ACOPOSmicro

User's manual

Version: **1.20 (December 2016)**
Model no.: **MAACPMICRO1-ENG**

Translation of the original documentation

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1 General information

1.1 Manual history

Information:

B&R makes every effort to keep user's manuals as current as possible. If there is a newer version available, it can be downloaded as a PDF file from the B&R website at www.br-automation.com.

Version	Date	Comment
1.20	December 2016	• Updated chapter "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"" on page 8. • 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.).
1.10	June 2015	• Updated chapter "System features". • Updated chapter "Technical data" and added new modules. • Updated chapter "Installation" and added the following chapters: – "ACOPOSmicro with heat sink" – "Dimension diagram for ACOPOSmicro with heat sink" – "Heat sink installation" • Updated chapter "Dimensioning" and added the following chapters: – "Power consumption - Stepper motor modules with heat sink" – "Limitation with 10A output current on both stepper motor axes" – "Example for short-term increase in output power" – "Minimum air current during continuous operation >9 A for both axes" • Updated chapter "Wiring" and added the following sections: – "X7 - Additional inputs/outputs" – "Input circuit diagram for additional digital inputs" – "Output circuit diagram for additional digital outputs" • Updated chapter "Operation - Stepper motor modules". • Updated chapter "Operation - Inverter modules". • Updated chapter "Operation - Power supply". • Chapter "Safety technology" in V1.20, see "History of chapter "Safety technology"" on page 8. • Editorial changes.
1.00	March 2013	• Revised entire manual. • Added inverter modules. • Added safety technology for inverter modules. • Added note regarding "IFA EMC and functional safety" in safety technology chapter. • Power supply module: Updated or added technical data, parallel operation, block diagram and installation notes. Removed revision notes: Documentation applies beginning with hardware revision B7. Updated description of phase failure.
0.10	November 2009	• First edition of user's manual with stepper motor modules.

Table 1: Manual history

Version	Date	Comment
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 "Enable input circuits in accordance with Safety Category 3 / SIL 2 / PL d and functionality (STO, SS1, SS2, SLS, SOS)", including subsections. • Added section "B&R modules with safe outputs". • Editorial changes.

Table 2: History of chapter "Safety technology"

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 safety notices

Safety notices in this manual are organized as follows:

Safety notice	Description
Danger!	Disregarding these safety guidelines and notices can be life-threatening.
Warning!	Disregarding these safety guidelines and notices can result in severe injury or substantial damage to property.
Caution!	Disregarding these safety guidelines and notices can result in injury or damage to property.
Information:	This information is important for preventing errors.

Table 3: Description of the safety notices used in this documentation

1.2.2 General information

B&R drive systems and motors have been designed, developed and manufactured for conventional use in industrial environments. They were not designed, developed and manufactured for any use involving serious risks or hazards that could lead to death, injury, serious physical damage or loss of any kind without the implementation of exceptionally stringent safety precautions.

In particular, such risks and hazards include the use of these devices to monitor nuclear reactions in nuclear power plants, their use 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 in accordance with 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 (e.g. IEC 60364). National accident prevention regulations must be observed.

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

Technical data as well as connection and environmental specifications can be found on the type plate and in this user's manual. Specifications regarding connection and environmental conditions must be observed!

> **Danger!**
>
> **Electronic devices are never completely 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 components that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

1.2.4.1 Packaging

Electrical components with a housing do not require any special ESD packaging, but they must still be handled properly.

1.2.4.2 Guidelines for proper ESD handling

- Do not touch the connector contacts on 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 loads, temperature, moisture, corrosive atmospheres, etc.).

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, power inverters, stepper motor module and power supplies. The oxide layer serving as the dielectric can be weakened by electrochemical processes when stored over a long period of time without voltage applied. 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.

Procedure for modules stored for a long period of time

If stored over a long period of time without nominal voltage applied from the servo drive, 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.

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.
Storage time begins from the moment goods are delivered 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). Suitable protective equipment (e.g. safety glasses, protective gloves, safety shoes, etc.) should be used when necessary!

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

Devices are only permitted to be installed by qualified personnel without voltage applied. Before installation, voltage to the control cabinet must be switched off and prevented from 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 in accordance with applicable guidelines (e.g. line cross sections, fuses, protective ground connections, see also "Dimensioning" on page 207).

1.2.7 Operation

1.2.7.1 Protection against touching electrical parts

Danger!

To operate drive systems, it is necessary for certain parts to carry dangerous voltages over 42 VDC. Touching one of these parts can result in a life-threatening electric shock. This could lead to death, severe 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). Ground connections must be established even when testing or operating the drive system for a short time!

Before switching on the device, all parts that carry voltage must be securely covered. During operation, all covers and control cabinet doors must remain closed.

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

Drive systems are labeled with the following warning:

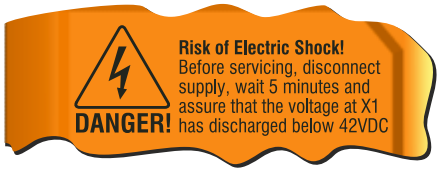


Figure 1: Warning sticker on the drive system

ACOPOSmicro units are provided with these warning stickers in different languages (see page 200).

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 mishandling of 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 need to 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 hanging 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 stickers must be affixed to drive systems and motors to indicate this danger (see page 200):



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

1.2.8 Specifications for functional safety

The characteristic values for functional safety are listed in section "Safety technology[V1.21]" on page 365.

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[V1.21]" 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 features

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 loss
- Uniform design for inverter and stepper motor modules

ACOPOSmicro with heat spreader Without encoder interfaces	ACOPOSmicro with heat sink With 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 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 needed 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 in accordance with EN 1037 as well as the requirements concerning category 0 stop functions in accordance with EN 60204-1 are met. The requirements concerning the STO safety function in accordance with EN 61800-5-2 are also met.

2.1.5 Keying and identification

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. Nevertheless, ACOPOSmicro drives can also be utilized in the low voltage range with nearly no limitations – even as low as 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

It goes without saying with this system 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 loss 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 accuracy, this also enables much smoother operation. The common problem of accumulating resonance frequencies is significantly minimized by the ability to fine-tune the current. 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

Powerful solutions across the board

Reduced energy, service and maintenance costs thanks to a longer lifespan 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

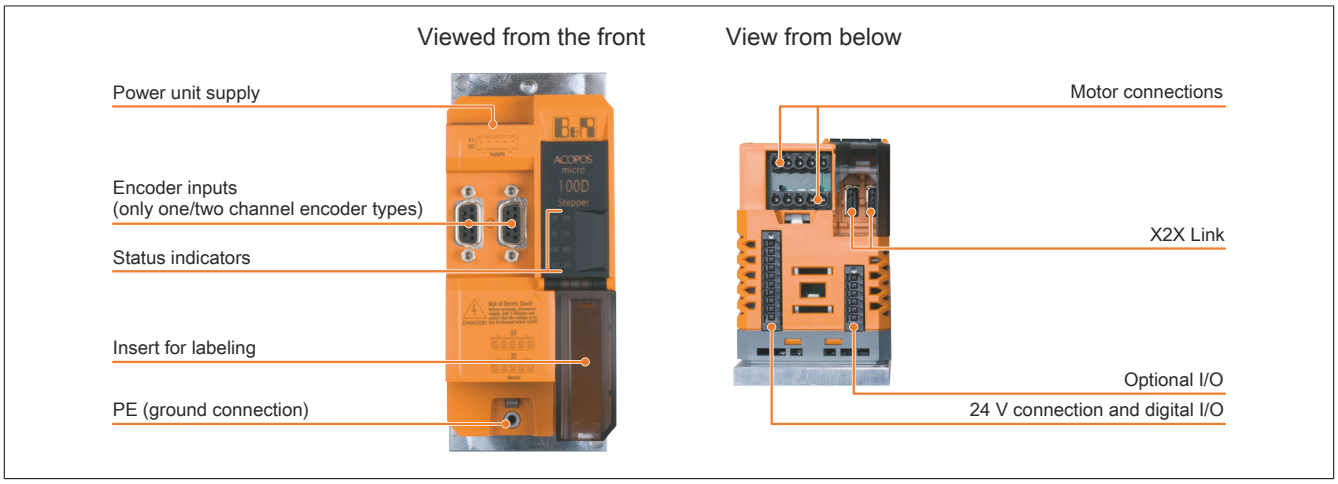


Figure 3: ACOPOSmicro stepper motor modules - Operating and connection elements

ACOPOSmicro inverter modules

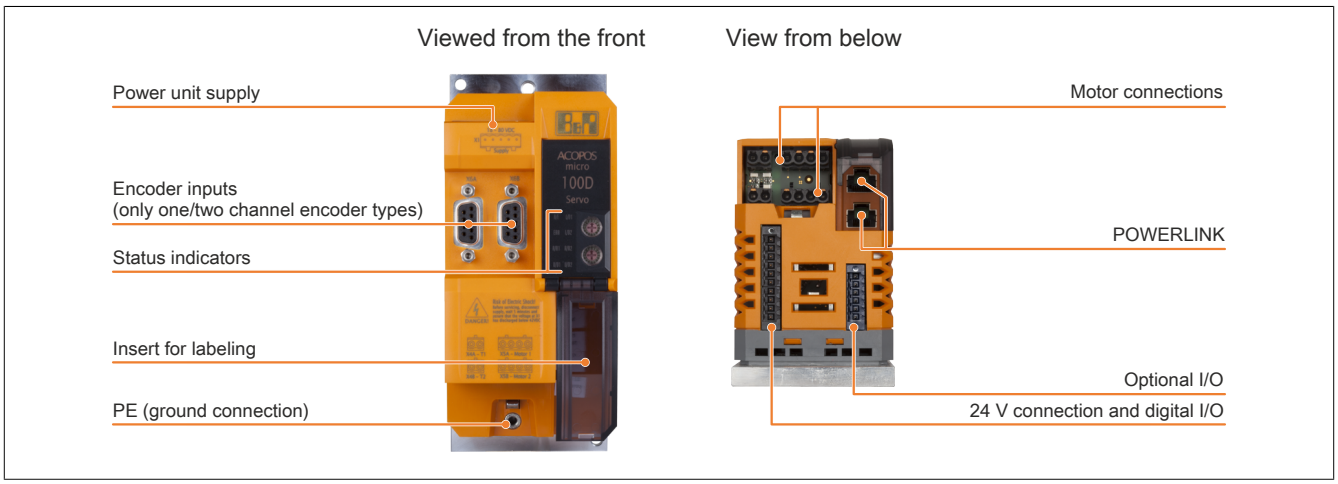


Figure 4: ACOPOSmicro inverter modules - Operating and connection elements

2.1.11 Dimensions

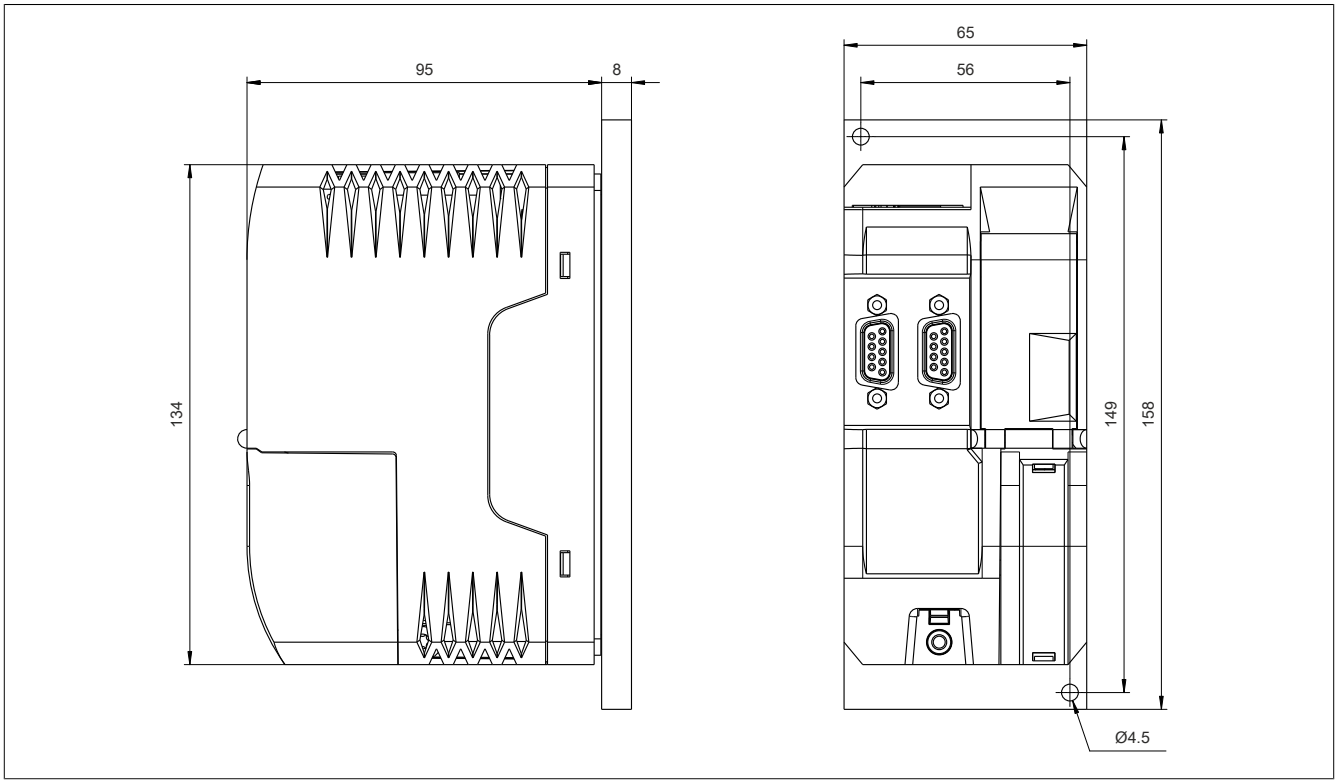


Figure 5: ACOPOSmicro with cold plate - Dimensions

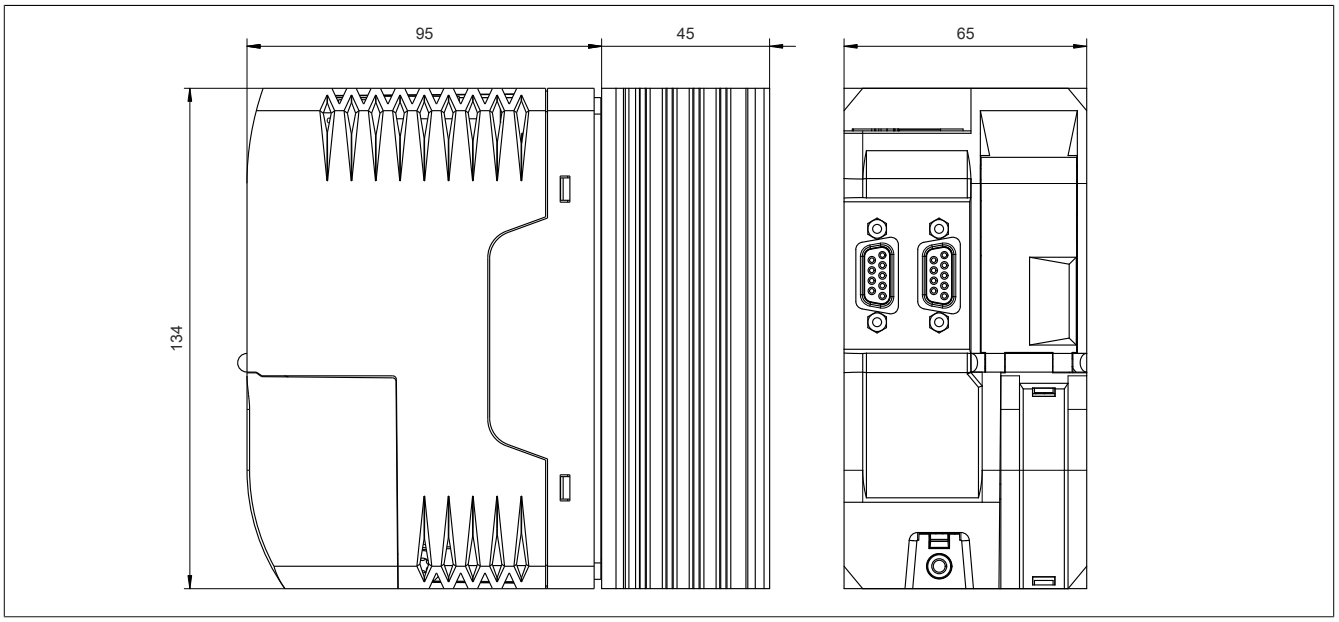
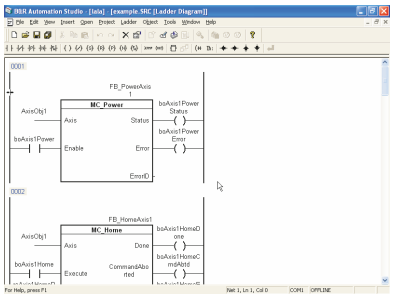


Figure 6: ACOPOSmicro with heat sink - Dimensions

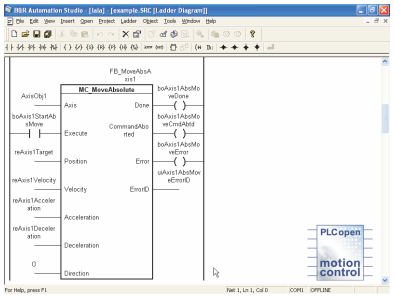
2.1.12 Software

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 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 of the software components necessary for machine automation on a powerful 64-bit platform, providing sufficient computing power to handle even the most complex CNC machine tools. 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
- High-performance with fast response times
- Ultimate freedom for automation concepts with unlimited PLC and CNC system flexibility
- 8 independent CNC channels
- Up to a total of 100 axes for positioning, CNC and electronic gears

- Customizable graphical interface
- Nearly 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 and easy commissioning

All B&R products are programmed and configured in the same way using a Windows-based tool, B&R Automation Studio. This software makes it possible to implement complex drive solutions after just a short orientation period, with hardware components and program sections added and configured in easy-to-use dialog boxes. This considerably reduces project development time.

In addition to being able to verify all axis movements without programming using the NC Test feature, motions ranging from point-to-point movements to those involving gear functions can be carried out interactively. The response of an axis can even be monitored while the system is online, while Trace functionality records relevant drive data for clear analysis at any time.

2.1.12.5 Tools for straightforward and efficient diagnostics

In addition to an oscilloscope function for monitoring the drive in real time, it is also possible to analyze a movement during operation through the use of versatile triggers that generate all kinds of useful data. 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, with the ability to analyze the results and effects on speed, acceleration and jolt immediately in the form of detailed graphs.

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.

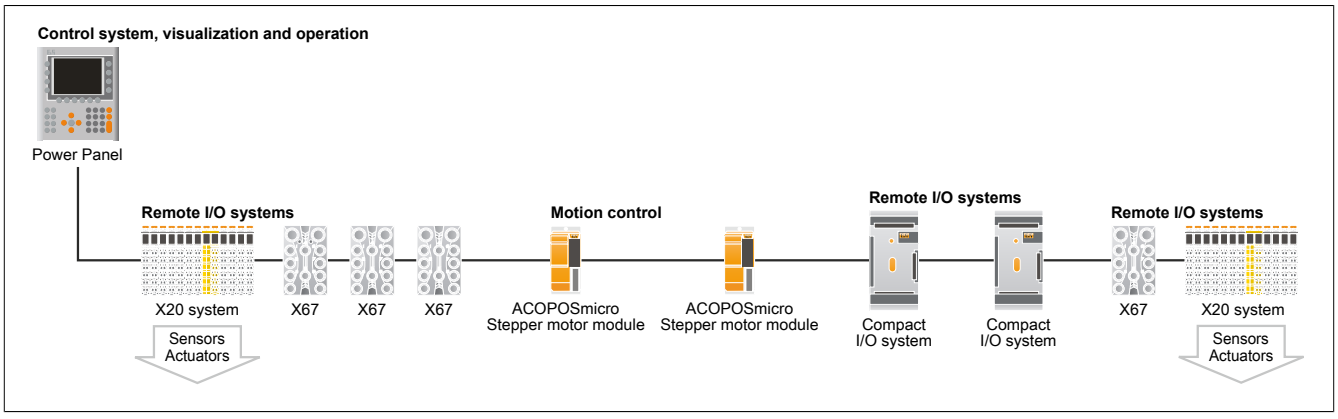


Figure 7: Topology - Compact solution for small and mid-sized machines

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 4: 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.

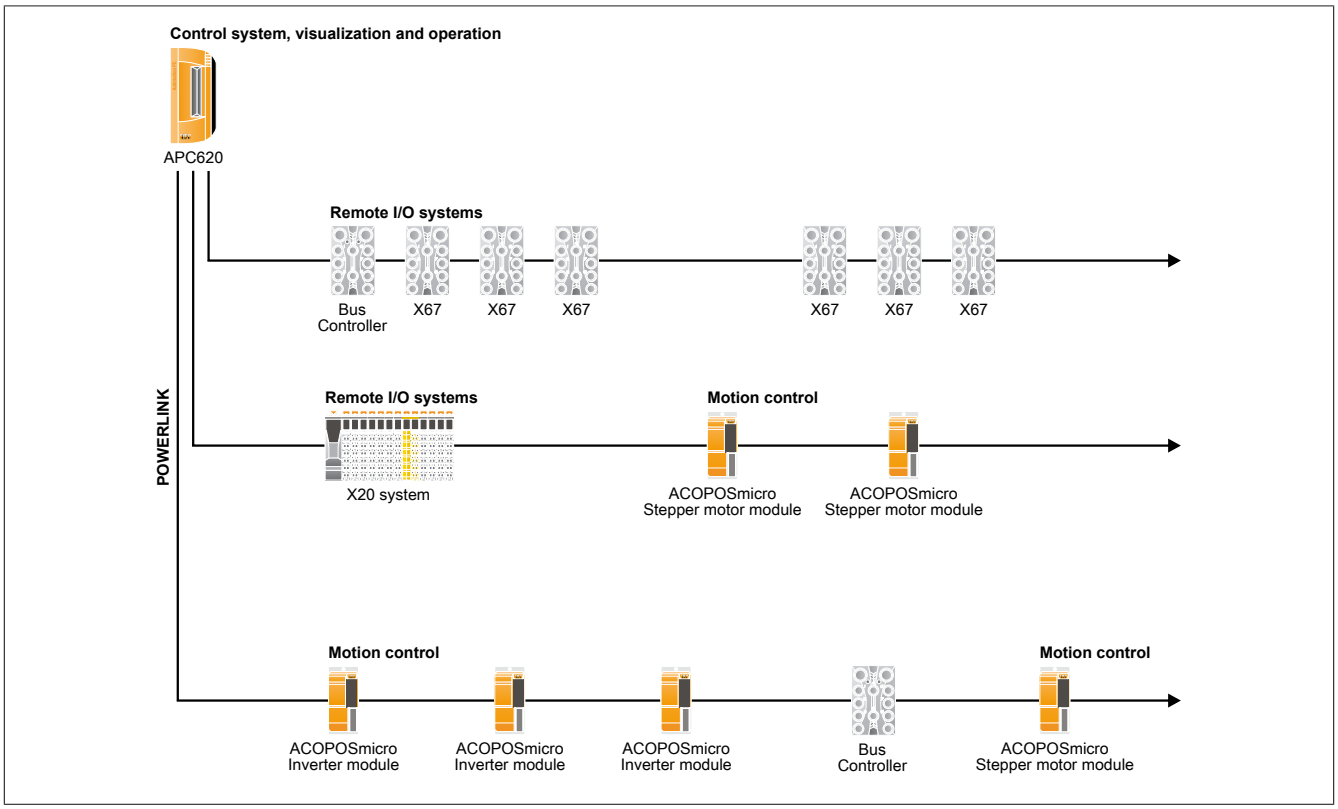


Figure 8: Topology - Customized system combinations

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.

