 1 m/s² acceleration

Table 214: Mechanical conditions during operation

11.3.1.2 Transport

IEC 60721-3-2, class 2M1	
	EN 61800-2
Vibration during transport 2 ≤ f < 9 Hz 9 ≤ f < 200 Hz 200 ≤ f < 500 Hz	3.5 mm amplitude 10 m/s² acceleration 15 m/s² acceleration

Table 215: Mechanical conditions during transport

11.3.2 Climate conditions per EN 61800-2

11.3.2.1 Operation

IEC 60721-3-3, class 3K3	
	EN 61800-2
Ambient temperature during operation	5 to 45°C
Relative humidity during operation	5 - 85%, non-condensing

Table 216: Climate conditions during operation

11.3.2.2 Storage

IEC 60721-3-1, class 1K4	
	EN 61800-2
Storage temperature	-25 to +55°C

Table 217: Climate conditions during storage - Temperature

IEC 60721-3-1, class 1K3	
	EN 61800-2
Relative humidity during storage	5% - 95%, non-condensing

Table 218: Climate conditions during storage - Relative humidity

11.3.2.3 Transport

IEC 60721-3-2, class 2K3	
	EN 61800-2
Transport temperature	-25 to +70°C
Relative humidity during transport	95% at +40°C

Table 219: Climate conditions during transport

11.4 Requirements for immunity to disturbances (EMC)

11.4.1 Evaluation criteria (performance criteria)

Criteria A ..... The test object is not interfered with during testing.

Criteria B ..... The test object is only interfered with temporarily during testing.

Criteria C ..... The system does not reboot itself automatically (reset required).

11.4.2 High-frequency disturbances per EN 61800-3

These immunity tests are applicable for industrial environments (2nd environment).

11.4.2.1 Electrostatic discharge

Testing performed per EN 61000-4-2		
	EN 61800-3	**Performance criteria**
Contact discharge to powder-coated and bare metal housing parts	4 kV	B
Discharge through the air to plastic housing parts	8 kV	

Table 220: Limit values for electrical discharge

11.4.2.2 Electromagnetic fields

Testing performed per EN 61000-4-3		
	EN 61800-3	**Performance criteria**
Housing, completely wired	80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation at 1 kHz	A

Table 221: Limit values for electromagnetic fields

11.4.2.3 Burst

Testing performed per EN 61000-4-4		
	EN 61800-3	**Performance criteria**
Power connection	2 kV, 1 min, direct coupling	B
Connections for measurement and control functions in the process environment	2 kV, 1 min	
Signal interfaces, other wires	1 kV, 1 min	

Table 222: Limit values for burst

11.4.2.4 Surge

Testing performed per EN 61000-4-5		
	EN 61800-3	**Performance criteria**
Power connection	1 kV (2 Ω)[1], DM, symmetrical 2 kV (12 Ω)[1], CM, asymmetrical	B

Table 223: Limit values for surge

1) The impedance from IEC 61000-4-5 has been added because it is not defined in IEC 61800-3.

11.4.2.5 High-frequency conducted disturbances

Testing performed per EN 61000-4-6		
	EN 61800-3	**Performance criteria**
Power connection	0.15 - 80 MHz, 10 V, 80% amplitude modulation at 1 kHz	A
Connections for measurement and control functions in the process environment		
Signal interfaces, other wires		

Table 224: Limit values for high-frequency conducted disturbances

11.5 Requirements for emissions (EMC)

11.5.1 High-frequency emissions per EN 61800-3

These emission tests are valid for industrial environments (2nd environment).

11.5.1.1 Limit values for disturbance voltage on the mains connections in the frequency band from 150 kHz to 30 MHz

Testing performed per EN 55011			
Continuous current on motor	**Frequency range [MHz]**	**Quasi-peak value**	**Mean**
I ≤ 100 A	0.15 ≤ f < 0.5	100 dB (µV)	90 dB (µV)
	0.5 ≤ f < 5	86 dB (µV)	76 dB (µV)
	5 ≤ f < 30	90 dB (µV)	80 dB (µV)

Table 225: Limit values for disturbance voltage on the mains connections in the frequency band from 150 kHz to 30 MHz

11.5.1.2 Electromagnetic emissions

Testing performed per EN 55011	
Frequency range [MHz]	**Quasi-peak value**
30 ≤ f ≤ 230	40 dB (µV/m), measured at distance of 30 m
230 < f ≤ 1000	50 dB (µV/m), measured at distance of 30 m

Table 226: Limit values for electromagnetic emissions

1) Limit values are increased by 10 dB (µV/m) when measured from a distance of 10 m.

11.6 Additional environmental limit values per EN 61800-2

	EN 61800-2
Pollution degree per EN 61800-2, 4.1.2.1.	2 (non-conductive pollution)
Overvoltage category in accordance with IEC 60364-4-443:1999	III
Degree of protection per EN 60529	IP20

Table 227: Additional environmental limit values

Reduction of the continuous current at installation elevations starting at 500 m above sea level	10% per 1000 m
Maximum installation elevation of stepper motor modules	4000 m
Maximum installation elevation of inverter modules	4000 m
Maximum installation elevation of a power supply module	2000 m[1)]

Table 227: Additional environmental limit values

1) The power supply module can be operated up to 4000 m, but only in the overvoltage category II.

11.7 International certifications

B&R products and services comply with applicable standards. These are international standards from organizations such as ISO, IEC and CENELEC, as well as national standards from organizations such as UL, CSA, FCC, VDE, ÖVE, etc. We pay special attention to the reliability of our products in the industrial sector.

Certifications	
USA and Canada 	All important B&R products are tested and listed by Underwriters Laboratories and checked quarterly by a UL inspector. This mark is valid for the USA and Canada and simplifies the certification of your machines and manufacturing systems in this economic region.
Europe 	This mark certifies that all harmonized EN standards for the applicable directives have been met.
Russian Federation 	GOST-R certification is available for the export of all ACOPOSmicro stepper motor modules to the Russian Federation.

Table 228: International certifications

12 Declaration of conformity

This document was originally written in the German language. The German edition therefore represents the original documentation in accordance with Machinery Directive 2006/42/EC. Documents in other languages should be interpreted as translations of the original documentation.

Product manufacturer:

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Fax: +43 7748 6586-26

office@br-automation.com

Commercial register number: FN 111651 v
Commercial registry: Regional court Ried im Innkreis
UID number: ATU62367156
Legal structure: Limited liability company
Corporate headquarters: Municipality of Eggelsberg (Upper Austria)

Declarations of conformity for B&R products are available for download on the B&R website (www.br-automation.com).

Appendix A UL Markings

- ACOPOSmicro servo drive modules (80VD100Px.Cxxx-xx) provide motor overload protection at 100% of the FLA (Full-Load-Amperage) rating.
- ACOPOSmicro servo drive modules are intended for use in a pollution degree 2 environment.
- For ACOPOSmicro stepper drive modules (80SD100Xx.xxxx-xx) an external motor overload protection is required to be supplied at installation.
- ACOPOSmicro stepper drive modules do not provide motor over-temperature sensing.
- For branch circuit protection of the drives, use fuses or circuit breaker rated as tabulated below:

Inverter model	Drive output rating, A	Type of branch circuit protective device	Maximum current rating, A
80VD100Px.Cxxx-xx)	7.2 A	Class CC of Class J fuses (or inverse-Time circuit breakers)	300 percent of output current rating
80SD100Xx.xxxx-xx	8.0 A	Class CC of Class J fuses (or inverse-Time circuit breakers)	300 percent of output current rating

- The parallel connection of 3 power supplies 80PS80X3.10-01 is tested and evaluated in accordance with the requirements of UL 508C and CSA C22.2, No.274.

14 Abbreviations and terminology

Abbreviations appear throughout the user's manual, for example in data tables or descriptions of pinouts.

Abbreviation	Term	Explanation
NC	Normally closed	Normally closed relay contact.
	Not connected	Used in pinout descriptions if a terminal or pin is not connected on the module side.
ND	Not defined	Stands for an undefined value in technical data tables. This may be because the cable manufacturer has not provided a value for certain technical data.
NO	Normally open	Stands for a normally open relay contact.
TBD	To be defined	Used in technical data tables when there is currently no value for specific technical data. The value will be supplied later.