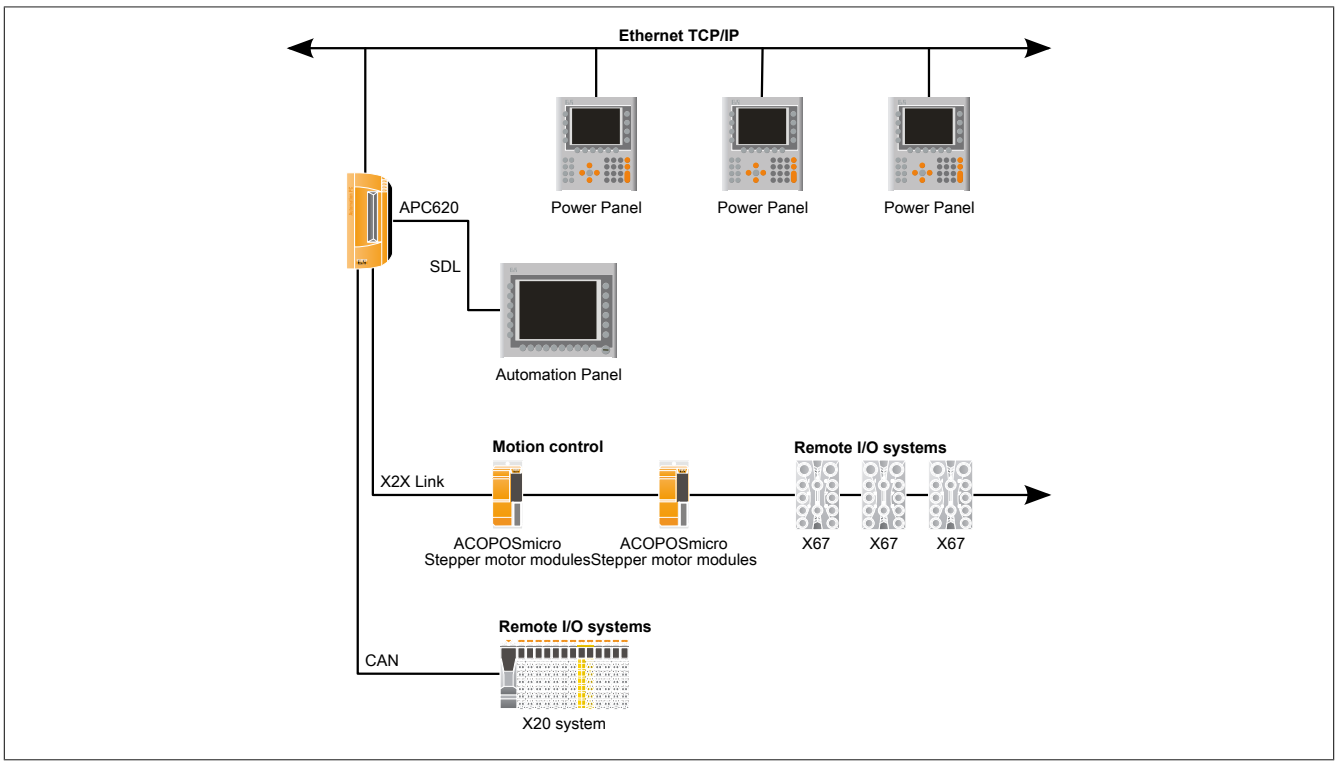


Figure 9: Topology - APC620 embedded for central control, visualization and operation

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 5: 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 24 V incremental encoder
								44			2x 24 V 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

3.1 Overview

Stepper motor modules

Model number	Short description	Page
0TB103.3	Accessory terminal block, 3-pin male, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	133
0TB1106.8010	Accessory terminal block, 6-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	127
0TB1106.8110	Accessory terminal block, 6-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	127
0TB1110.8010	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	128
0TB1110.8110	Accessory terminal block, 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	128
0TB1410.8110-01	Accessory terminal block, 3x 10-pin Cage clamp 1.5 mm², protected against vibration by the screw flange, with labeling and LED	128
0TB2102.4021	Accessory terminal block, 2-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2102.4022	Accessory terminal block, 2-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2102.4121-01	Accessory terminal block, 2-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2102.4122-01	Accessory terminal block, 2-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2104.4021	Accessory terminal block, 4-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2104.4022	Accessory terminal block, 4-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2104.4121-01	Accessory terminal block, 4-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2104.4122-01	Accessory terminal block, 4-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2105.4021	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2105.4022	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2105.4031	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm², for LinMot	129
0TB2105.4032	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm², LinMot	129
0TB2105.4121-01	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2105.4122-01	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2105.4131	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm², LinMot	130
0TB2105.4132	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm², LinMot	130
0TB2105.9021	Accessory terminal block, 5-pin, DC, screw clamp terminal block 2.5 mm²	131
0TB2105.9121-01	Accessory terminal block, 5-pin, DC, cage clamp terminal block 2.5 mm²	131
0TB3102-7010	Accessory terminal block, 2-pin, screw clamp terminal block 6 mm²	132
0TB3104-7021	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled + + - -	132
0TB3104-7022	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled L1 L2 L3 PE	132
0TB710.90	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm²	133
0TB710.91	Accessory terminal block, 10-pin, cage clamp terminal block 1.5 mm²	133
80CM01001.21-01	Motor cable, length 1 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM01001.61-01	Motor cable, length 1 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM01002.21-01	Motor cable, length 1 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM01003.25-01	Incremental encoder cable, length 1 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM01004.25-01	SSI encoder cable, length 1 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
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 can be used in cable drag chains, UL listed	165
80CM01013.21-01	Hybrid cable, length 1 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
80CM02001.21-01	Motor cable, length 2 m, 5x 0.75 mm², 4-pin Molex 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 encoders, springtec connector 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 motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM02003.25-01	Incremental encoder cable, length 2 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM02004.25-01	SSI encoder cable, length 2 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
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 can be used in cable drag chains, UL listed	165
80CM02013.21-01	Hybrid cable, length 2 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
80CM03001.21-01	Motor cable, length 3 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag	146

Inverter modules

Model number	Short description	Page
0TB103.3	Accessory terminal block, 3-pin male, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	133
0TB1106.8010	Accessory terminal block, 6-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	127
0TB1106.8110	Accessory terminal block, 6-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	127
0TB1110.8010	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	128
0TB1110.8110	Accessory terminal block, 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	128
0TB1410.8110-01	Accessory terminal block, 3x 10-pin Cage clamp 1.5 mm², protected against vibration by the screw flange, with labeling and LED	128
0TB2102.4021	Accessory terminal block, 2-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2102.4022	Accessory terminal block, 2-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2102.4121-01	Accessory terminal block, 2-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2102.4122-01	Accessory terminal block, 2-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2104.4021	Accessory terminal block, 4-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2104.4022	Accessory terminal block, 4-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2104.4121-01	Accessory terminal block, 4-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2104.4122-01	Accessory terminal block, 4-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2105.4021	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2105.4022	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2105.4031	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm², for LinMot	129
0TB2105.4032	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm², LinMot	129
0TB2105.4121-01	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2105.4122-01	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2105.4131	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm², LinMot	130
0TB2105.4132	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm², LinMot	130
0TB2105.9021	Accessory terminal block, 5-pin, DC, screw clamp terminal block 2.5 mm²	131
0TB2105.9121-01	Accessory terminal block, 5-pin, DC, cage clamp terminal block 2.5 mm²	131
0TB3102-7010	Accessory terminal block, 2-pin, screw clamp terminal block 6 mm²	132
0TB3104-7021	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled + + - -	132
0TB3104-7022	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled L1 L2 L3 PE	132
0TB710.90	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm²	133
0TB710.91	Accessory terminal block, 10-pin, cage clamp terminal block 1.5 mm²	133
80CM01001.21-01	Motor cable, length 1 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM01001.61-01	Motor cable, length 1 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM01002.21-01	Motor cable, length 1 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM01003.25-01	Incremental encoder cable, length 1 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM01004.25-01	SSI encoder cable, length 1 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
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 can be used in cable drag chains, UL listed	165
80CM01013.21-01	Hybrid cable, length 1 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
80CM02001.21-01	Motor cable, length 2 m, 5x 0.75 mm², 4-pin Molex 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 encoders, springtec connector 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 motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM02003.25-01	Incremental encoder cable, length 2 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM02004.25-01	SSI encoder cable, length 2 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
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 can be used in cable drag chains, UL listed	165
80CM02013.21-01	Hybrid cable, length 2 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
80CM03001.21-01	Motor cable, length 3 m, 5x 0.75 mm², 4-pin Molex 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 encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149

Power supply modules

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0TB1106.8110	Accessory terminal block, 6-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	127
0TB1110.8010	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	128
0TB1110.8110	Accessory terminal block, 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
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0TB2105.9021	Accessory terminal block, 5-pin, DC, screw clamp terminal block 2.5 mm²	131
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80CM01001.21-01	Motor cable, length 1 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM01001.61-01	Motor cable, length 1 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM01002.21-01	Motor cable, length 1 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM01003.25-01	Incremental encoder cable, length 1 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM01004.25-01	SSI encoder cable, length 1 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
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 can be used in cable drag chains, UL listed	165
80CM01013.21-01	Hybrid cable, length 1 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
80CM02001.21-01	Motor cable, length 2 m, 5x 0.75 mm², 4-pin Molex 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 encoders, springtec connector 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 motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM02003.25-01	Incremental encoder cable, length 2 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM02004.25-01	SSI encoder cable, length 2 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
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 can be used in cable drag chains, UL listed	165
80CM02013.21-01	Hybrid cable, length 2 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
80CM03001.21-01	Motor cable, length 3 m, 5x 0.75 mm², 4-pin Molex 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 encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149

Accessories

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	Batteries	
80XB120A2.36-00	1x lithium battery, 1/2 AA 3.6 V	199
	Braking resistor	
80XBR0025.010-11	Braking resistor for power supply module 80PS080X3.10-01, 2.5 Ω, 100 W	197
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	198
	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	182
8BCF0005.1221B-0	EnDat 2.2 cable, length 5 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	182
8BCF0007.1221B-0	EnDat 2.2 cable, length 7 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	182
8BCF0010.1221B-0	EnDat 2.2 cable, length 10 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	182
8BCF0015.1221B-0	EnDat 2.2 cable, length 15 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	182
8BCF0020.1221B-0	EnDat 2.2 cable, length 20 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	182
8BCF0025.1221B-0	EnDat 2.2 cable, length 25 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	182
	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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
	Hiperface motor cables	
80CM01001.61-01	Motor cable, length 1 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM02001.61-01	Motor cable, length 2 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM03001.61-01	Motor cable, length 3 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM05001.61-01	Motor cable, length 5 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM10001.61-01	Motor cable, length 10 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM15001.61-01	Motor cable, length 15 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM20001.61-01	Motor cable, length 20 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	199
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	199
	Hybrid cables	
80CM01013.21-01	Hybrid cable, length 1 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
80CM02013.21-01	Hybrid cable, length 2 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
80CM03013.21-01	Hybrid cable, length 3 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
80CM05013.21-01	Hybrid cable, length 5 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
80CM10013.21-01	Hybrid cable, length 10 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
	Incremental encoder cables	
80CM01003.25-01	Incremental encoder cable, length 1 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM02003.25-01	Incremental encoder cable, length 2 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM03003.25-01	Incremental encoder cable, length 3 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM05003.25-01	Incremental encoder cable, length 5 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM10003.25-01	Incremental encoder cable, length 10 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM15003.25-01	Incremental encoder cable, length 15 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157

Model number	Short description	Page
80CM20003.25-01	Incremental encoder cable, length 20 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM25003.25-01	Incremental encoder cable, length 25 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
	Inverter modules	
80VD100PD.C000-01	ACOPOSmicro inverter module, POWERLINK interface, 2x EnDat 2.2, 24-64 VDC ±25% 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.	73
80VD100PD.C000-14	ACOPOSmicro inverter module, POWERLINK interface, 2x EnDat 2.2, 24-64 VDC ±25% 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, sink, 2 digital outputs 24 VDC, 1 A, order terminal blocks and encoder buffer battery 80XB120A2.36-00 separately.	76
80VD100PD.C022-01	ACOPOSmicro inverter module, POWERLINK interface, 2x resolver, 24-64 VDC ±25% 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.	80
80VD100PD.C022-14	ACOPOSmicro inverter module, POWERLINK interface, 2x resolver, 24-64 VDC ±25% 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, sink, 2 digital outputs 24 VDC, 1 A, order terminal blocks separately.	83
80VD100PD.C033-01	ACOPOSmicro inverter module, POWERLINK interface, 2x SSI absolute encoder, 24-64 VDC ±25% 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.C088-01	ACOPOSmicro inverter module, POWERLINK interface, 2x SinCos encoder, 24-64 VDC ±25% supply, 2 motor connectors, 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.C144-01	ACOPOSmicro inverter module, POWERLINK interface, 2x incremental encoder, 24-64 VDC ±25% 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
80VD100PD.C188-01	ACOPOSmicro inverter module, POWERLINK interface, 2x LinMot®, 24-64 VDC ±25% 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.	96
80VD100PS.C00X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x EnDat 2.2, 24-64 VDC ±25% 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.	99
80VD100PS.C02X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x resolver, 24-64 VDC ±25% 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.C03X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x SSI absolute encoder, 24-64 VDC ±25% 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
80VD100PS.C08X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x SinCos encoder, 24-64 VDC ±25% 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.	108
	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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186

Model number	Short description	Page
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	189
	Motor cables	
80CM01001.21-01	Motor cable, length 1 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM02001.21-01	Motor cable, length 2 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM03001.21-01	Motor cable, length 3 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM05001.21-01	Motor cable, length 5 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM10001.21-01	Motor cable, length 10 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM15001.21-01	Motor cable, length 15 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM20001.21-01	Motor cable, length 20 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM25001.21-01	Motor cable, length 25 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
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 drag chains, UL/CSA listed	172
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	174
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	172
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	174
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 drag chains, UL/CSA listed	172
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	174
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 drag chains, UL/CSA listed	172
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	174
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 drag chains, UL/CSA listed	172
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	174
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 drag chains, UL/CSA listed	172
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	174
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 drag chains, UL/CSA listed	172
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	174
	Motor cables 0.75 mm² SpringTec connector	
8BCM0005.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 5 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0006.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 6 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0007.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 7 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0010.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 10 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0015.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 15 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0017.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 17 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0020.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 20 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0025.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 25 m, can be used in cable drag chains, UL/CSA listed	192
	Motor cables with brake	
80CM01002.21-01	Motor cable, length 1 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM02002.21-01	Motor cable, length 2 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM03002.21-01	Motor cable, length 3 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM05002.21-01	Motor cable, length 5 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM10002.21-01	Motor cable, length 10 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM15002.21-01	Motor cable, length 15 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM20002.21-01	Motor cable, length 20 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK connection cable, RJ45 to RJ45, 0.2 m	137
X20CA0E61.00025	POWERLINK connection cable, RJ45 to RJ45, 025 m	137
X20CA0E61.00030	POWERLINK connection cable, RJ45 to RJ45, 03 m	137
X20CA0E61.00035	POWERLINK connection cable, RJ45 to RJ45, 035 m	137
X20CA0E61.00040	POWERLINK connection cable, RJ45 to RJ45, 04 m	137

Model number	Short description	Page
X20CA0E61.00050	POWERLINK connection cable, RJ45 to RJ45, 0.5 m	137
X20CA0E61.00100	POWERLINK connection cable, RJ45 to RJ45, 1 m	137
X20CA0E61.00150	POWERLINK connection cable, RJ45 to RJ45, 1.5 m	137
X20CA0E61.00200	POWERLINK connection cable, RJ45 to RJ45, 2 m	137
X20CA0E61.00500	POWERLINK connection cable, RJ45 to RJ45, 5 m	137
X20CA0E61.01000	POWERLINK connection cable, RJ45 to RJ45, 10 m	137
X20CA0E61.01500	POWERLINK connection cable, RJ45 to RJ45, 15 m	137
X20CA0E61.02000	POWERLINK connection cable, RJ45 to RJ45, 20 m	137
X20CA0E61.0300	POWERLINK connection cable, RJ45 to RJ45, 30 m	140
X20CA0E61.0500	POWERLINK connection cable, RJ45 to RJ45, 50 m	140
X20CA0E61.0600	POWERLINK connection cable, RJ45 to RJ45, 60 m	140
X20CA0E61.1000	POWERLINK connection cable, RJ45 to RJ45, 100 m	140
X20CA3E61.0100	POWERLINK connection cable, RJ45 to RJ45, can be used in cable drag chains, 10 m	135
X20CA3E61.0150	POWERLINK connection cable, RJ45 to RJ45, can be used in cable drag chains, 15 m	135
X20CA3E61.0200	POWERLINK connection cable, RJ45 to RJ45, can be used in cable drag chains, 20 m	135
	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.	115
	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 connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
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	179
8BCR0005.1121A-0	Resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0005.3121A-0	Resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0007.1121A-0	Resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0007.3121A-0	Resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0010.1121A-0	Resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0010.3121A-0	Resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0015.1121A-0	Resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0015.3121A-0	Resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0020.1121A-0	Resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0020.3121A-0	Resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0025.1121A-0	Resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0025.3121A-0	Resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
	SSI encoder cables	
80CM01004.25-01	SSI encoder cable, length 1 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM02004.25-01	SSI encoder cable, length 2 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM03004.25-01	SSI encoder cable, length 3 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM05004.25-01	SSI encoder cable, length 5 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM10004.25-01	SSI encoder cable, length 10 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM15004.25-01	SSI encoder cable, length 15 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM20004.25-01	SSI encoder cable, length 20 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161

Model number	Short description	Page
	Stepper motor modules	
80SD100XD.C011-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x HIPERFACE encoder, 24-64 VDC ±25% 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.C033-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x 5 V SSI absolute encoder, 24-64 VDC ±25% 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.C044-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x 24 V incremental encoder, 24-64 VDC ±25% 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.	40
80SD100XD.C04X-13	ACOPOSmicro stepper motor module, X2X Link interface, 1x 24 V incremental encoder, 24-64 VDC ±25% 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, can be configured as an incremental encoder, 2 digital outputs, 24 VDC, 0.5 A, order terminal blocks separately.	43
80SD100XD.C0XX-01	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% 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.	47
80SD100XD.C0XX-21	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% 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.	50
80SD100XD.W044-01	ACOPOSmicro stepper motor module, heat sink, X2X Link interface, 2x 24 V incremental encoder, 24-64 VDC ±25% 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
80SD100XD.W0XX-01	ACOPOSmicro stepper motor module, heat sink, X2X Link interface, 24-64 VDC ±25% 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.	56
80SD100XS.C04X-01	ACOPOSmicro stepper motor module, X2X Link interface, 1x 24 V incremental encoder, 24-64 VDC ±25% 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.	59
80SD100XS.C04X-13	ACOPOSmicro stepper motor module, X2X Link interface, 1x 24 V incremental encoder, 24-64 VDC ±25% 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, can be configured as an incremental encoder, 2 digital outputs, 24 VDC, 0.5 A, order terminal blocks separately.	62
80SD100XS.C0XX-01	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% 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	66
	Terminal blocks	
0TB103.3	Accessory terminal block, 3-pin male, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	133
0TB1106.8010	Accessory terminal block, 6-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	127
0TB1106.8110	Accessory terminal block, 6-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	127
0TB1110.8010	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	128
0TB1110.8110	Accessory terminal block, 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	128
0TB1410.8110-01	Accessory terminal block, 3x 10-pin Cage clamp 1.5 mm², protected against vibration by the screw flange, with labeling and LED	128
0TB2102.4021	Accessory terminal block, 2-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2102.4022	Accessory terminal block, 2-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2102.4121-01	Accessory terminal block, 2-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2102.4122-01	Accessory terminal block, 2-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2104.4021	Accessory terminal block, 4-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2104.4022	Accessory terminal block, 4-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2104.4121-01	Accessory terminal block, 4-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2104.4122-01	Accessory terminal block, 4-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2105.4021	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2105.4022	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2105.4031	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm², for LinMot	129
0TB2105.4032	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm², LinMot	129
0TB2105.4121-01	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2105.4122-01	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2105.4131	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm², LinMot	130
0TB2105.4132	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm², LinMot	130
0TB2105.9021	Accessory terminal block, 5-pin, DC, screw clamp terminal block 2.5 mm²	131
0TB2105.9121-01	Accessory terminal block, 5-pin, DC, cage clamp terminal block 2.5 mm²	131
0TB3102-7010	Accessory terminal block, 2-pin, screw clamp terminal block 6 mm²	132
0TB3104-7021	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled + + - -	132
0TB3104-7022	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled L1 L2 L3 PE	132
0TB710.90	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm²	133
0TB710.91	Accessory terminal block, 10-pin, cage clamp terminal block 1.5 mm²	133
	X2X Link cables	
X20CA0X48.0010	X2X Link connection cable, open on one side, 1 m	142
X20CA0X48.0020	X2X Link connection cable, open on one side, 2 m	142

Model number	Short description	Page
X20CA0X48.0050	X2X Link connection cable, open on one side, 5 m	142
X20CA0X48.0100	X2X Link connection cable, open on one side, 10 m	142
X20CA0X48.0200	X2X Link connection cable, open on one side, 20 m	142
X20CA0X68.0003	X2X Link connection cable, 0.3 m	144
X20CA0X68.0010	X2X Link connection cable, 1 m	144
X20CA0X68.0020	X2X Link connection cable, 2 m	144
X20CA0X68.0050	X2X Link connection cable, 5 m	144
X20CA0X68.0100	X2X Link connection cable, 10 m	144

3.2 Stepper motor modules

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

By individually adjusting 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 the latter reduces energy consumption and thermal load, the effects are positive on the lifespan 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
- Ramp function model based on the 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 6: Overview of available ACOPOSmicro stepper motor module variants

3.2.2 80SD100XD.C011-01

3.2.2.1 Order data

Model number	Short description	Figure
	Stepper motor modules	
80SD100XD.C011-01	ACOPOSmicro stepper motor module, X2X Link interface, 2x HIPERFACE encoder, 24-64 VDC ±25% 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 7: 80SD100XD.C011-01 - Order data

3.2.2.2 Technical data

Model 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
Certification	
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 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 - Dissipated power from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact

Table 8: 80SD100XD.C011-01 - Technical data

Model number	80SD100XD.C011-01
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 capability	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 the 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	
Typical	30 ms
Maximum	452 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC

Table 8: 80SD100XD.C011-01 - Technical data

Model number	80SD100XD.C011-01
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 8: 80SD100XD.C011-01 - Technical data

1) Including 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

Model 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% 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 9: 80SD100XD.C033-01 - Order data

3.2.3.2 Technical data

Model 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
Certification	
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 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 - Dissipated power from the power unit for each powered axis"

Table 10: 80SD100XD.C033-01 - Technical data

Model number	80SD100XD.C033-01
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 capability	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 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	452 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2

Table 10: 80SD100XD.C033-01 - Technical data

Model number	80SD100XD.C033-01
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 10: 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) Including enable input
3) Depends on the supply of the CPU component
4) Without heat spreader

3.2.4 80SD100XD.C044-01

3.2.4.1 Order data

Model 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% 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 11: 80SD100XD.C044-01 - Order data

3.2.4.2 Technical data

Model 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
Certification	
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 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 - Dissipated power from the power unit for each powered axis"

Table 12: 80SD100XD.C044-01 - Technical data

Model number	80SD100XD.C044-01
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 capability	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 (to COM)
High	>15 V (to COM)
Temperature measurement	
Type	KTY
Value	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 V
High	>15 V

Table 12: 80SD100XD.C044-01 - Technical data

Model number	80SD100XD.C044-01
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	452 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 12: 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) Including 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

Model 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% 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, can be configured as an 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 13: 80SD100XD.C04X-13 - Order data

3.2.5.2 Technical data

Model 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
Certification	
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 supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A

Table 14: 80SD100XD.C04X-13 - Technical data

Model number	80SD100XD.C04X-13
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Dissipated power from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 capability	40 mA [4]
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Switching threshold	
Low	<5 V (to COM)
High	>15 V (to COM)
Temperature measurement	
Type	KTY
Value	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 V
High	>15 V

Table 14: 80SD100XD.C04X-13 - Technical data

Model number	80SD100XD.C04X-13
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	452 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Digital inputs (option board)	
Quantity	4
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 3.1 mA
Input filter	
Hardware	<5 µs
Software	-
Input circuit	Sink
Additional functions	Incremental encoder, event counter, period duration or gate measurement
Input resistance	Typ. 7.8 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
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 cutoff for overcurrent and short circuit
Design	High-side FET positive switching
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 module power supply
Max. internal resistance	0.3 Ω

Table 14: 80SD100XD.C04X-13 - Technical data

Model number	80SD100XD.C04X-13
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
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 14: 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) Including 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

Model number	Short description	Figure
	Stepper motor modules	
80SD100XD.C0XX-01	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% 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 15: 80SD100XD.C0XX-01 - Order data

3.2.6.2 Technical data

Model 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
Certification	
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 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 - Dissipated power from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC

Table 16: 80SD100XD.C0XX-01 - Technical data

Model number	80SD100XD.C0XX-01
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	452 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	IP20

Table 16: 80SD100XD.C0XX-01 - Technical data

Model number	80SD100XD.C0XX-01
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 characteristics	
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 grounded backplane

Table 16: 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) Including enable input
3) Without heat spreader

3.2.7 80SD100XD.C0XX-21

3.2.7.1 Order data

Model number	Short description	Figure
	Stepper motor modules	
80SD100XD.C0XX-21	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% 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 terminal block 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 17: 80SD100XD.C0XX-21 - Order data

3.2.7.2 Technical data

Model 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
Certification	
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 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 - Dissipated power from the power unit for each powered axis"

Table 18: 80SD100XD.C0XX-21 - Technical data

Model number	80SD100XD.C0XX-21
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	452 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Analog inputs (option board)	
Quantity	2
Input signal	±10 V
Input type	Differential input
Digital converter resolution	13-bit
Conversion time	50 µs for all channels

Table 18: 80SD100XD.C0XX-21 - Technical data

Model number	80SD100XD.C0XX-21
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
Permitted input signal	Max. ±30 V
Output of the digital value during overload	
Above upper limit	0x7FFF
Below lower limit	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
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 18: 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) Including enable input
3) Without heat spreader

3.2.8 80SD100XD.W044-01

3.2.8.1 Order data

Model 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% 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 19: 80SD100XD.W044-01 - Order data

3.2.8.2 Technical data

Model 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
Certification	
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 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 - Dissipated power from the power unit for each powered axis"

Table 20: 80SD100XD.W044-01 - Technical data

Model number	80SD100XD.W044-01
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 capability	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 (to COM)
High	>15 V (to COM)
Temperature measurement	
Type	KTY
Value	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 V
High	>15 V

Table 20: 80SD100XD.W044-01 - Technical data

Model number	80SD100XD.W044-01
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	452 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 20: 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) Including enable input
3) Depends on the 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

Model number	Short description	Figure
	Stepper motor modules	
80SD100XD.W0XX-01	ACOPOSmicro stepper motor module, heat sink, X2X Link interface, 24-64 VDC ±25% 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 21: 80SD100XD.W0XX-01 - Order data

3.2.9.2 Technical data

Model 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
Certification	
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 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 - Dissipated power from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact

Table 22: 80SD100XD.W0XX-01 - Technical data

Model number	80SD100XD.W0XX-01
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	452 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	IP20

Table 22: 80SD100XD.W0XX-01 - Technical data

Model number	80SD100XD.W0XX-01
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 characteristics	
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 22: 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

Model 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% 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 23: 80SD100XS.C04X-01 - Order data

3.2.10.2 Technical data

Model number	80SD100XS.C04X-01
Short description	
Stepper motor module	Connection for 1 stepper motor with ABR interface, 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
Certification	
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 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 - Dissipated power from the power unit for each powered axis"

Table 24: 80SD100XS.C04X-01 - Technical data

Model number	80SD100XS.C04X-01
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 capability	40 mA [4]
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Switching threshold	
Low	<5 V (to COM)
High	>15 V (to COM)
Temperature measurement	
Type	KTY
Value	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 V
High	>15 V

Table 24: 80SD100XS.C04X-01 - Technical data

Model number	80SD100XS.C04X-01
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	867 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 24: 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) Including 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

Model 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% 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, can be configured as an 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 25: 80SD100XS.C04X-13 - Order data

3.2.11.2 Technical data

Model number	80SD100XS.C04X-13
Short description	
Stepper motor module	Connection for 1 stepper motor with ABR interface, 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
Certification	
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 supply
Reverse polarity protection	Yes
Power supply	
Input voltage	24 to 64 VDC ±25%
Inrush current	Max. 10 A

Table 26: 80SD100XS.C04X-13 - Technical data

Model number	80SD100XS.C04X-13
Power consumption	
Idle (no motor powered)	Max. 0.5 W
Full load	See diagram "Dimensioning - Dissipated power from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 capability	40 mA [4]
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Switching threshold	
Low	<5 V (to COM)
High	>15 V (to COM)
Temperature measurement	
Type	KTY
Value	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 V
High	>15 V

Table 26: 80SD100XS.C04X-13 - Technical data

Model number	80SD100XS.C04X-13
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	867 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Digital inputs (option board)	
Quantity	4
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 3.1 mA
Input filter	
Hardware	<5 µs
Software	-
Input circuit	Sink
Additional functions	Incremental encoder, event counter, period duration or gate measurement
Input resistance	Typ. 7.8 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
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 cutoff for overcurrent and short circuit
Design	High-side FET positive switching
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 module power supply
Max. internal resistance	0.3 Ω

Table 26: 80SD100XS.C04X-13 - Technical data

Model number	80SD100XS.C04X-13
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
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 26: 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

Model number	Short description	Figure
	Stepper motor modules	
80SD100XS.C0XX-01	ACOPOSmicro stepper motor module, X2X Link interface, 24-64 VDC ±25% 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 27: 80SD100XS.C0XX-01 - Order data

3.2.12.2 Technical data

Model 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
Certification	
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 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 - Dissipated power from the power unit for each powered axis"
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC

Table 28: 80SD100XS.C0XX-01 - Technical data

Model number	80SD100XS.C0XX-01
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	867 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	1
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	IP20

Table 28: 80SD100XS.C0XX-01 - Technical data

Model number	80SD100XS.C0XX-01
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 characteristics	
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 grounded backplane

Table 28: 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) Including 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>No power to module or module ready for operation</td></tr>
<tr><td></td><td></td><td>On</td><td>Module in error or reset status</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>Reset mode</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>PREOPERATIONAL mode</td></tr>
<tr><td></td><td></td><td>On</td><td>RUN mode</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 29: 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 power unit's supply module 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.

The following applies to the "Standard" function model:

⇨ 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 taken:

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

The following applies to the "Standard" function model:

⇨ 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 descriptions "Temperature" on page 268 (for the standard function model) and "Temperature" on page 323 (for the ramp function model).

Heat sink temperature (temperature on the power unit):

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

- 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

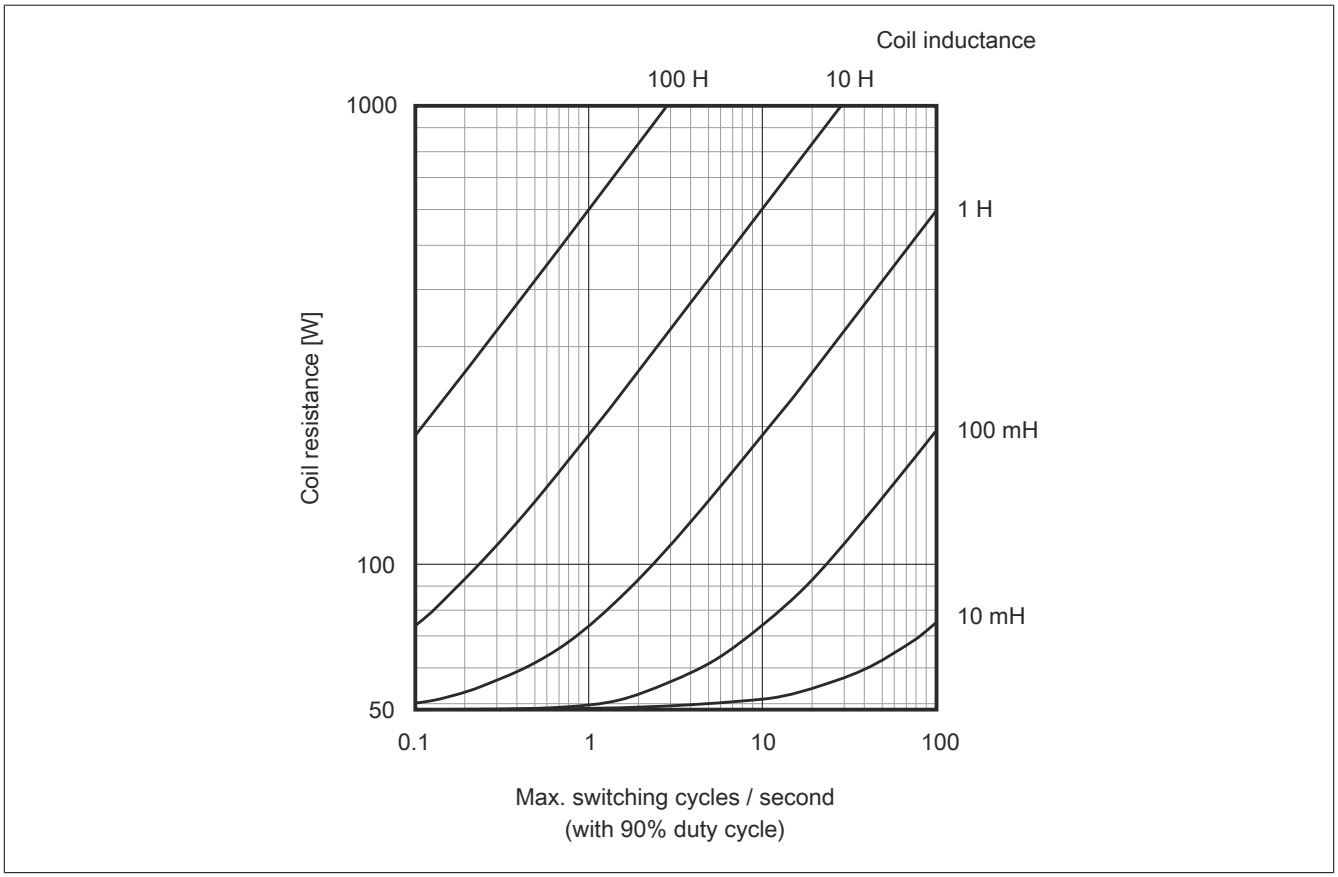


Figure 10: Additional digital inputs/outputs - Switching inductive loads

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 interface, 2-phase bipolar	Max. 7 W
80SD100XS.C04X-13	Connection for 1 stepper motor with ABR interface, 2-phase bipolar	Max. 7 W
80SD100XS.C0XX-01	Connection for one stepper motor without encoder, 2-phase bipolar	Max. 6 W

2) See the register description "Heat sink temperature" on page 268 (for the standard function model) and "Temperature of the power output stage" on page 323 (for the ramp function model).

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 207.

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.

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 mains also directly affect the output voltage.

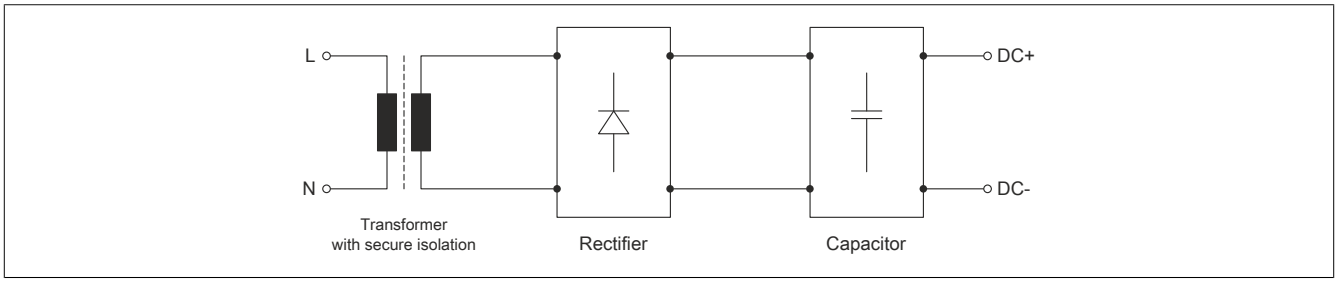


Figure 11: Transformer for motor supply

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. A wide range of servo motors can be connected, from 24 to 64 VDC ±25% nominal voltage and 8 A continuous current.

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 and 45°C or higher, 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 30: 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	Beginning with hardware revision F3 and ACP10 3.150
80VD100PD.C000-14	3.0.81 SP3 or later	2.380 or later	Beginning with hardware revision C3 and ACP10 3.150
80VD100PD.C022-01	3.0.81 or later	2.240 or later	Beginning with hardware revision F3 and ACP10 3.150
80VD100PD.C022-14	3.0.81 SP3 or later	2.380 or later	Beginning with hardware revision E3 and ACP10 3.150
80VD100PD.C033-01	3.0.90 or later	2.440 or later	Beginning with hardware revision C3 and ACP10 3.150
80VD100PD.C088-01	3.0.90 or later	2.45.00 or later	Beginning with hardware revision D3 and ACP10 3.150
80VD100PD.C144-01	4.1.7.61 or later	3.13 or later	Beginning with hardware revision C3 and ACP10 3.150
80VD100PD.C188-01	3.0.90 or later	2.391 or later	Beginning with hardware revision C3 and ACP10 3.150
80VD100PS.C00X-01	3.0.81.26 or later	2.271 or later	Beginning 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	Beginning with hardware revision E3 and ACP10 3.150
80VD100PS.C03X-01	3.0.90 or later	2.440 or later	Beginning with hardware revision C3 and ACP10 3.150
80VD100PS.C08X-01	3.0.90 or later	2.45.00 or later	Beginning with hardware revision C3 and ACP10 3.150

1 If the parameter group is added manually, see "Adding parameter groups manually" on page 353.

3.3.3 80VD100PD.C000-01

3.3.3.1 Order data

Model number	Short description	Figure
	Inverter modules	
80VD100PD.C000-01	ACOPOSmicro inverter module, POWERLINK interface, 2x EnDat 2.2, 24-64 VDC ±25% 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 31: 80VD100PD.C000-01 - Order data

3.3.3.2 Technical data

Model number	80VD100PD.C000-01
Short description	
Inverter module	Connection for 2 servo motors with EnDat 2.2 encoder
General information	
B&R ID code	0xADF7
Status indicators	POWERLINK, operating status, module status, module 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
Certification	
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 32: 80VD100PD.C000-01 - Technical data

Model 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 loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 capability	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 V
High	>15 V

Table 32: 80VD100PD.C000-01 - Technical data

Model number	80VD100PD.C000-01
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	551 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 32: 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) Including enable input
3) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 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 beginning with hardware revision F3 and ACP10 V3.150 possible
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

Model number	Short description	Figure
	Inverter modules	
80VD100PD.C000-14	ACOPOSmicro inverter module, POWERLINK interface, 2x EnDat 2.2, 24-64 VDC ±25% 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, 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 33: 80VD100PD.C000-14 - Order data

3.3.4.2 Technical data

Model number	80VD100PD.C000-14
Short description	
Inverter module	Connection for 2 servo motors with EnDat 2.2 encoder
General information	
B&R ID code	0xC9DE
Status indicators	POWERLINK, operating status, module status, module 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
Certification	
CE	Yes
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 34: 80VD100PD.C000-14 - Technical data

Model number	80VD100PD.C000-14
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	1.31 kW
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 capability	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 V
High	>15 V

Table 34: 80VD100PD.C000-14 - Technical data

Model number	80VD100PD.C000-14
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	551 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Digital inputs (option board)	
Quantity	1
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	8 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Electrical isolation	Yes
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
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 34: 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) Including enable input
3) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 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 beginning with hardware revision C3 and ACP10 V3.150 possible
6) Without heat spreader

3.3.5 80VD100PD.C022-01

3.3.5.1 Order data

Model number	Short description	Figure
	Inverter modules	
80VD100PD.C022-01	ACOPOSmicro inverter module, POWERLINK interface, 2x resolver, 24-64 VDC ±25% 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 35: 80VD100PD.C022-01 - Order data

3.3.5.2 Technical data

Model 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 status, module status, module 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
Certification	
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 36: 80VD100PD.C022-01 - Technical data

Model number	80VD100PD.C022-01
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	1.31 kW
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 restrictions
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

Table 36: 80VD100PD.C022-01 - Technical data

Model number	80VD100PD.C022-01
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	551 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 36: 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) Including enable input
3) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 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 beginning with hardware revision F3 and ACP10 V3.150 possible
6) Without heat spreader

3.3.6 80VD100PD.C022-14

3.3.6.1 Order data

Model number	Short description	Figure
	Inverter modules	
80VD100PD.C022-14	ACOPOSmicro inverter module, POWERLINK interface, 2x resolver, 24-64 VDC ±25% 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, 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 37: 80VD100PD.C022-14 - Order data

3.3.6.2 Technical data

Model 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 status, module status, module 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
Certification	
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 38: 80VD100PD.C022-14 - Technical data

Model number	80VD100PD.C022-14
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	1.31 kW
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 restrictions
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

Table 38: 80VD100PD.C022-14 - Technical data

Model number	80VD100PD.C022-14
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	551 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Digital inputs (option board)	
Quantity	1
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Input current at nominal voltage	8 mA
Input circuit	Sink
Switching threshold	
Low	<5 VDC
High	>15 VDC
Electrical isolation	Yes
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
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
Note	Order terminal blocks and cables separately
Mounting/Cooling	Screw mounting with heat spreader on mounting plate or cold plate

Table 38: 80VD100PD.C022-14 - Technical data

Model number	80VD100PD.C022-14
Dimensions [6]	
Width	65 mm
Height	134 mm
Depth	95 mm
Weight	750 g
Backplane	Always mount on conductive and grounded backplane

Table 38: 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) Including enable input
3) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 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 beginning with hardware revision E3 and ACP10 V3.150 possible
6) Without heat spreader

3.3.7 80VD100PD.C033-01

3.3.7.1 Order data

Model number	Short description	Figure
	Inverter modules	
80VD100PD.C033-01	ACOPOSmicro inverter module, POWERLINK interface, 2x SSI absolute encoder, 24-64 VDC ±25% 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 39: 80VD100PD.C033-01 - Order data

3.3.7.2 Technical data

Model 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 status, module status, module 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
Certification	
CE	Yes
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)]	1.31 kW

Table 40: 80VD100PD.C033-01 - Technical data

Model number	80VD100PD.C033-01
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 capability	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 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	551 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2

Table 40: 80VD100PD.C033-01 - Technical data

Model number	80VD100PD.C033-01
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 40: 80VD100PD.C033-01 - Technical data

1) Including enable input
2) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 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 beginning with hardware revision C3 and ACP10 V3.150 possible
5) Without heat spreader

3.3.8 80VD100PD.C088-01

3.3.8.1 Order data

Model number	Short description	Figure
	Inverter modules	
80VD100PD.C088-01	ACOPOSmicro inverter module, POWERLINK interface, 2x Sin-Cos encoder, 24-64 VDC ±25% supply, 2 motor connectors, 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 41: 80VD100PD.C088-01 - Order data

3.3.8.2 Technical data

Model 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 status, module status, module 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
Certification	
CE	Yes
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)]	1.31 kW

Table 42: 80VD100PD.C088-01 - Technical data

Model number	80VD100PD.C088-01
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 capability	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 the 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 V
High	>15 V

Table 42: 80VD100PD.C088-01 - Technical data

Model number	80VD100PD.C088-01
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	551 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 42: 80VD100PD.C088-01 - Technical data

1) Including enable input
2) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 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 beginning with hardware revision D3 and ACP10 V3.150 possible
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

Model number	Short description	Figure
	Inverter modules	
80VD100PD.C144-01	ACOPOSmicro inverter module, POWERLINK interface, 2x incremental encoder, 24-64 VDC ±25% 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 43: 80VD100PD.C144-01 - Order data

3.3.9.2 Technical data

Model 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 status, module status, module 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
Certification	
CE	Yes
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)]	1.31 kW

Table 44: 80VD100PD.C144-01 - Technical data

Model number	80VD100PD.C144-01
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 the 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 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	551 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}

Table 44: 80VD100PD.C144-01 - Technical data

Model number	80VD100PD.C144-01
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 44: 80VD100PD.C144-01 - Technical data

1) Including enable input
2) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 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 beginning with hardware revision C3 and ACP10 V3.150 possible
5) Without heat spreader

3.3.10 80VD100PD.C188-01

3.3.10.1 Order data

Model number	Short description	Figure
	Inverter modules	
80VD100PD.C188-01	ACOPOSmicro inverter module, POWERLINK interface, 2x LinMot®, 24-64 VDC ±25% 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 45: 80VD100PD.C188-01 - Order data

3.3.10.2 Technical data

Model 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 status, module status, module 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
Certification	
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	
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]	1.31 kW

Table 46: 80VD100PD.C188-01 - Technical data

Model number	80VD100PD.C188-01
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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} [4]
Max. current / motor	10.6 A_{RMS} / 15 A_{Peak} [4]
Max. current / module	30 A_{Peak} [4]
Max. phase voltage	
Linear motor	Input voltage of the power supply / √2 [5]
Rotary motor	Power supply input voltage [5]
Nominal switching frequency	5 kHz
Possible switching frequencies	5/10/20/40 kHz [6]
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	Female RJ45 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 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	551 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA

Table 46: 80VD100PD.C188-01 - Technical data

Model number	80VD100PD.C188-01
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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	780 g
Backplane	Always mount on conductive and grounded backplane

Table 46: 80VD100PD.C188-01 - Technical data

1) Including the enable input.
2) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 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) When the motor voltage increases, the maximum permitted peak current decreases. In this case, the two channels are only permitted to be operated under the following restrictions:
   (a) Both channels are operated with a maximum peak current of 12.5 A_{Peak}.
   (b) One channel is operated with a maximum peak current of 15 A_{Peak} and the other with a maximum peak current of 10 A_{Peak}.
   The nominal current is not affected by this restriction.
5) 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).
6) 40 kHz beginning with hardware revision C3 and ACP10 V3.150 possible
7) Without heat spreader

3.3.11 80VD100PS.C00X-01

3.3.11.1 Order data

Model number	Short description	Figure
	Inverter modules	
80VD100PS.C00X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x EnDat 2.2, 24-64 VDC ±25% 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 47: 80VD100PS.C00X-01 - Order data

3.3.11.2 Technical data

Model 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 status, module status, module 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
Certification	
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 48: 80VD100PS.C00X-01 - Technical data

Model number	80VD100PS.C00X-01
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	655 W
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 capability	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 V
High	>15 V

Table 48: 80VD100PS.C00X-01 - Technical data

Model number	80VD100PS.C00X-01
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	1082 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 48: 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) Including enable input
3) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 45°C ambient temperature.
4) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
5) 40 kHz beginning with hardware revision E3 and ACP10 V3.150 possible
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

Model number	Short description	Figure
	Inverter modules	
80VD100PS.C02X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x resolver, 24-64 VDC ±25% 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 49: 80VD100PS.C02X-01 - Order data

3.3.12.2 Technical data

Model 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 status, module status, module 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
Certification	
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 50: 80VD100PS.C02X-01 - Technical data

Model number	80VD100PS.C02X-01
Power consumption	
Idle (no motor powered)	0.5 W
Continuous power consumption [3]	655 W
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 restrictions
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

Table 50: 80VD100PS.C02X-01 - Technical data

Model number	80VD100PS.C02X-01
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	1082 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 50: 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) Including enable input
3) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 45°C ambient temperature.
4) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
5) 40 kHz beginning with hardware revision E3 and ACP10 V3.150 possible
6) Without heat spreader

3.3.13 80VD100PS.C03X-01

3.3.13.1 Order data

Model number	Short description	Figure
	Inverter modules	
80VD100PS.C03X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x SSI absolute encoder, 24-64 VDC ±25% 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 51: 80VD100PS.C03X-01 - Order data

3.3.13.2 Technical data

Model 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 status, module status, module 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
Certification	
CE	Yes
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 52: 80VD100PS.C03X-01 - Technical data

Model number	80VD100PS.C03X-01
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 capability	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 V
High	>15 V
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	1082 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2

Table 52: 80VD100PS.C03X-01 - Technical data

Model number	80VD100PS.C03X-01
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 52: 80VD100PS.C03X-01 - Technical data

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

3.3.14 80VD100PS.C08X-01

3.3.14.1 Order data

Model number	Short description	Figure
	Inverter modules	
80VD100PS.C08X-01	ACOPOSmicro inverter module, POWERLINK interface, 1x Sin-Cos encoder, 24-64 VDC ±25% 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 53: 80VD100PS.C08X-01 - Order data

3.3.14.2 Technical data

Model 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 status, module status, module 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
Certification	
CE	Yes
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 54: 80VD100PS.C08X-01 - Technical data

Model number	80VD100PS.C08X-01
Power loss 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
Inrush current limitation	Yes, PTC (min. 9 Ω), bridged during operation using relay contact
Undervoltage cutoff	<18 VDC
Overvoltage cutoff	>95 VDC
Voltage measurement	Yes
Line protection	Must be handled 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	Female RJ45 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 capability	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 the 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 V
High	>15 V

Table 54: 80VD100PS.C08X-01 - Technical data

Model number	80VD100PS.C08X-01
Switching delay at nominal input voltage	
Enable 1 -> 0, PWM off	
Typical	30 ms
Maximum	1082 ms
Enable 0 -> 1, ready for PWM	
Maximum	315 ms
Isolation voltage between input and bus	500 V_{Eff}
Input capacitance	100 µF
Digital inputs / Trigger inputs	
Quantity	2
Can be used as trigger input	2
Nominal voltage	24 VDC
Input voltage	24 VDC ±25%
Input current at nominal voltage	Typ. 10 mA
Input filter	
Hardware	<10 µs
Input circuit	Sink
Input resistance	Typ. 2.2 kΩ
Switching threshold	
Low	<5 V
High	>15 V
Isolation voltage between input and bus	500 V_{Eff}
Operating conditions	
Mounting orientation	
Horizontal	No
Vertical	Yes
Degree of pollution in accordance with EN 61800-5-1	2 (non-conductive pollution)
EN 60529 protection	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 characteristics	
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 grounded backplane

Table 54: 80VD100PS.C08X-01 - Technical data

1) Including enable input
2) Valid in the following conditions: 80 VDC DC bus voltage, 5 kHz switching frequency, 45°C ambient temperature.
3) I_{M1} ... Mean value of the currents on the axis 1 motor connection [A].
4) 40 kHz beginning with hardware revision C3 and ACP10 V3.150 possible
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

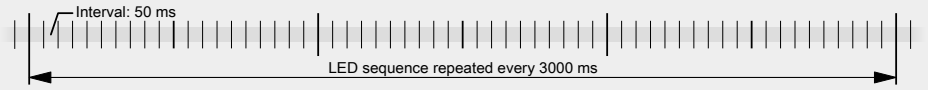
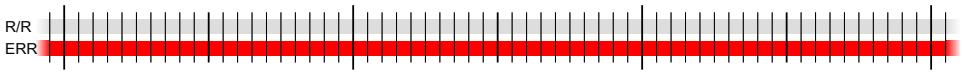
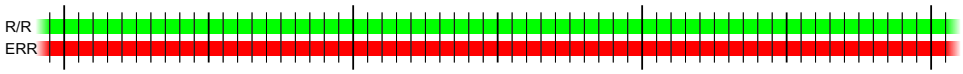
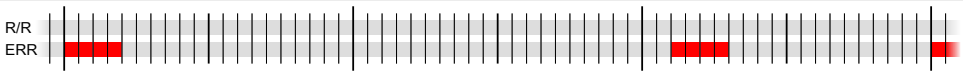
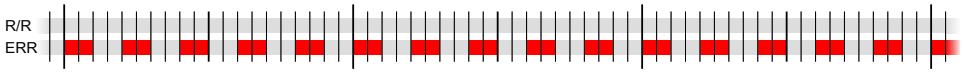
<table>
<tr><th>Figure</th><th colspan="4">Description</th></tr>
<tr><td rowspan="20">
</td><td colspan="4">Status indicators for module functionality</td></tr>
<tr><td>LED</td><td>Color</td><td>State</td><td>Description</td></tr>
<tr><td>ERR</td><td>Red</td><td>Off</td><td>No power to module or module ready for operation</td></tr>
<tr><td></td><td></td><td>On</td><td>Module in error or reset status.
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 higher)</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>The module is not receiving power or initialization of the network interface has 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 is taking place, but the client itself is not yet a participant.</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 55: LED status indicators

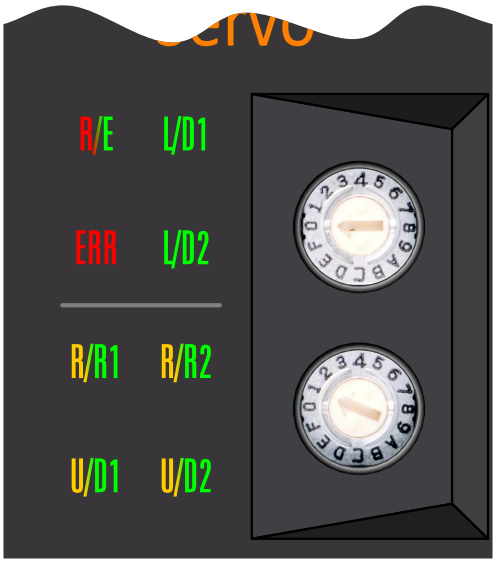
The table above provides a description of the LED status indicators on 2-channel ACOPOSmicro inverter modules. 1-channel variants are equipped with only RUN LED and one U/D LED.

- 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 booting 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



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 2 servo motors with EnDat 2.2 encoder	Max. 8 W
80VD100PD.C000-14	Connection for 2 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
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 207.

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.

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 mains also directly affect the output voltage.

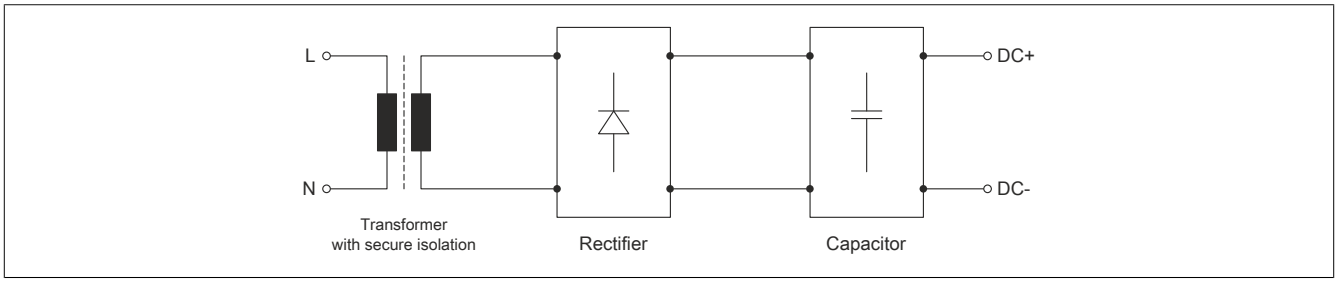


Figure 12: Transformer for motor supply

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:

	ACOPOSmicro service life		
Number of EnDat 2.2 encoders used	**24 VDC CPU supply always off**	**24 VDC CPU supply 50% on**	**24 VDC CPU 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 56: 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 "Voltage supply failure", "Faulty position value", "Battery charge too low"). The error is will not be not 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 Replacing the battery

The following conditions 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.

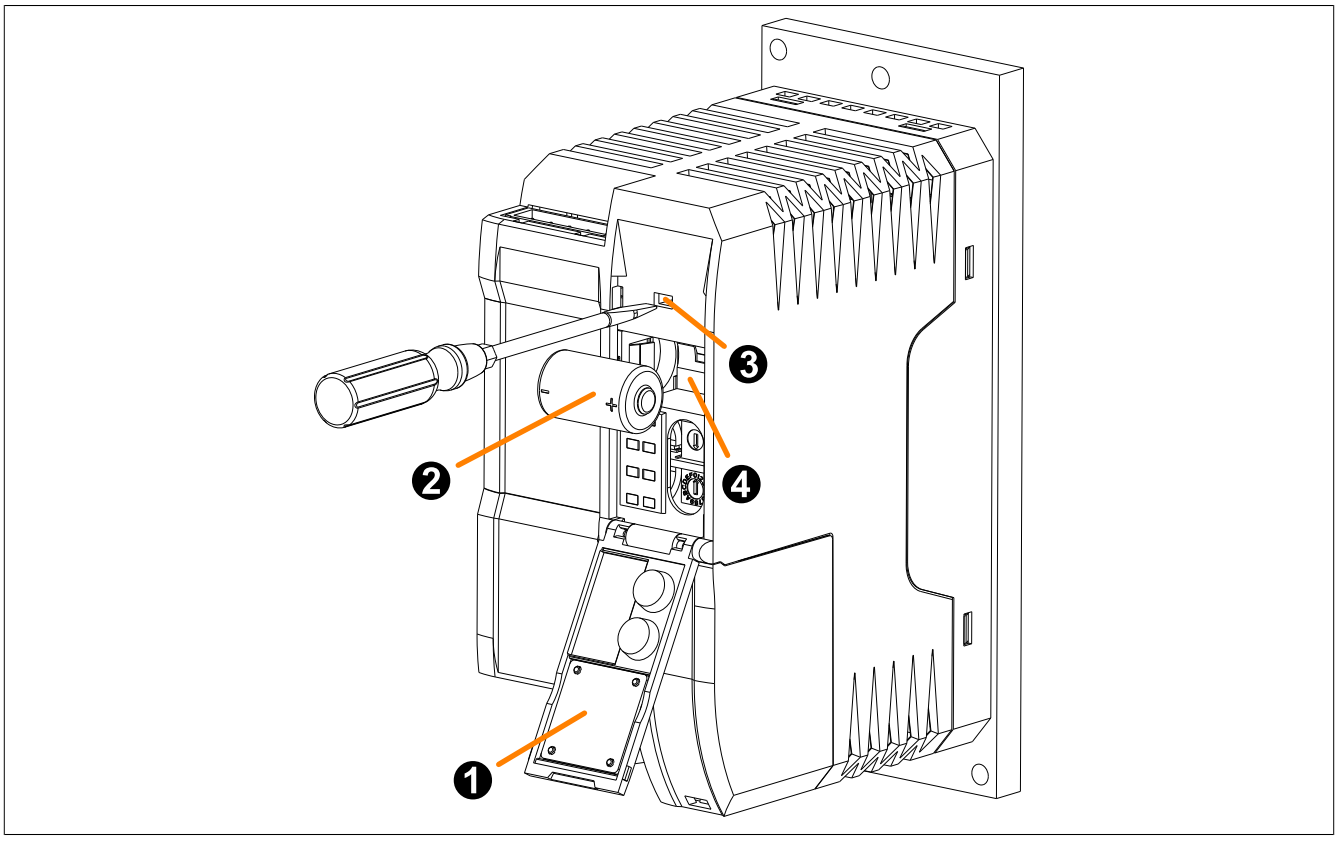
Information:

Make sure to insert the battery with correct polarity!

Used batteries must be disposed of properly!

Changing/Inserting the backup battery

1. Open the cover ❶ on the ACOPOSmicro.
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. Place the new backup battery ❷ into the battery compartment ❹ as shown.
4. Close the cover ❶.



3.4 Power supply modules

80PS080X3.10-01 is power supply module for the ACOPOSmicro drive system. The 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

Model 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 57: 80PS080X3.10-01 - Order data

3.4.2 Technical data

Model 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 between the power supply module and ACOPOSmicro module
Certification	
CE	Yes
KC	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
Discharge current to PE	<3.5 mA
Protective circuit	Transient surge protection with varistor
Protection	
Internal	Each phase internally fused (5 A)
External	External fuse required for line protection

Table 58: 80PS080X3.10-01 - Technical data

Model number	80PS080X3.10-01
Power output	
Output power	Max. 1000 W continuous power
Output protection	Short circuit, overload and open circuit protection
Regulation precision	±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 power rating	
Overload current	20% overcurrent
Overload duration	2 s
Turn-on time	<5 s (does not apply during firmware update)
Parallel operation	Yes, max. 3 power supplies, for redundancy and increased power
Serial 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 operation	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	
Design	10-pin terminal block
Type	X2X Link
Min. X2X Link cycle time	250 µs
Efficiency, reliability	
Effectiveness	>92%
Power loss	
Rated load	90 W
No-load operation	30 W
Operating conditions	
Mounting orientation	
Vertical	Yes
Ventilation / Cooling	Internally controlled fan
EN 60529 protection	IP20
Environmental 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 characteristics	
Material	Robust metal housing
Dimensions	
Width	67.5 mm
Height	257 mm
Depth	219 mm
Weight	3.75 kg

Table 58: 80PS080X3.10-01 - Technical data

1) Adjustable via X2X communication.

3.4.3 LED status indicators

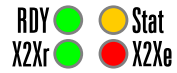
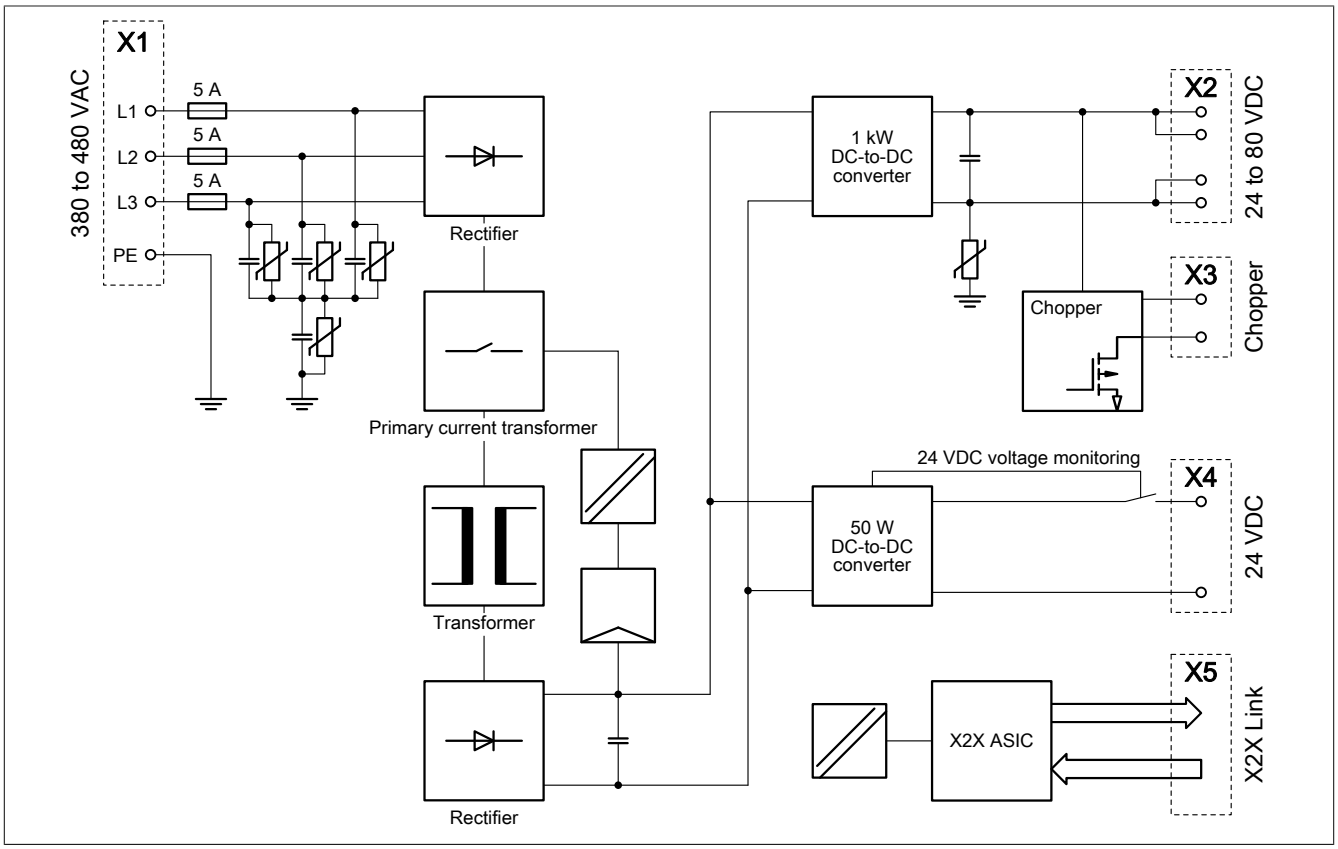
Figure	Description			
	**Status indicators for module functionality**			
	RDY	**Color**	**State**	**Description**
		Red	Off	No power to module or module ready for operation
			On	Module in error or reset status
			Single flash	I/O channel warning/error, power output is off
			Double flash	24 VDC output is off
		Green	Off	No power to module
			Single flash	Reset mode
			Double flash	Firmware update mode
			Blinking	PREOPERATIONAL mode
			On	RUN mode
	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 59: LED status indicators

3.4.4 Block diagram



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:

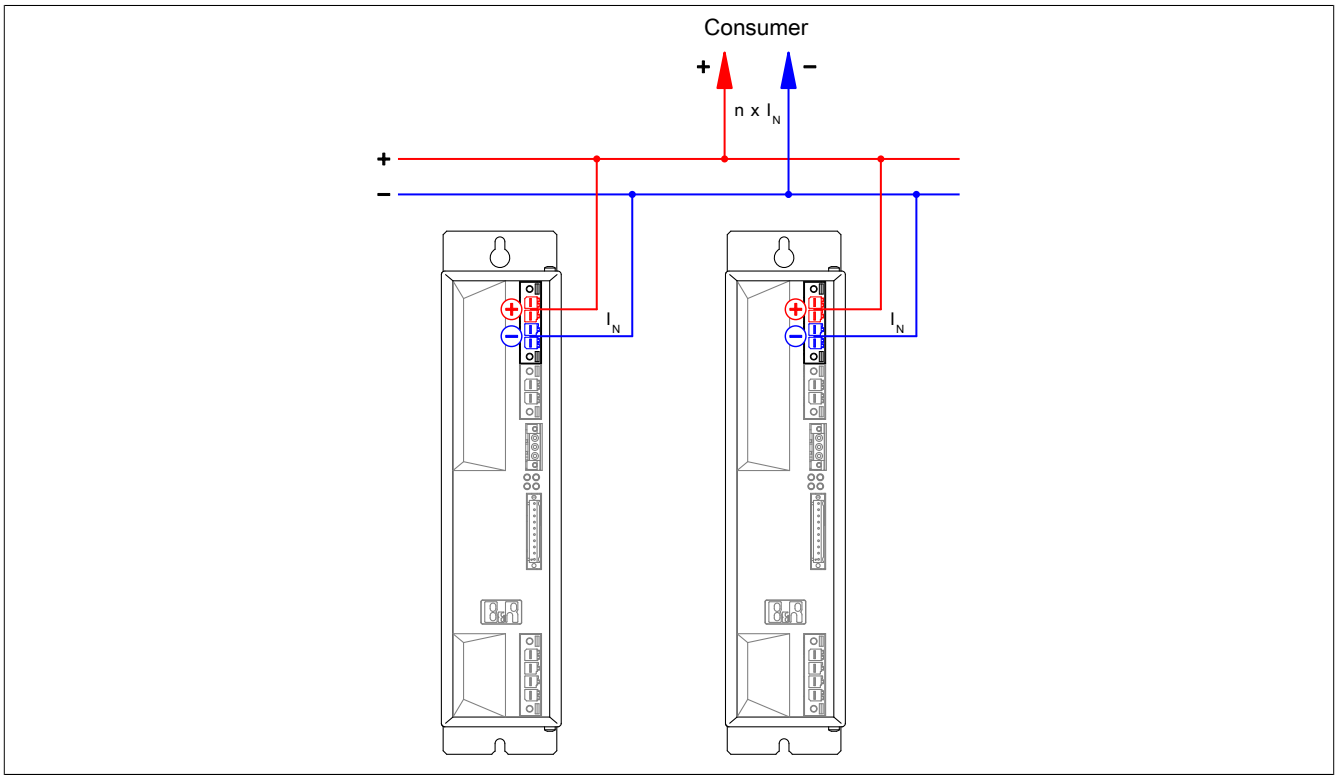
- **All power supply modules must be configured for parallel operation before the output is switched on when the voltage configuration is written.**
- **The same voltage must be set for every power supply module.**

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:

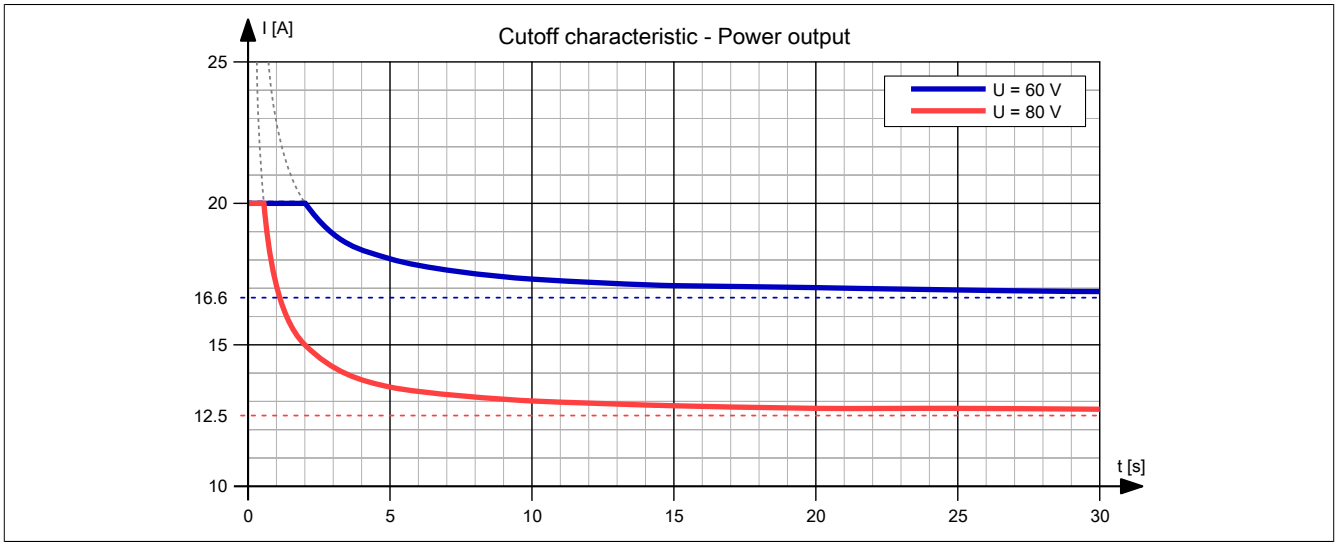


Figure 13: Cutoff characteristic - Power output

* 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 allows 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 60: 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 error can be acknowledged and operation is once again possible.

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:

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

Formula key:

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 362).

3.5 Accessories

3.5.1 Overview

Model number	Short description	Page
	Batteries	
80XB120A2.36-00	1x lithium battery, 1/2 AA 3.6 V	199
	Braking resistor	
80XBR0025.010-11	Braking resistor for power supply module 80PS080X3.10-01, 2.5 Ω, 100 W	197
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	198
	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	182
8BCF0005.1221B-0	EnDat 2.2 cable, length 5 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	182
8BCF0007.1221B-0	EnDat 2.2 cable, length 7 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	182
8BCF0010.1221B-0	EnDat 2.2 cable, length 10 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	182
8BCF0015.1221B-0	EnDat 2.2 cable, length 15 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	182
8BCF0020.1221B-0	EnDat 2.2 cable, length 20 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	182
8BCF0025.1221B-0	EnDat 2.2 cable, length 25 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	182
	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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
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 can be used in cable drag chains, UL listed	165
	Hiperface motor cables	
80CM01001.61-01	Motor cable, length 1 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM02001.61-01	Motor cable, length 2 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM03001.61-01	Motor cable, length 3 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM05001.61-01	Motor cable, length 5 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM10001.61-01	Motor cable, length 10 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM15001.61-01	Motor cable, length 15 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
80CM20001.61-01	Motor cable, length 20 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	149
	Hose clamps	
80XSC0000.00-01	Accessory for ACOPOSmicro: 1x hose clamp, B 9 mm, D 8-12 mm	199
80XSC0000.00-10	Accessory for ACOPOSmicro: 10x hose clamp, B 9 mm, D 8-12 mm	199
	Hybrid cables	
80CM01013.21-01	Hybrid cable, length 1 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
80CM02013.21-01	Hybrid cable, length 2 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
80CM03013.21-01	Hybrid cable, length 3 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
80CM05013.21-01	Hybrid cable, length 5 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
80CM10013.21-01	Hybrid cable, length 10 m, 4x 0.5 mm², 2x 0.35 mm², 3x 0.14 mm², for stepper motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	169
	Incremental encoder cables	
80CM01003.25-01	Incremental encoder cable, length 1 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM02003.25-01	Incremental encoder cable, length 2 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM03003.25-01	Incremental encoder cable, length 3 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM05003.25-01	Incremental encoder cable, length 5 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157

Model number	Short description	Page
80CM10003.25-01	Incremental encoder cable, length 10 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM15003.25-01	Incremental encoder cable, length 15 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM20003.25-01	Incremental encoder cable, length 20 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
80CM25003.25-01	Incremental encoder cable, length 25 m, 4x 0.14 mm², 2x 0.35 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	157
	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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
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 on the motor side, can be used in cable drag chains, UL/CSA listed	186
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	189
	Motor cables	
80CM01001.21-01	Motor cable, length 1 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM02001.21-01	Motor cable, length 2 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM03001.21-01	Motor cable, length 3 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM05001.21-01	Motor cable, length 5 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM10001.21-01	Motor cable, length 10 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM15001.21-01	Motor cable, length 15 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM20001.21-01	Motor cable, length 20 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
80CM25001.21-01	Motor cable, length 25 m, 5x 0.75 mm², 4-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	146
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 drag chains, UL/CSA listed	172
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	174
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	172
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	174
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 drag chains, UL/CSA listed	172
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	174
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 drag chains, UL/CSA listed	172
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	174

Model number	Short description	Page
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 drag chains, UL/CSA listed	172
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	174
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 drag chains, UL/CSA listed	172
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	174
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 drag chains, UL/CSA listed	172
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	174
	Motor cables 0.75 mm² SpringTec connector	
8BCM0005.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 5 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0006.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 6 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0007.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 7 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0010.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 10 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0015.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 15 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0017.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 17 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0020.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 20 m, can be used in cable drag chains, UL/CSA listed	192
8BCM0025.10360-0	Cable extension for 0.75 mm² motor cable with springtec connector, length 25 m, can be used in cable drag chains, UL/CSA listed	192
	Motor cables with brake	
80CM01002.21-01	Motor cable, length 1 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM02002.21-01	Motor cable, length 2 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM03002.21-01	Motor cable, length 3 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM05002.21-01	Motor cable, length 5 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM10002.21-01	Motor cable, length 10 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM15002.21-01	Motor cable, length 15 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
80CM20002.21-01	Motor cable, length 20 m, 5x 0.75 mm², 2x 0.5 mm², for stepper motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	153
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK connection cable, RJ45 to RJ45, 0.2 m	137
X20CA0E61.00025	POWERLINK connection cable, RJ45 to RJ45, 025 m	137
X20CA0E61.00030	POWERLINK connection cable, RJ45 to RJ45, 03 m	137
X20CA0E61.00035	POWERLINK connection cable, RJ45 to RJ45, 035 m	137
X20CA0E61.00040	POWERLINK connection cable, RJ45 to RJ45, 04 m	137
X20CA0E61.00050	POWERLINK connection cable, RJ45 to RJ45, 0.5 m	137
X20CA0E61.00100	POWERLINK connection cable, RJ45 to RJ45, 1 m	137
X20CA0E61.00150	POWERLINK connection cable, RJ45 to RJ45, 1.5 m	137
X20CA0E61.00200	POWERLINK connection cable, RJ45 to RJ45, 2 m	137
X20CA0E61.00500	POWERLINK connection cable, RJ45 to RJ45, 5 m	137
X20CA0E61.01000	POWERLINK connection cable, RJ45 to RJ45, 10 m	137
X20CA0E61.01500	POWERLINK connection cable, RJ45 to RJ45, 15 m	137
X20CA0E61.02000	POWERLINK connection cable, RJ45 to RJ45, 20 m	137
X20CA0E61.0300	POWERLINK connection cable, RJ45 to RJ45, 30 m	140
X20CA0E61.0500	POWERLINK connection cable, RJ45 to RJ45, 50 m	140
X20CA0E61.0600	POWERLINK connection cable, RJ45 to RJ45, 60 m	140
X20CA0E61.1000	POWERLINK connection cable, RJ45 to RJ45, 100 m	140
X20CA3E61.0100	POWERLINK connection cable, RJ45 to RJ45, can be used in cable drag chains, 10 m	135
X20CA3E61.0150	POWERLINK connection cable, RJ45 to RJ45, can be used in cable drag chains, 15 m	135
X20CA3E61.0200	POWERLINK connection cable, RJ45 to RJ45, can be used in cable drag chains, 20 m	135
	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

Model number	Short description	Page
	Resolver cables	
8BCR0002.1121A-0	Resolver cable, length 2 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
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	179
8BCR0005.1121A-0	Resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0005.3121A-0	Resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0007.1121A-0	Resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0007.3121A-0	Resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0010.1121A-0	Resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0010.3121A-0	Resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0015.1121A-0	Resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0015.3121A-0	Resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0020.1121A-0	Resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0020.3121A-0	Resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
8BCR0025.1121A-0	Resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	177
8BCR0025.3121A-0	Resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	179
	SSI encoder cables	
80CM01004.25-01	SSI encoder cable, length 1 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM02004.25-01	SSI encoder cable, length 2 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM03004.25-01	SSI encoder cable, length 3 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM05004.25-01	SSI encoder cable, length 5 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM10004.25-01	SSI encoder cable, length 10 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM15004.25-01	SSI encoder cable, length 15 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
80CM20004.25-01	SSI encoder cable, length 20 m, 4x 0.14 mm², 4x 0.34 mm², 8-pin Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	161
	Terminal blocks	
0TB103.3	Accessory terminal block, 3-pin male, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	133
0TB1106.8010	Accessory terminal block, 6-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	127
0TB1106.8110	Accessory terminal block, 6-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	127
0TB1110.8010	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm², protected against vibration by the screw flange	128
0TB1110.8110	Accessory terminal block, 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
0TB1310.3100	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange	128
0TB1310.8110	Accessory terminal block, 3x 10-pin, cage clamp terminal block, 1.5 mm², protected against vibration by the screw flange, with labeling	128
0TB1410.8110-01	Accessory terminal block, 3x 10-pin Cage clamp 1.5 mm², protected against vibration by the screw flange, with labeling and LED	128
0TB2102.4021	Accessory terminal block, 2-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2102.4022	Accessory terminal block, 2-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2102.4121-01	Accessory terminal block, 2-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2102.4122-01	Accessory terminal block, 2-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2104.4021	Accessory terminal block, 4-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2104.4022	Accessory terminal block, 4-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2104.4121-01	Accessory terminal block, 4-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2104.4122-01	Accessory terminal block, 4-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2105.4021	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm²	129
0TB2105.4022	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm²	129
0TB2105.4031	Accessory terminal block, 5-pin, AX1, screw clamp terminal block 2.5 mm², for LinMot	129
0TB2105.4032	Accessory terminal block, 5-pin, AX2, screw clamp terminal block 2.5 mm², LinMot	129
0TB2105.4121-01	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm²	130
0TB2105.4122-01	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm²	130
0TB2105.4131	Accessory terminal block, 5-pin, AX1, cage clamp terminal block 2.5 mm², LinMot	130
0TB2105.4132	Accessory terminal block, 5-pin, AX2, cage clamp terminal block 2.5 mm², LinMot	130
0TB2105.9021	Accessory terminal block, 5-pin, DC, screw clamp terminal block 2.5 mm²	131
0TB2105.9121-01	Accessory terminal block, 5-pin, DC, cage clamp terminal block 2.5 mm²	131

Model number	Short description	Page
0TB3102-7010	Accessory terminal block, 2-pin, screw clamp terminal block 6 mm²	132
0TB3104-7021	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled + + - -	132
0TB3104-7022	Accessory terminal block, 4-pin, screw clamp terminal block 6 mm², Labeled L1 L2 L3 PE	132
0TB710.90	Accessory terminal block, 10-pin, screw clamp terminal block 1.5 mm²	133
0TB710.91	Accessory terminal block, 10-pin, cage clamp terminal block 1.5 mm²	133
	X2X Link cables	
X20CA0X48.0010	X2X Link connection cable, open on one side, 1 m	142
X20CA0X48.0020	X2X Link connection cable, open on one side, 2 m	142
X20CA0X48.0050	X2X Link connection cable, open on one side, 5 m	142
X20CA0X48.0100	X2X Link connection cable, open on one side, 10 m	142
X20CA0X48.0200	X2X Link connection cable, open on one side, 20 m	142
X20CA0X68.0003	X2X Link connection cable, 0.3 m	144
X20CA0X68.0010	X2X Link connection cable, 1 m	144
X20CA0X68.0020	X2X Link connection cable, 2 m	144
X20CA0X68.0050	X2X Link connection cable, 5 m	144
X20CA0X68.0100	X2X Link connection cable, 10 m	144

3.5.2 Terminal blocks

The following table provides an overview of the terminal blocks, their pins and the keying used:

Model number	Short description	Number of pins	Keying
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 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

Model 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 61: 0TB1106.8010, 0TB1106.8110 - Order data

3.5.2.1.2 Technical data

Model number	0TB1106.8010	0TB1106.8110
Terminal block		
Note	Protected against vibration by the screw flange, nominal values according to UL	
Number of pins	6	
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
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 strand 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 characteristics		
Nominal voltage	300 V	
Nominal current [1)]	10 A / contact	
Contact resistance	≤4.2 mΩ	

Table 62: 0TB1106.8010, 0TB1106.8110 - Technical data

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

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

3.5.2.2.1 Order data



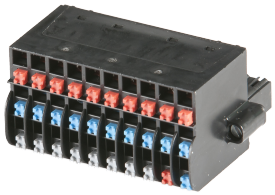
0TB1110.8010



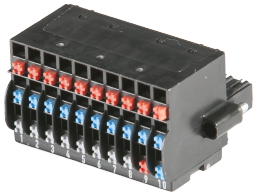
0TB1110.8110

Model 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 63: 0TB1110.8010, 0TB1110.8110 - Order data



0TB1310.3100



0TB1310.8110



0TB1410.8110-01

Model 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 1.5 mm², protected against vibration by the screw flange, with labeling and LED

Table 64: 0TB1310.3100, 0TB1310.8110, 0TB1410.8110-01 - Order data

3.5.2.2.2 Technical data

Model number	0TB1110.8010	0TB1110.8110
Terminal block		
Note	Protected against vibration by the screw flange, nominal values according to UL	
Number of pins	10	
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
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 strand 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 characteristics		
Nominal voltage	300 V	
Nominal current [1)]	10 A / contact	
Contact resistance	≤4.2 mΩ	

Table 65: 0TB1110.8010, 0TB1110.8110 - 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 clamps

3.5.2.3.1.1 Order data



0TB2102.4021
0TB2102.4022



0TB2104.4021
0TB2104.4022



0TB2105.4021
0TB2105.4022



0TB2105.4031
0TB2105.4032

Model 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 66: 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

Model number	0TB2102. 4021	0TB2102. 4022	0TB2104. 4021	0TB2104. 4022	0TB2105. 4021	0TB2105. 4022	0TB2105. 4031	0TB2105. 4032
Terminal block								
Note	Nominal values according to UL							
Number of pins	2		4		5			
Type of terminal block	Screw clamp terminal block							
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 67: 0TB2102.4021, 0TB2102.4022, 0TB2104.4021, 0TB2104.4022, 0TB2105.4021, 0TB2105.4022, 0TB2105.4031, 0TB2105.4032 - Technical data

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

3.5.2.3.2 Cage clamp terminal blocks

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

Model 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 68: 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

Model 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 values according to UL							
Number of pins	2		4		5			
Type of terminal block	Cage clamp terminal block							
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 69: 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 limit data for each I/O module must be taken into consideration.

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

Model 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 70: 0TB2105.9021, 0TB2105.9121-01 - Order data

3.5.2.4.2 Technical data

Model number	0TB2105.9021	0TB2105.9121-01
Terminal block		
Note	Nominal values according to UL	
Number of pins	5	
Type of terminal block	Screw clamp terminal block	Cage clamp terminal block
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

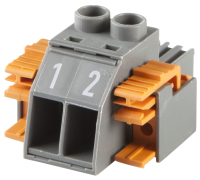
Table 71: 0TB2105.9021, 0TB2105.9121-01 - Technical data

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

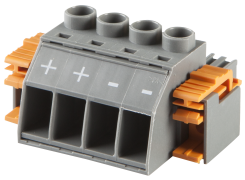
3.5.2.5 Terminal blocks for the connection of power supply modules

3.5.2.5.1 Terminal blocks with multi-function flange

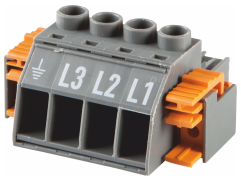
3.5.2.5.1.1 Order data



0TB3102-7010



0TB3104-7021



0TB3104-7022

Model 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 72: 0TB3102-7010, 0TB3104-7021, 0TB3104-7022 - Order data

3.5.2.5.1.2 Technical data

Model number	0TB3102-7010	0TB3104-7021	0TB3104-7022
Terminal block			
Note	Multi-function flange for secure, fast and tool-free locking Nominal values according to UL		
Number of pins	2	4	
Type of terminal block	Screw clamp terminal block		
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 73: 0TB3102-7010, 0TB3104-7021, 0TB3104-7022 - Technical data

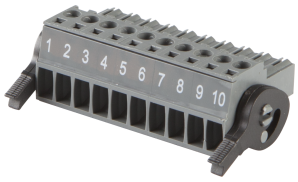
1) The limit data for each I/O module must be taken into consideration.

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

Model 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 74: 0TB103.3, 0TB710.90, 0TB710.91 - Order data

3.5.2.5.2.2 Technical data

Model number	0TB103.3	0TB710.90	0TB710.91
General information			
Certification			
CE		Yes	
cULus	Yes	-	
ATEX Zone 2 [1]	Yes	-	
GL	Yes	-	
Terminal block			
Note	Protected against vibration by the screw flange Nominal values according to UL	Mechanical removal aid Nominal values according to UL	
Number of pins	3 (male)	10	
Type of terminal block	Screw clamp terminal block		Cage clamp terminal block
Cable type	Only copper wires (no aluminum wires!)		
Distance between contacts	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 strand wires	0.20 to 1.50 mm²		
With wire end sleeves	0.20 to 1.50 mm²		
Electrical characteristics			
Nominal voltage	300 V		
Nominal current [2]	10 A / contact		
Contact resistance	≤5 mΩ	≤4.2 mΩ	

Table 75: 0TB103.3, 0TB710.90, 0TB710.91 - Technical data

1) Ta min.: 0°C
Ta max.: See environmental conditions
2) The limit data for each I/O module must be taken into consideration.

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 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)]

3.5.3.1.1 Pre-assembled cables

Using B&R cables guarantees that the EMC limits are not exceeded. The cables are assembled in the EU and are therefore subject to the strictest quality standards.

> **Information:**
>
> **When using cables from other manufacturers, B&R cannot guarantee adherence to EMC limit values! The connectors on the cables as well as on the motors are part of a properly functioning EMC concept!**

3.5.3.2 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



Model number	Short description
	POWERLINK/Ethernet cables
X20CA3E61.0100	POWERLINK connection cable, RJ45 to RJ45, can be used in cable drag chains, 10 m
X20CA3E61.0150	POWERLINK 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 76: X20CA3E61.0100, X20CA3E61.0150, X20CA3E61.0200 - Order data

[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!

Technical data

Model number	X20CA3E61.0100	X20CA3E61.0150	X20CA3E61.0200
General information			
Durability	Oil resistant in accordance with VDE 0473 part 811-2-1 (IEC 60811-2-1) Flame-retardant in accordance with IEC 60332-1-2 UV resistant		
Short description	POWERLINK connection cable RJ45 to RJ45, 10 m	POWERLINK connection cable RJ45 to RJ45, 15 m	POWERLINK connection cable RJ45 to RJ45, 20 m
Type	Connection cables		
Cable cross section			
AWG	4x 22 AWG		
mm²	4x 0.34 mm²		
Cable construction			
Outer sheathing			
Material	Polyurethane (PUR) GN		
Features	Halogen-free		
Color	Green		
Labeling	X20CA3E61.xxxx		
Lines			
Wire insulation	Polyethylene (PE)		
Wire colors	Red, white, yellow, blue		
Shield	Aluminum-clad foil (overlapping), tinned copper braiding, 85% covering		
Type	Tinned copper wire AWG 22/7		
Stranding	Yellow with yellow, orange with orange, white with white, blue with blue		
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 (EN50173-1), ISO/IEC 24702 (EN 50173-3)		
Transfer rate	10/100 Mbit/s		
Insulation resistance	≥500 MΩ/km at 20°C		
Operating conditions			
EN 60529 protection			
Cables	IP67		
RJ45 connector	IP20, only when connected properly		
Environmental conditions			
Temperature			
Transport	-50 to 70°C		
Fixed installation	-25 to 60°C		
Flexible installation	-20 to 60°C		
Mechanical characteristics			
Installation	Easy snap-on mounting onto the DIN rail		
Dimensions			
Length	10 m	15 m	20 m
Diameter	6.5 mm ±0.2 mm		
Flex radius			
After installation	≥7x outer diameter		
During installation	≥3x outer diameter		
Drag chain data			
Acceleration	4 m/s²		
Flex cycles	200 mm		
Speed	4 m/s		
Weight	0.061 kg/m		

Table 77: X20CA3E61.0100, X20CA3E61.0150, X20CA3E61.0200 - Technical data

3.5.3.2.2 Not for use in cable drag chains

3.5.3.2.2.1 X20CA0E61.xxxxx - POWERLINK cables

Order data

Model number	Short description	Figure
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK connection cable, RJ45 to RJ45, 025 m	
X20CA0E61.00030	POWERLINK connection cable, RJ45 to RJ45, 03 m	
X20CA0E61.00035	POWERLINK connection cable, RJ45 to RJ45, 035 m	
X20CA0E61.00040	POWERLINK connection cable, RJ45 to RJ45, 04 m	
X20CA0E61.00050	POWERLINK connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK connection cable, RJ45 to RJ45, 1 m	
X20CA0E61.00150	POWERLINK connection cable, RJ45 to RJ45, 1.5 m	
X20CA0E61.00200	POWERLINK connection cable, RJ45 to RJ45, 2 m	
X20CA0E61.00500	POWERLINK connection cable, RJ45 to RJ45, 5 m	
X20CA0E61.01000	POWERLINK connection cable, RJ45 to RJ45, 10 m	
X20CA0E61.01500	POWERLINK connection cable, RJ45 to RJ45, 15 m	
X20CA0E61.02000	POWERLINK connection cable, RJ45 to RJ45, 20 m	

Table 78: 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

Model number	X20CA0E61.00020	X20CA0E61.00025	X20CA0E61.00030	X20CA0E61.00035	X20CA0E61.00040	X20CA0E61.00050	X20CA0E61.00100
General information							
Durability	Flame-retardant in accordance with 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 sheathing	Halogen-free, flame-retardant						
Outer sheathing							
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 made 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 according to 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							
EN 60529 protection							
Cables	IP67						
RJ45 connector	IP20, only when connected properly						
Environmental conditions							
Temperature							
Fixed installation	-40 to 80°C						
Flexible installation	-10 to 60°C						
Mechanical characteristics							
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						
Flex radius							
After installation	≥4x outer diameter						
During installation	≥8x outer diameter						
Weight	0.058 kg/m						

Table 79: X20CA0E61.00020, X20CA0E61.00025, X20CA0E61.00030, X20CA0E61.00035, X20CA0E61.00040, X20CA0E61.00050, X20CA0E61.00100 - Technical data

Model number	X20CA0E61.00150	X20CA0E61.00200	X20CA0E61.00500	X20CA0E61.01000	X20CA0E61.01500	X20CA0E61.02000
General information						
Durability	Flame-retardant in accordance with 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 sheathing	Halogen-free, flame-retardant					
Outer sheathing						
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 made 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 according to 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						
EN 60529 protection						
Cables	IP67					
RJ45 connector	IP20, only when connected properly					
Environmental conditions						
Temperature						
Fixed installation	-40 to 80°C					
Flexible installation	-10 to 60°C					
Mechanical characteristics						
Dimensions						
Length	1.5 m	2 m	5 m	10 m	15 m	20 m
Diameter	6.7 mm ±0.2 mm					
Flex radius						
After installation	≥4x outer diameter					
During installation	≥8x outer diameter					
Weight	0.058 kg/m					

Table 80: 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

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

Table 81: X20CA0E61.0300, X20CA0E61.0500, X20CA0E61.0600, X20CA0E61.1000 - Order data

Technical data

Model number	X20CA0E61.0300	X20CA0E61.0500	X20CA0E61.0600	X20CA0E61.1000
General information				
Durability	Oil resistant in accordance with VDE 0473 part 811-2-1 (IEC 60811-2-1) Flame-retardant in accordance with 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 sheathing				
Material	Polyurethane (PUR) GN			
Features	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 made 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 (EN50173-1), ISO/IEC 24702 (EN 50173-3)			
Transfer rate	10/100 Mbit/s			
Insulation resistance	≥500 MΩ/km at 20°C			
Operating conditions				
EN 60529 protection				
Cables	IP67			
RJ45 connector	IP20, only when connected properly			
Environmental conditions				
Temperature				
Transport	-50 to 70°C			
Fixed installation	-25 to 60°C			
Flexible installation	-20 to 60°C			
Mechanical characteristics				
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			
Flex radius				
After installation	≥7x outer diameter			
During installation	≥3x outer diameter			
Weight	0.061 kg/m			

Table 82: X20CA0E61.0300, X20CA0E61.0500, X20CA0E61.0600, X20CA0E61.1000 - Technical data

3.5.3.2.3 Wiring

3.5.3.2.3.1 Dimensions and pinout

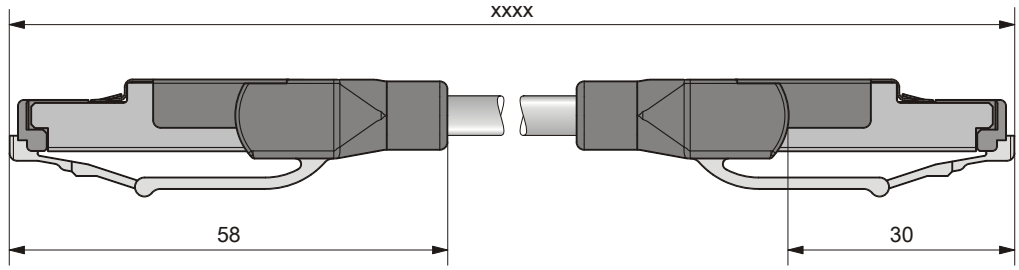
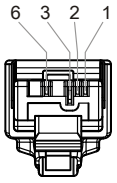
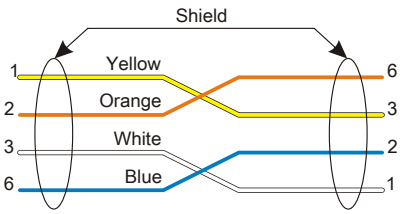
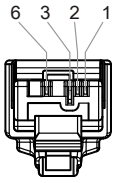
<table>
<tr><th colspan="3">Dimensions</th></tr>
<tr><td colspan="3">
</td></tr>
<tr><th colspan="3">Pinout</th></tr>
<tr><th>Male RJ45 connector</th><th></th><th>Male RJ45 connector</th></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>

Table 83: POWERLINK connection cables - Dimensions and pinout

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

Model number	Short description	Figure
	X2X Link cables	
X20CA0X48.0010	X2X Link connection cable, open on one side, 1 m	
X20CA0X48.0020	X2X Link connection cable, open on one side, 2 m	
X20CA0X48.0050	X2X Link connection cable, open on one side, 5 m	
X20CA0X48.0100	X2X Link connection cable, open on one side, 10 m	
X20CA0X48.0200	X2X Link connection cable, open on one side, 20 m	

Table 84: X20CA0X48.0010, X20CA0X48.0020, X20CA0X48.0050, X20CA0X48.0100, X20CA0X48.0200 - Order data

3.5.3.3.1.2 Technical data

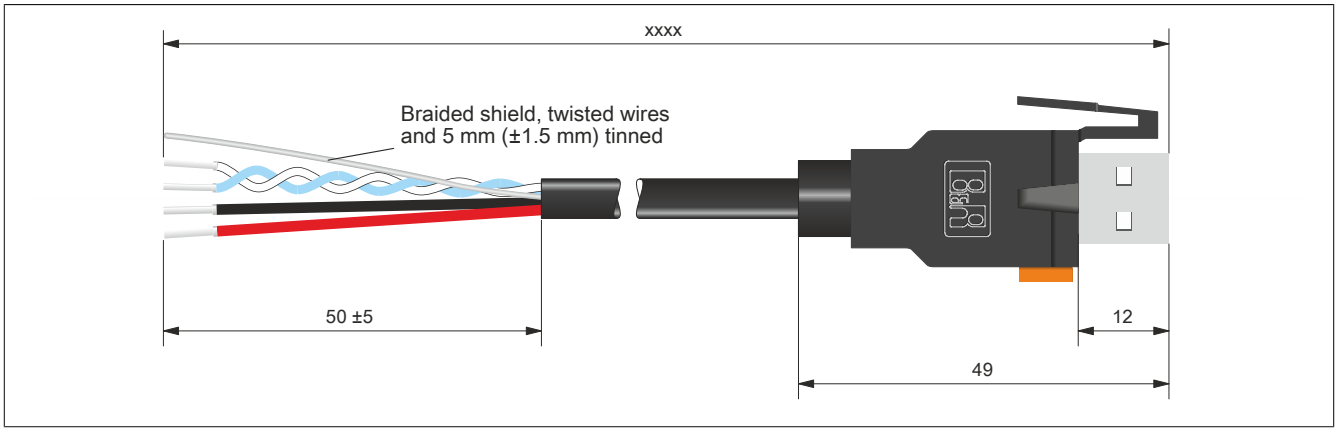
Model number	X20CA0X48.0010	X20CA0X48.0020	X20CA0X48.0050	X20CA0X48.0100	X20CA0X48.0200
General information					
Durability	Flame-retardant in accordance with VW-1 and FT1				
Nominal voltage	30 V				
Cable cross section					
Data cables					
AWG	2x 24 AWG				
mm²	2x 0.25 mm²				
Supply lines					
AWG	2x 22 AWG				
mm²	2x 0.34 mm²				
RoHS-compliant [1]	Yes				
Cable construction					
Signal lines					
Shield	Paired shield with aluminum foil				
Stranding	Twisted pair wires				
Outer sheathing					
Material	PVC				
Color	Black				
Lines					
Features	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 characteristics					
Dimensions					
Length	1.0 m	2.0 m	5.0 m	10.0 m	20.0 m
Diameter	7 mm ± 0.19 mm				

Table 85: X20CA0X48.0010, X20CA0X48.0020, X20CA0X48.0050, X20CA0X48.0100, X20CA0X48.0200 - Technical data

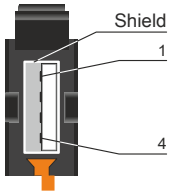
1) RoHS (Restriction of the use of certain Hazardous Substances) limits the use of the following substances in electrical and electronic devices: lead, mercury, cadmium, chrome VI as well as flame-retardant polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE).

3.5.3.3.1.3 Wiring

Dimensions



Pinout

Open	Pin	Name	Wire colors	Male connector
For custom Wiring	1	X2X+	Red	
	2	X2X\	Blue	
	3	X2X	White	
	4	X2X⊥	Black	
	Male connector	SHLD	Shield	

Keying for X3A

3.5.3.3.2 X20CA0X68.xxxx - X2X Link device connection cables

3.5.3.3.2.1 Order data

Model number	Short description	Figure
	X2X Link cables	
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 86: X20CA0X68.0003, X20CA0X68.0010, X20CA0X68.0020, X20CA0X68.0050, X20CA0X68.0100 - Order data

3.5.3.3.2.2 Technical data

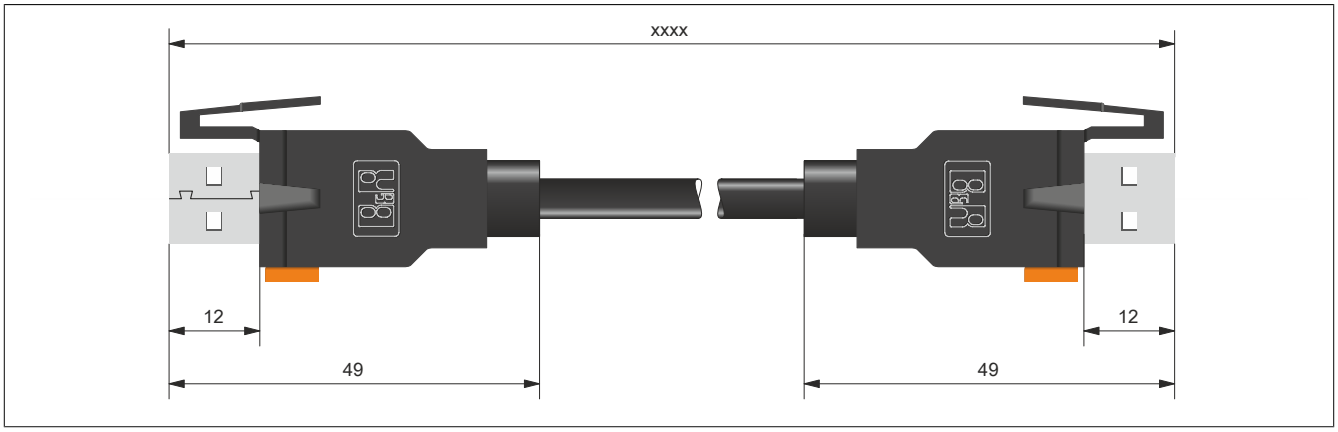
Model number	X20CA0X68.0003	X20CA0X68.0010	X20CA0X68.0020	X20CA0X68.0050	X20CA0X68.0100
General information					
Durability	Flame-retardant in accordance with VW-1 and FT1				
Nominal voltage	30 V				
Cable cross section					
Data cables					
AWG	2x 24 AWG				
mm²	2x 0.25 mm²				
Supply lines					
AWG	2x 22 AWG				
mm²	2x 0.34 mm²				
RoHS-compliant [1]	Yes				
Cable construction					
Signal lines					
Shield	Paired shield with aluminum foil				
Stranding	Twisted pair wires				
Outer sheathing					
Material	PVC				
Color	Black				
Lines					
Features	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 characteristics					
Dimensions					
Length	0.3 m	1.0 m	2.0 m	5.0 m	10.0 m
Diameter	7 mm ± 0.19 mm				

Table 87: X20CA0X68.0003, X20CA0X68.0010, X20CA0X68.0020, X20CA0X68.0050, X20CA0X68.0100 - Technical data

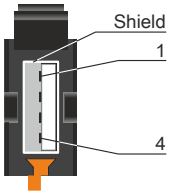
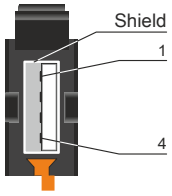
1) RoHS (Restriction of the use of certain Hazardous Substances) limits the use of the following substances in electrical and electronic devices: lead, mercury, cadmium, chrome VI as well as flame-retardant polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE).

3.5.3.3.2.3 Wiring

Dimensions



Pinout

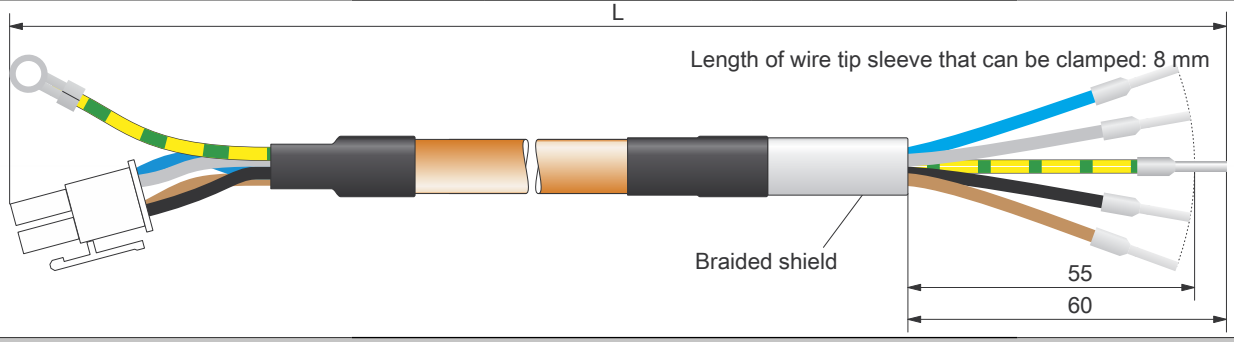
Male connector	Pin	Name	Wire colors	Male connector
 Keying for X3B	1	X2X+	Red	 Keying for X3A
	2	X2X\	Blue	
	3	X2X	White	
	4	X2X⊥	Black	
	Male connector	SHLD	Shield	

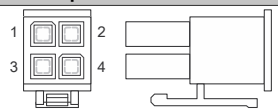
3.5.3.4 Cables for stepper motor modules

3.5.3.4.1 Motor cable

3.5.3.4.1.1 80CMxx001.21-01 - Motor cables

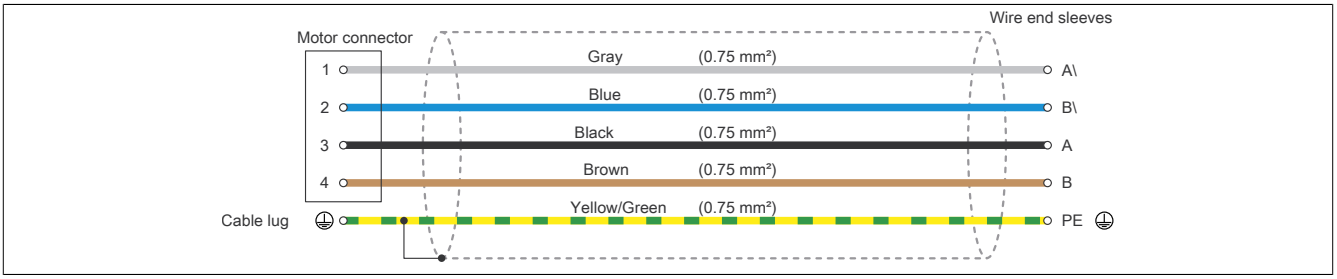
Pinout

Dimensions


Pinout				
4-pin terminal block	**Pin**	**Name**	**Wire colors**	**Open**
	1	A\	Gray	For custom wiring Connection to drive system
	2	B\	Blue	
	3	A	Black	
	4	B	Brown	
Cable lug	**Pin**	**Name**	**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

Cable diagram



Order data

Model number	Short description	Figure
	Motor cables	
80CM01001.21-01	Motor cable, length 1 m, 5x 0.75 mm², 4-pin Molex 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 Molex 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 Molex 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 Molex connector on the motor side, can be used in cable drag chains, UL listed	

Table 88: 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

Model number	Short description	Figure
80CM10001.21-01	Motor cable, length 10 m, 5x 0.75 mm², 4-pin Molex 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 Molex 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 Molex 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 Molex connector on the motor side, can be used in cable drag chains, UL listed	

Table 88: 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

Model 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 in accordance with VDE 0472 Part 803 as well as standard hydraulic oil							
Listed	UL AWM style 20234, 80°C, 1000 V, E63216 as well as 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, green, yellow/green							
Design	Tinned copper stranded wire							
Diameter	0.75 mm²							
Stranding	No							
Cable stranding	With filler elements and foil shield							
Complete shielding	Tinned copper braiding, optical coverage >85% with foil shield							
Outer sheathing								
Material	PUR							
Color	Orange, similar to RAL 2003 flat							
Labeling	BERNECKER + RAINER 5x 0.75 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							
Max. current-carrying capacity in accordance with IEC 60364-5-523 by installation type								
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 characteristics								
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							

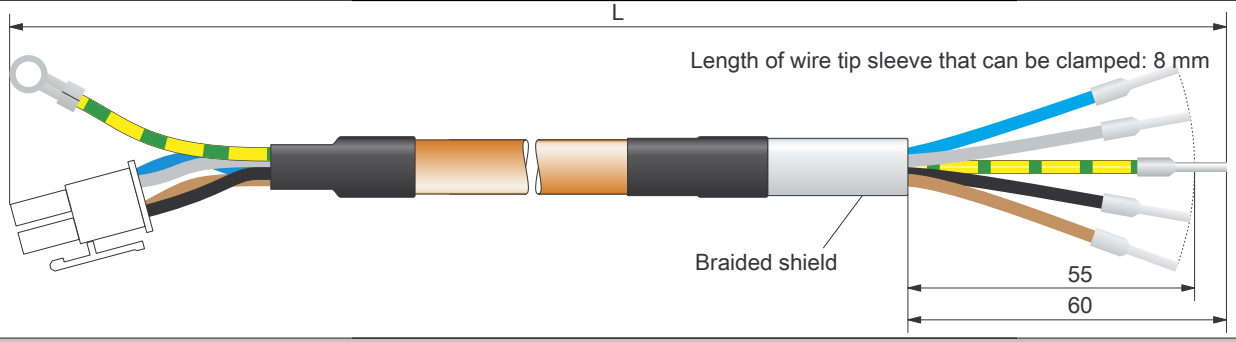
Table 89: 80CM01001.21-01, 80CM02001.21-01, 80CM03001.21-01, 80CM05001.21-01, 80CM10001.21-01, 80CM15001.21-01, 80CM20001.21-01, 80CM25001.21-01 - Technical data

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

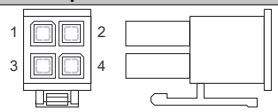
Wiring

Pinout

Dimensions

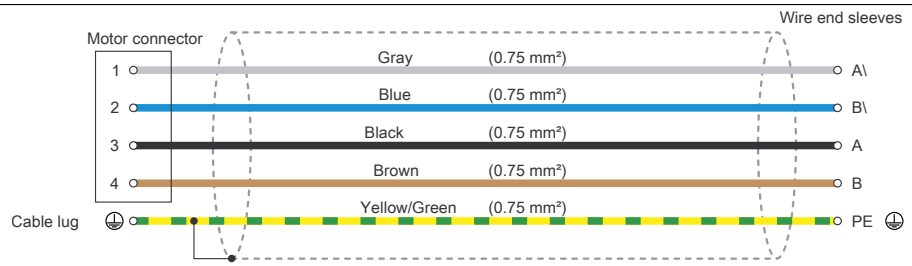


Pinout

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

Cable lengths (L)

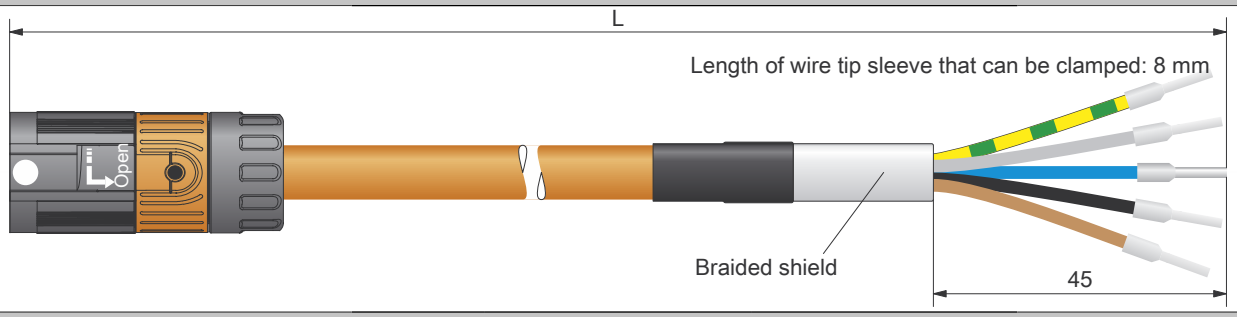
Model number	Length [m]
80CM**01**001.21-01	1
80CM**02**001.21-01	2
80CM**03**001.21-01	3
80CM**05**001.21-01	5
80CM**10**001.21-01	10
80CM**15**001.21-01	15
80CM**20**001.21-01	20
80CM**25**001.21-01	25



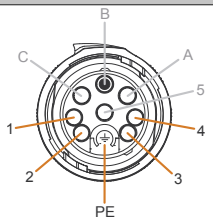
3.5.3.4.1.2 80CMxx001.61-01 - HIPERFACE motor cables

Pinout

Dimensions

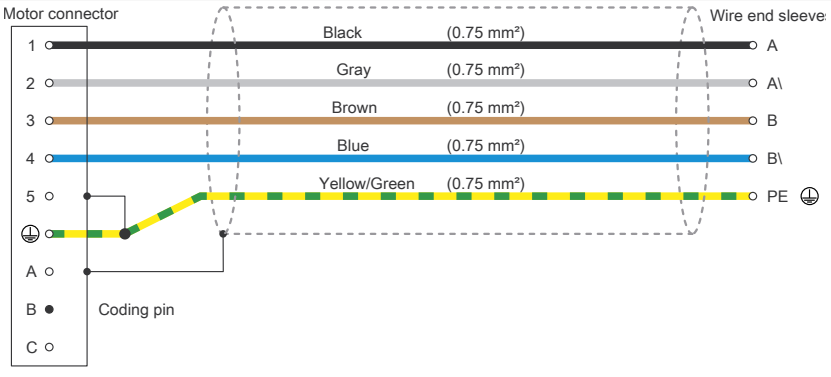


Pinout

9-pin circularfemale connector	Pin	Name	Wire colors	Open
	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



Order data

Model number	Short description	Figure
	Hiperface motor cables	
80CM01001.61-01	Motor cable, length 1 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, 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 encoders, 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 encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	

Table 90: 80CM01001.61-01, 80CM02001.61-01, 80CM03001.61-01, 80CM05001.61-01, 80CM10001.61-01, 80CM15001.61-01, 80CM20001.61-01 - Order data

Model number	Short description	Figure
80CM05001.61-01	Motor cable, length 5 m, 5x 0.75 mm², for stepper motors with HIPERFACE encoders, 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 encoders, 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 encoders, 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 encoders, springtec connector on the motor side, can be used in cable drag chains, UL listed	

Table 90: 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

Model 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 in accordance with VDE 0472 Part 803 as well as standard hydraulic oil						
Listed	UL AWM style 20234, 80°C, 1000 V, E63216 as well as 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, green, yellow/green						
Design	Tinned copper stranded wire						
Diameter	0.75 mm²						
Shield	No						
Stranding	No						
Cable stranding	With filler elements and foil shield						
Complete shielding	Tinned copper braiding, optical coverage >85% with foil shield						
Outer sheathing							
Material	PUR						
Color	Orange, similar to RAL 2003 flat						
Labeling	BERNECKER + RAINER 5x 0.75 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						
Max. current-carrying capacity in accordance with IEC 60364-5-523 by installation type							
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 characteristics							
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						

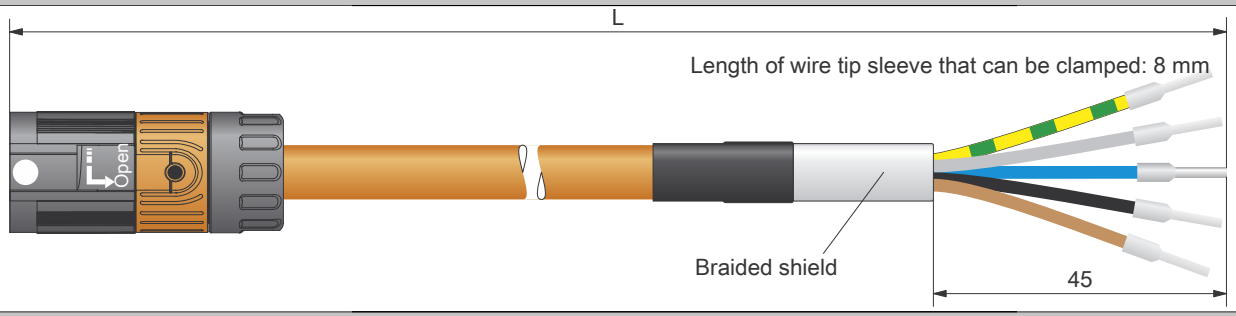
Table 91: 80CM01001.61-01, 80CM02001.61-01, 80CM03001.61-01, 80CM05001.61-01, 80CM10001.61-01, 80CM15001.61-01, 80CM20001.61-01 - Technical data

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

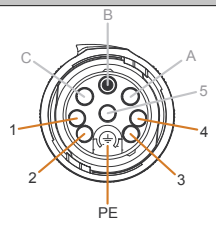
Wiring

Pinout

Dimensions

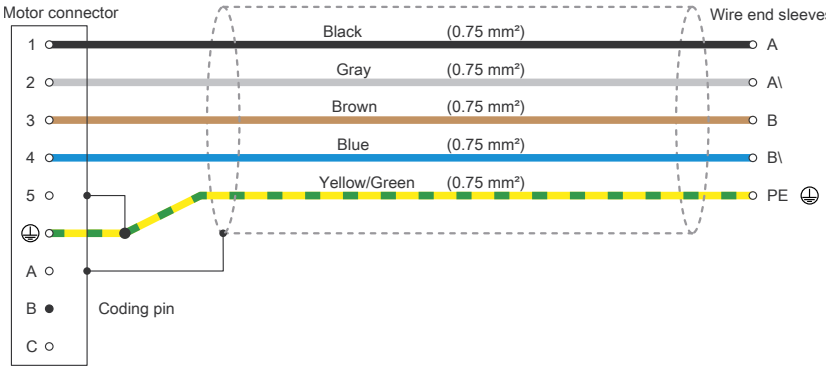


Pinout

9-pin circularfemale connector	Pin	Name	Wire colors	Open
	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

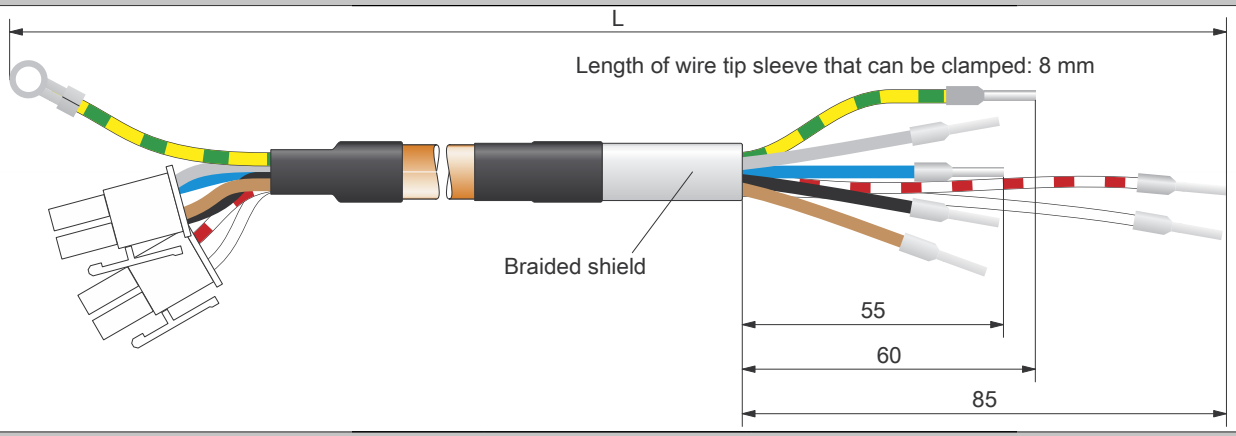
Cable diagram



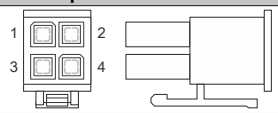
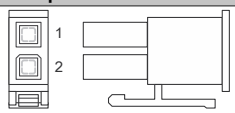
3.5.3.4.1.3 80CMxx002.21-01 - Motor cables (incl. brake lines)

Pinout

Dimensions

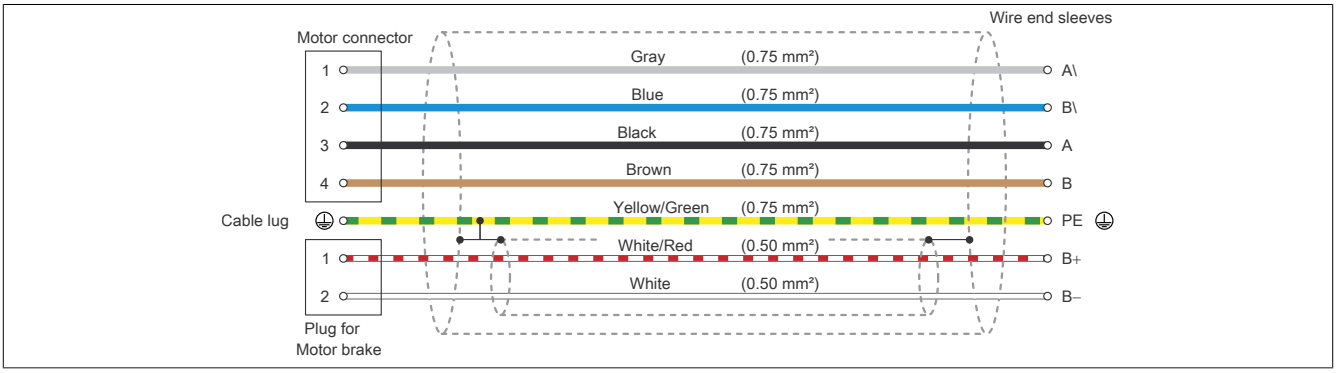


Pinout

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



Order data

Model 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 motor with brake, 4-pin and 2-pin Molex connector 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 motor with brake, 4-pin and 2-pin Molex connector 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 motor with brake, 4-pin and 2-pin Molex connector 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 motor with brake, 4-pin and 2-pin Molex connector 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 motor with brake, 4-pin and 2-pin Molex connector 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 motor with brake, 4-pin and 2-pin Molex connector 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 motor with brake, 4-pin and 2-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	

Table 92: 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

Model 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 in accordance with VDE 0472 Part 803 as well as standard hydraulic oil						
Listed	UL AWM style 20234, 80°C, 1000 V, E63216 as well as 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, green, yellow/green						
Design	Tinned copper stranded wire						
Diameter	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						
Diameter	0.5 mm²						
Shield	Separate shielding for 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% with foil shield						
Outer sheathing							
Material	PUR						
Color	Orange, similar to RAL 2003 flat						
Labeling	BERNECKER + RAINER 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						
Max. current-carrying capacity in accordance with IEC 60364-5-523 by installation type							
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 characteristics							
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						

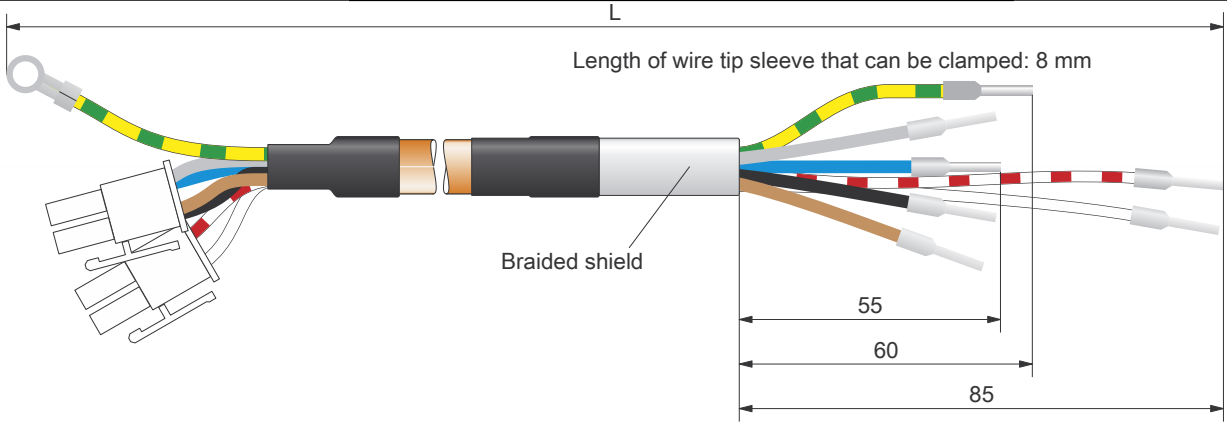
Table 93: 80CM01002.21-01, 80CM02002.21-01, 80CM03002.21-01, 80CM05002.21-01, 80CM10002.21-01, 80CM15002.21-01, 80CM20002.21-01 - Technical data

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

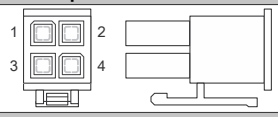
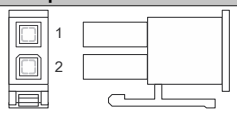
Wiring

Pinout

Dimensions

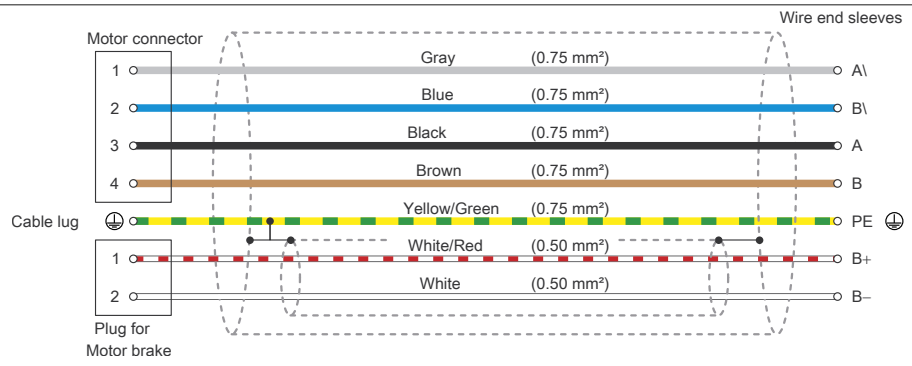


Pinout

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

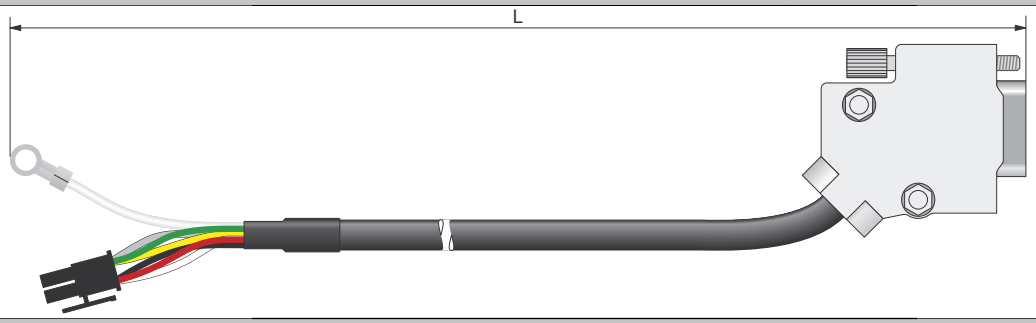


3.5.3.4.2 Encoder cable

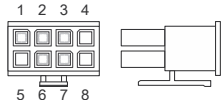
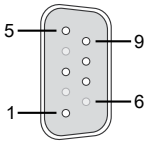
3.5.3.4.2.1 80CMxx003.25-01 - ABR incremental encoder cables

Pinout

Dimensions

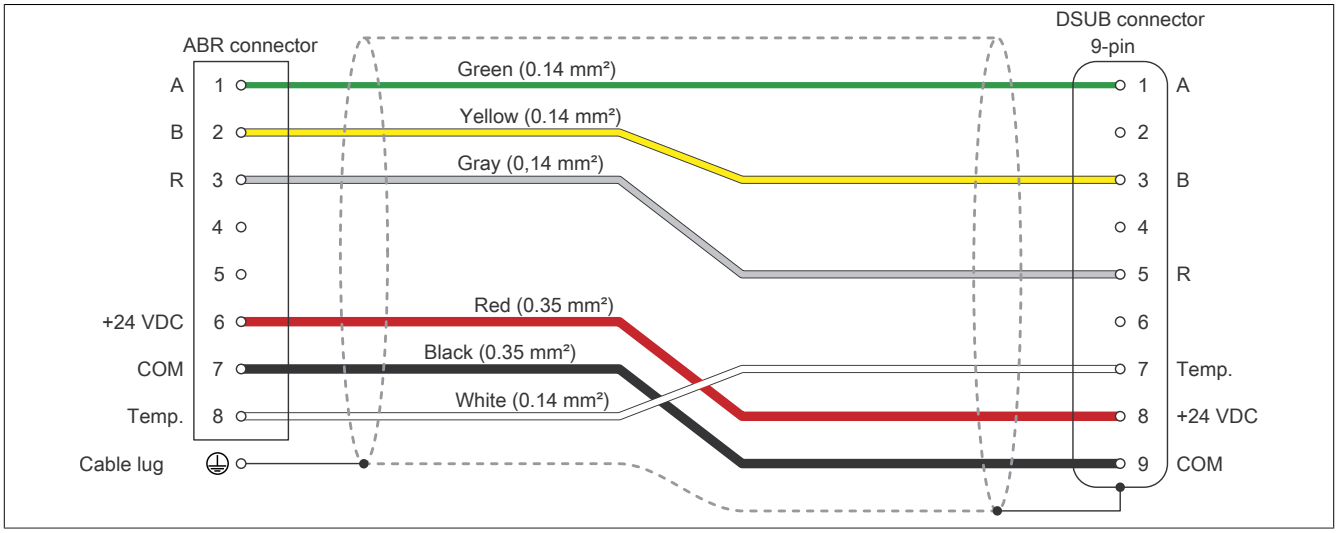


Pinout

8-pin terminal block	Pin	Name		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**	**Name**		**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



Order data

Model 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 Molex 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 Molex 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 Molex 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 Molex 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 Molex 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 Molex 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 Molex 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 Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	

Table 94: 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

Model 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 in accordance with VDE 0472 Part 803 as well as standard hydraulic oil							
Listed	UL AWM style 20963, 80°C, 30 V, E63216							
Cable construction								
Supply lines								
Quantity	2							
Wire insulation	Special thermoplastic material							
Wire colors	Red, black							
Design	Tinned copper stranded wire							
Diameter	0.35 mm²							
Shield	No							
Stranding	No							
Signal lines								
Quantity	4							
Wire insulation	Special thermoplastic material							
Wire colors	Gray, yellow, green, white							
Design	Tinned copper stranded wire							
Shield	No							
Stranding	All 4 wires together							
Cable stranding	With foil shield							
Complete shielding	Copper braiding, optical coverage ≥85% with foil shield							
Outer sheathing								
Material	PUR							
Color	RAL 6018							
Labeling	BERNECKER + RAINER 4x0.14+2x0.35 FLEX UL AWM STYLE 20963 80°C 30 V E63216							
Electrical characteristics								
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							
Environmental conditions								
Temperature								
Moving	-10 to 50°C							
Static	-20 to 80°C							
Mechanical characteristics								
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							
Speed	≤4 m/s							
Weight	0.045 kg/m							

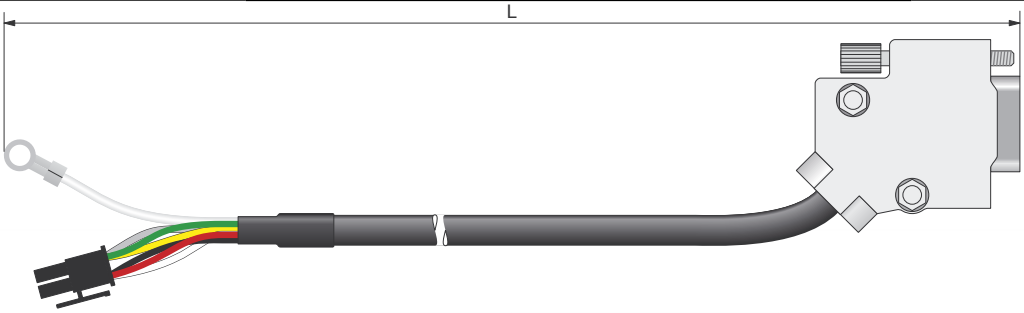
Table 95: 80CM01003.25-01, 80CM02003.25-01, 80CM03003.25-01, 80CM05003.25-01, 80CM10003.25-01, 80CM15003.25-01, 80CM20003.25-01, 80CM25003.25-01 - Technical data

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

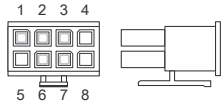
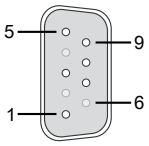
Wiring

Pinout

Dimensions

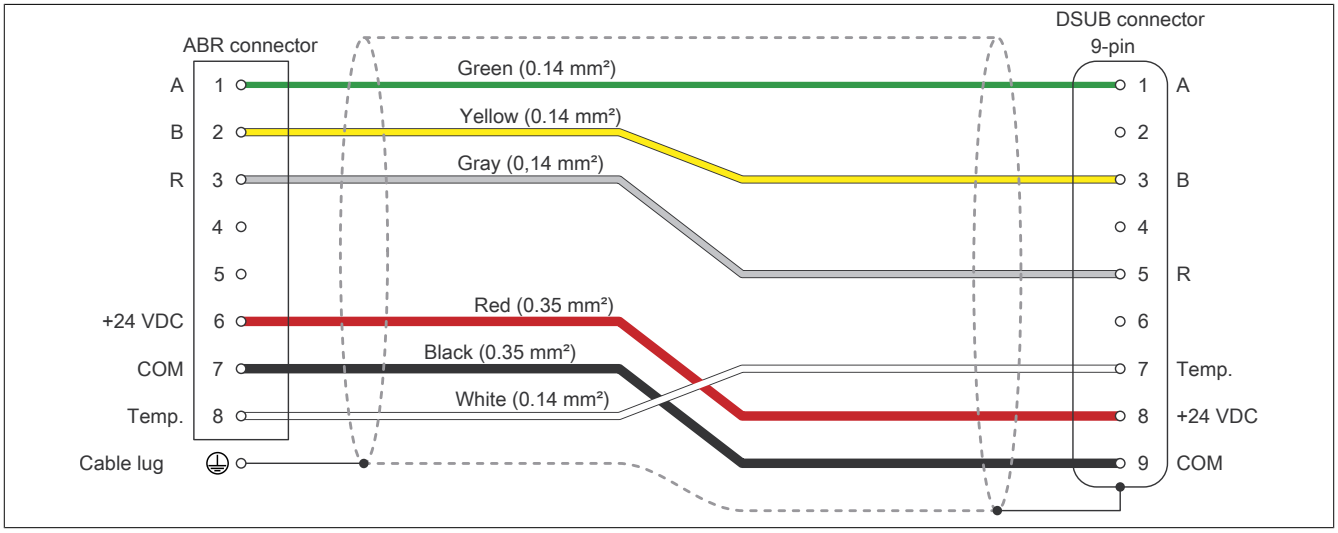


Pinout

8-pin terminal block	Pin	Name		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**	**Name**		**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

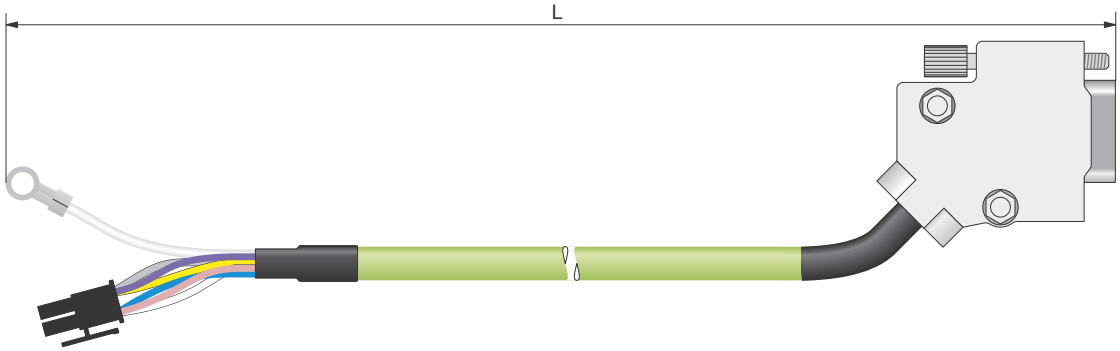
Cable diagram



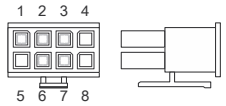
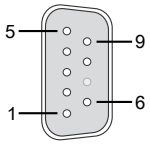
3.5.3.4.2.2 80CMxx004.25-01 - SSI absolute encoder cables

Pinout

Dimensions

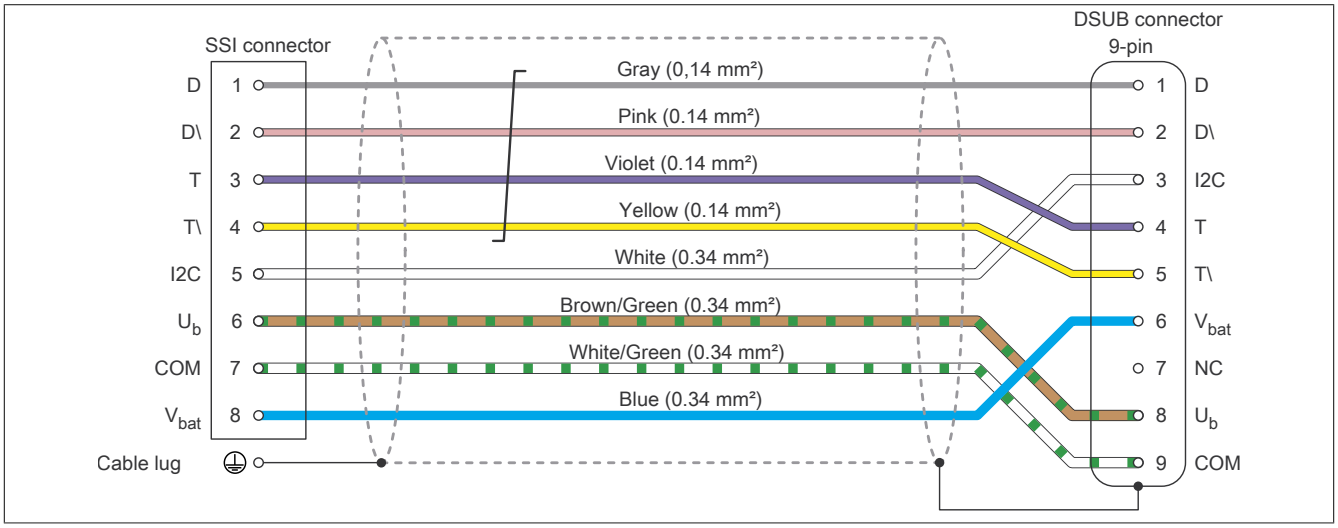


Pinout

8-pin terminal block	Pin	Name		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**	**Name**		**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



Order data

Model 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 Molex 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 Molex 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 Molex 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 Molex 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 Molex 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 Molex 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 Molex connector on the motor side, 9-pin DSUB connector on the drive side, can be used in cable drag chains, UL listed	

Table 96: 80CM01004.25-01, 80CM02004.25-01, 80CM03004.25-01, 80CM05004.25-01, 80CM10004.25-01, 80CM15004.25-01, 80CM20004.25-01 - Order data

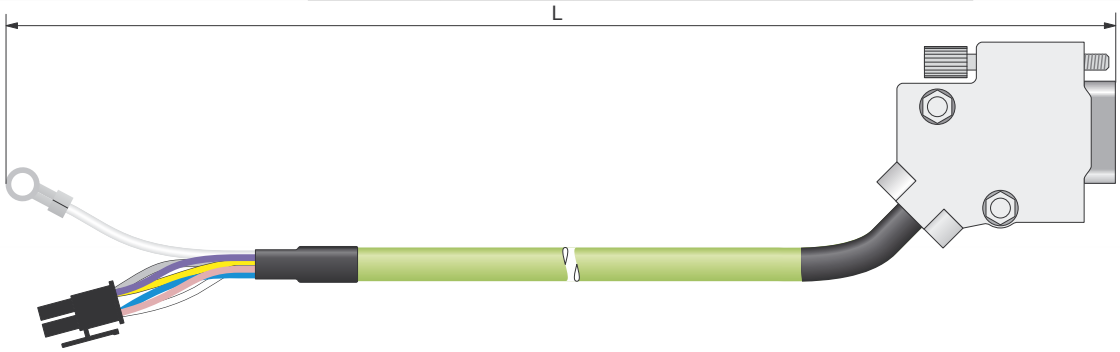
Technical data

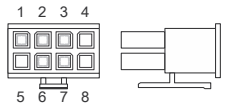
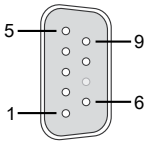
Model number	80CM01004.25-01	80CM02004.25-01	80CM03004.25-01	80CM05004.25-01	80CM10004.25-01	80CM15004.25-01	80CM20004.25-01
General information							
Cable cross section	1x 4x 0.14 mm² + 4x 0.34 mm²						
Durability	Oil resistance in accordance with VDE 0472 part 803 test type B						
Listed	UL AWM 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						
Diameter	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						
Diameter	0.14 mm²						
Shield	No						
Stranding	All 4 wires together						
Cable stranding	With foil shield						
Complete shielding	Copper/Tin braiding						
Outer sheathing							
Material	PUR						
Color	Green						
Labeling	Heidenhain UR AWM style 20963 80°C 30V 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 characteristics							
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 97: 80CM01004.25-01, 80CM02004.25-01, 80CM03004.25-01, 80CM05004.25-01, 80CM10004.25-01, 80CM15004.25-01, 80CM20004.25-01 - Technical data

Wiring

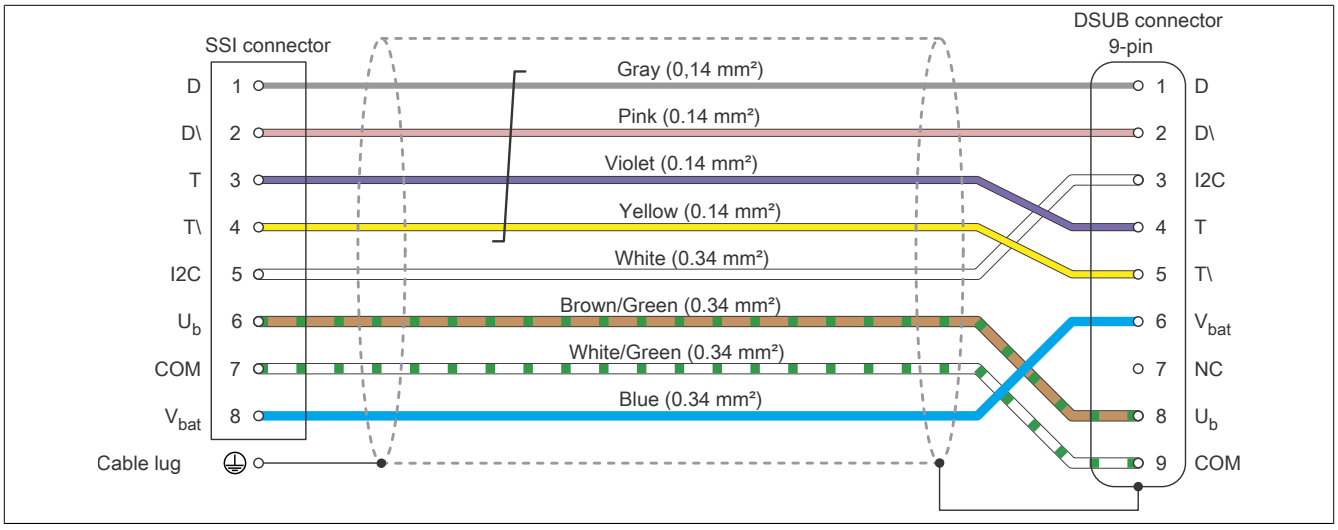
Pinout

Dimensions


Pinout					
8-pin terminal block	**Pin**	**Name**		**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**	**Name**		**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

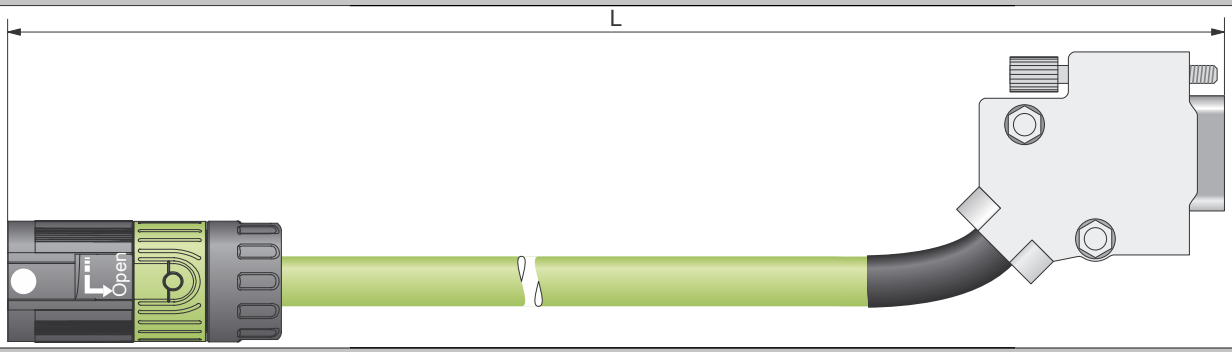
Cable diagram



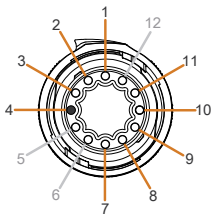
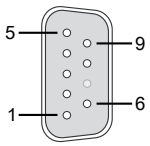
3.5.3.4.2.3 80CMxx005.65-01 - HIPERFACE encoder cables

Pinout

Dimensions

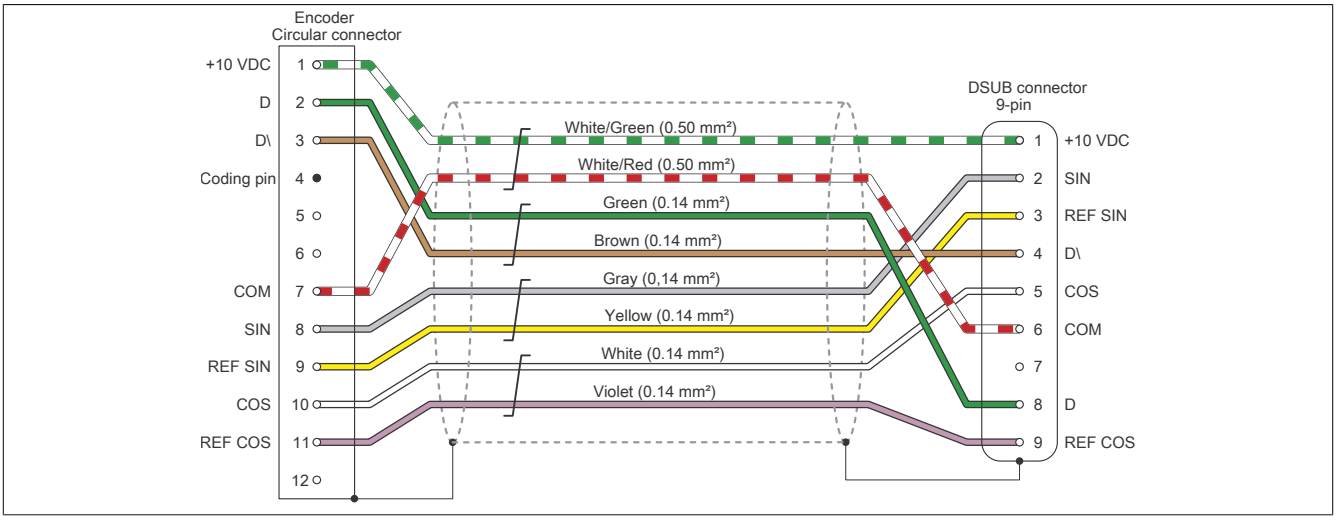


Pinout

12-pin female circular connector	Pin	Name		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



Order data

Model 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 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 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 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 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 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 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 can be used in cable drag chains, UL listed	

Table 98: 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

Model 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 in accordance with VDE 0472 Part 803 as well as standard hydraulic oil						
Listed	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						
Diameter	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						
Diameter	0.14 mm²						
Shield	No						
Stranding	Green with brown, gray with yellow, white with violet, black with red, pink with blue						
Cable stranding	With foil shield						
Complete shielding	Copper braiding, optical coverage >85% with foil shield						
Outer sheathing							
Material	PUR						
Color	RAL 6018						
Labeling	BERNECKER + RAINER 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 characteristics							
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						

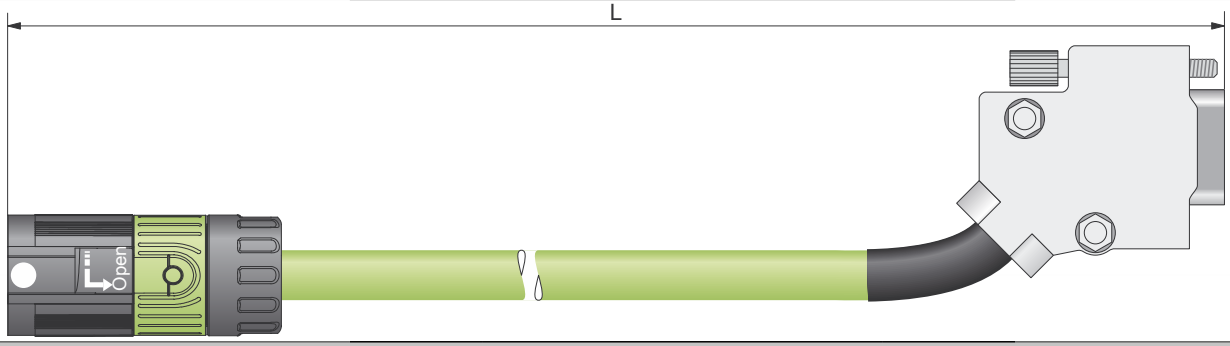
Table 99: 80CM01005.65-01, 80CM02005.65-01, 80CM03005.65-01, 80CM05005.65-01, 80CM10005.65-01, 80CM15005.65-01, 80CM20005.65-01 - Technical data

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

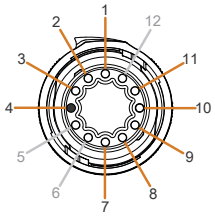
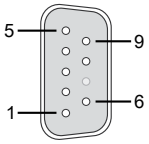
Wiring

Pinout

Dimensions

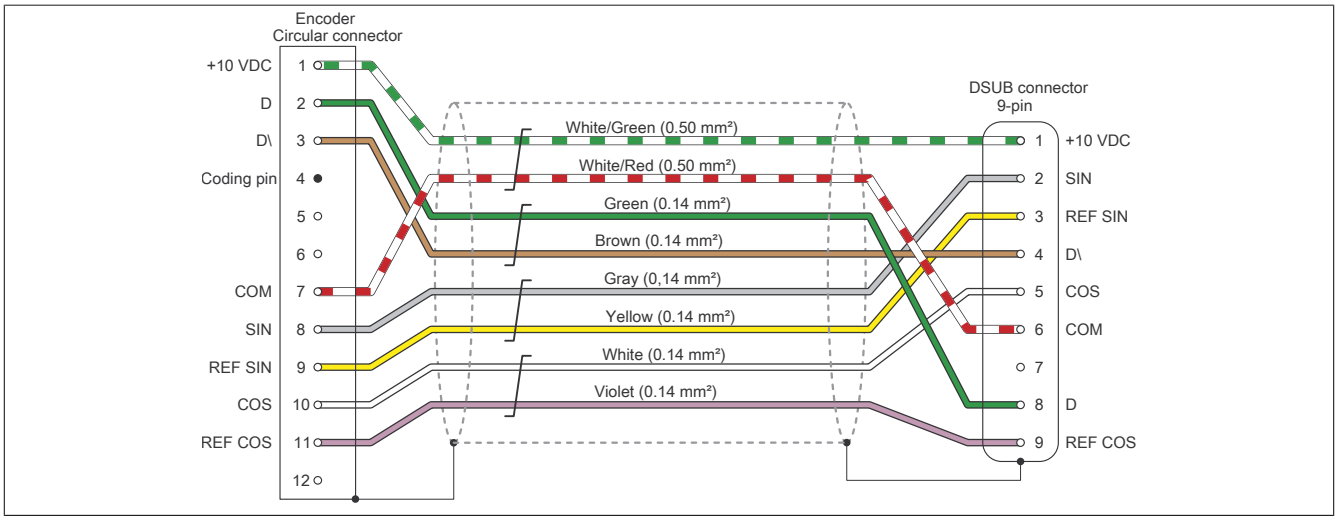


Pinout

12-pin female circular connector	Pin	Name		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

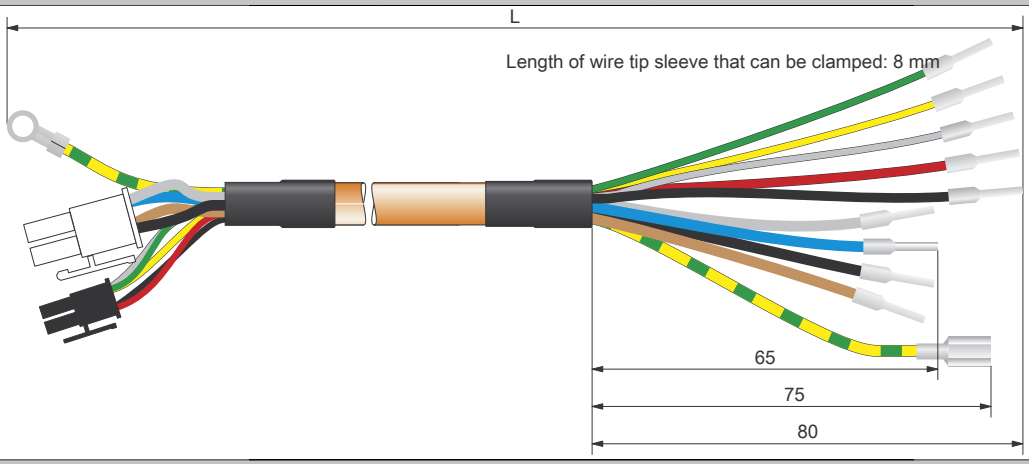


3.5.3.4.3 Hybrid cable

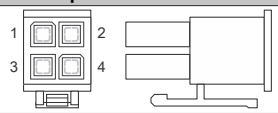
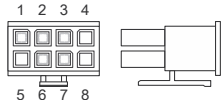
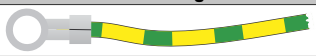
3.5.3.4.3.1 80CMxx013.21-01 - Hybrid cables

Pinout

Dimensions

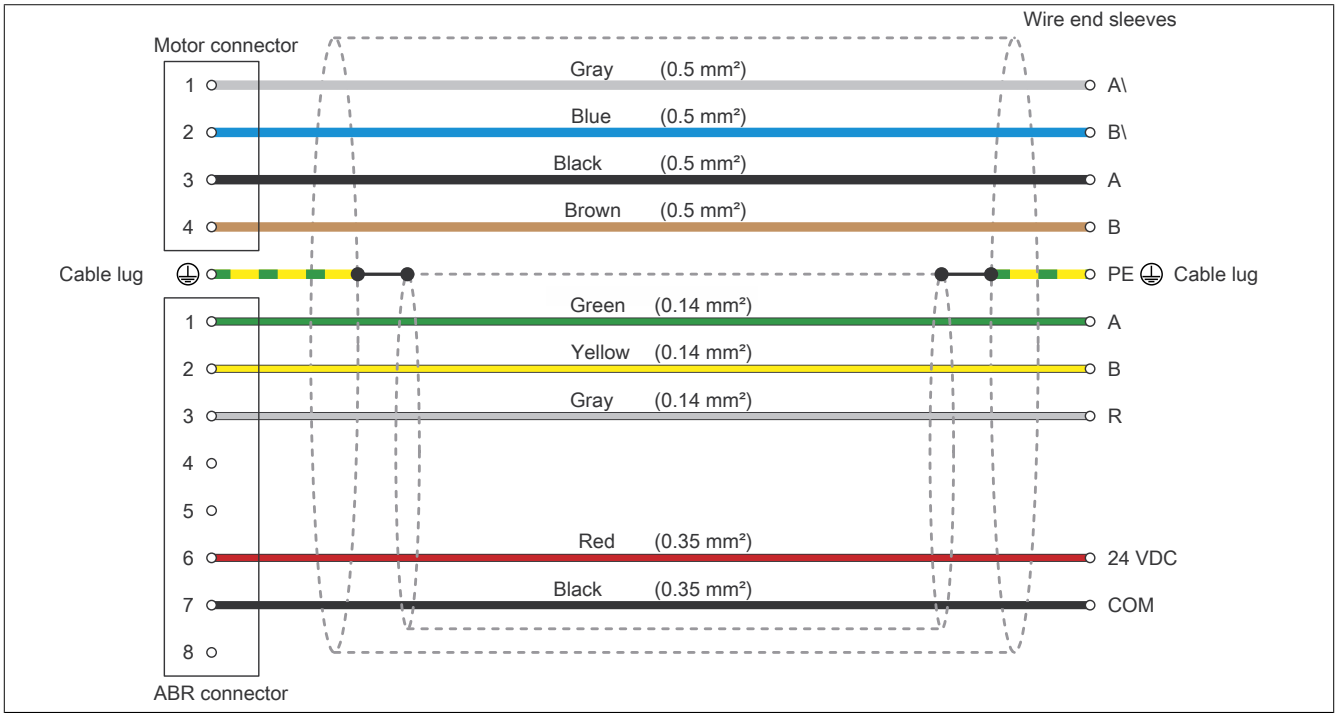


Pinout

4-pin terminal block	Pin	Name	Wire colors	Open
	1	A\	Gray	For custom wiring Connection to drive system
	2	B\	Blue	
	3	A	Black	
	4	B	Brown	
8-pin terminal block	**Pin**	**Name**	**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**	**Name**	**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



Order data

Model 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 motor with incremental encoder IP20, 4-pin and 8-pin Molex connector 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 motor with incremental encoder IP20, 4-pin and 8-pin Molex connector 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 motor with incremental encoder IP20, 4-pin and 8-pin Molex connector 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 motor with incremental encoder IP20, 4-pin and 8-pin Molex connector 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 motor with incremental encoder IP20, 4-pin and 8-pin Molex connector on the motor side, can be used in cable drag chains, UL listed	

Table 100: 80CM01013.21-01, 80CM02013.21-01, 80CM03013.21-01, 80CM05013.21-01, 80CM10013.21-01 - Order data

Technical data

Model number	80CM01013.21-01	80CM02013.21-01	80CM03013.21-01	80CM05013.21-01	80CM10013.21-01
General information					
Cable cross section	4x 0.5 mm² + 2x 0.35 mm² + 3x 0.14 mm²				
Listed	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				
Design	Tinned copper stranded wire				
Diameter	0.5 mm²				
Supply lines					
Quantity	2				
Wire insulation	Special thermoplastic material				
Wire colors	Red, black				
Design	Tinned copper stranded wire				
Diameter	0.35 mm²				
Stranding	Yes				
Signal lines					
Quantity	3				
Wire insulation	Special thermoplastic material				
Wire colors	Gray, yellow, green				
Design	Tinned copper stranded wire				
Diameter	0.14 mm²				
Shield	Yes				
Stranding	Yes				
Cable stranding	Yes				
Complete shielding	Tinned copper wire braiding, optical coverage ≥85%				
Outer sheathing					
Material	PUR				
Labeling	BERNECKER + RAINER 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 30V FT2 LL46064				
Electrical characteristics					
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				
Environmental conditions					
Temperature					
Moving	-10 to 50°C				
Static	-20 to 80°C				
Mechanical characteristics					
Dimensions					
Length	1 m	2 m	3 m	5 m	10 m
Diameter	72 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				
Speed	≤4 m/s				
Weight	0.085 kg/m				

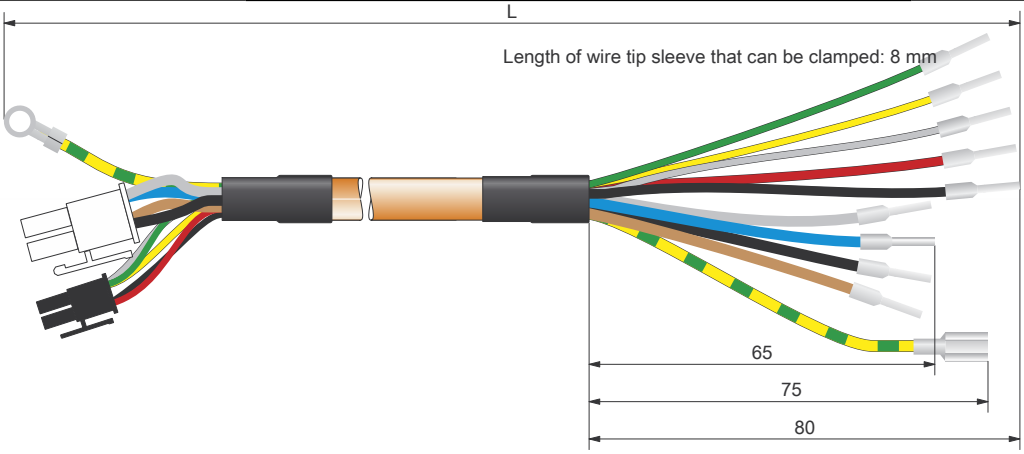
Table 101: 80CM01013.21-01, 80CM02013.21-01, 80CM03013.21-01, 80CM05013.21-01, 80CM10013.21-01 - Technical data

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

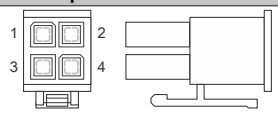
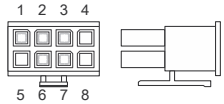
Wiring

Pinout

Dimensions

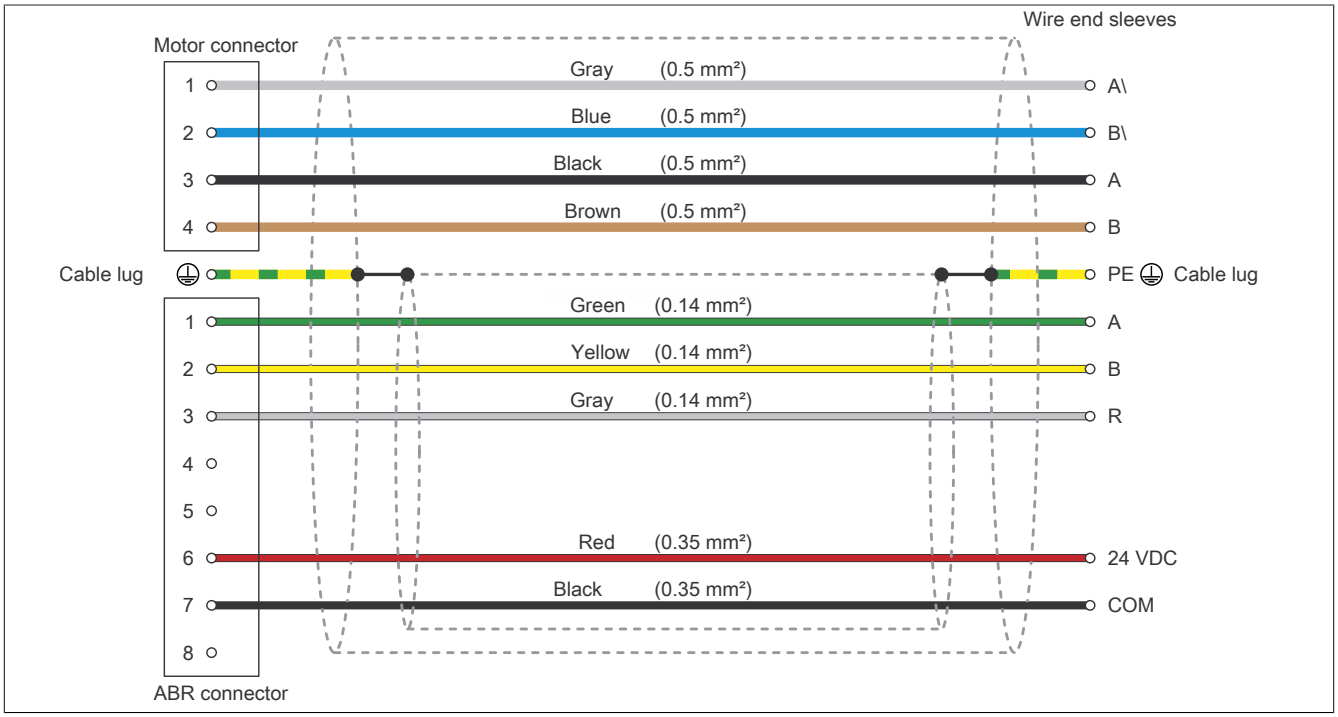


Pinout

4-pin terminal block	Pin	Name	Wire colors	Open
	1	A\	Gray	For custom wiring Connection to drive system
	2	B\	Blue	
	3	A	Black	
	4	B	Brown	
8-pin terminal block	**Pin**	**Name**	**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**	**Name**	**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

Model 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 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 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 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 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 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 drag chains, UL/CSA listed	

Table 102: 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

Model 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 0.35 mm²						
Durability	Oil resistance in accordance with VDE 0472 Part 803 as well as standard hydraulic oil						
Listed	UL AWM style 20234, 80°C, 1000 V, E63216 as well as CSA AWM I/II A/B, 90°C, 1000 V, FT2 LL46064						
Certification							
CE	Yes						
cULus	Yes						
Cable construction							
Power lines							
Quantity	4						
Wire insulation	Special thermoplastic material						
Wire colors	Black, brown, blue, yellow/green						
Design	Tinned copper stranded wire						
Diameter	0.75 mm²						
Shield	No						
Stranding	No						
Signal lines							
Quantity	4						
Wire insulation	Special thermoplastic material						
Wire colors	White, white/red, white/blue, white/green						
Design	Tinned copper stranded wire						
Diameter	0.35 mm²						
Shield	Separate shielding for 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						
Complete shielding	Tinned copper braiding, optical coverage >85% with foil shield						
Outer sheathing							
Material	PUR						
Color	Orange, similar to RAL 2003 flat						
Labeling	BERNECKER + RAINER 4x0.75+2x2x0.35 FLEX UL AWM STYLE 20234 80°C 1000 V E63216 CSA AWM I/II A/B 90°C 1000 V FT2 LL46064						
Connector							
Type	8-pin female springtec motor connector						
Connection cycles	>50						
Contacts	8 (4 power and 4 signal contacts)						
EN 60529 protection	IP67 when connected						
Electrical characteristics							
Test voltage							
Wire/Wire	3 kV						
Wire/Shield	3 kV						
Conductor resistance							
Power lines	≤0.06 Ω	≤0.15 Ω	≤0.2 Ω	≤0.29 Ω	≤0.44 Ω	≤0.58 Ω	≤0.73 Ω
Signal lines	≤0.11 Ω	≤0.28 Ω	≤0.39 Ω	≤0.55 Ω	≤0.83 Ω	≤1.1 Ω	≤1.36 Ω
Insulation resistance	>100 GΩ	>40 GΩ	>28.57 GΩ	>20 GΩ	>13.33 GΩ	>10 GΩ	>8 GΩ
Max. current load in accordance with IEC 60364-5-523 by installation type							
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 80°C						
Static	-40 to 90°C						
Mechanical characteristics							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	10.9 mm ±0.4 mm						
Flex 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	0.35 kg	0.91 kg	1.24 kg	1.75 kg	2.6 kg	3.5 kg	4.2 kg

Table 103: 8BCM0002.1034C-0, 8BCM0005.1034C-0, 8BCM0007.1034C-0, 8BCM0010.1034C-0, 8BCM0015.1034C-0, 8BCM0020.1034C-0, 8BCM0025.1034C-0 - Technical data

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

3.5.3.5.1.2 Not for use in cable drag chains

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

Order data

Model 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 104: 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

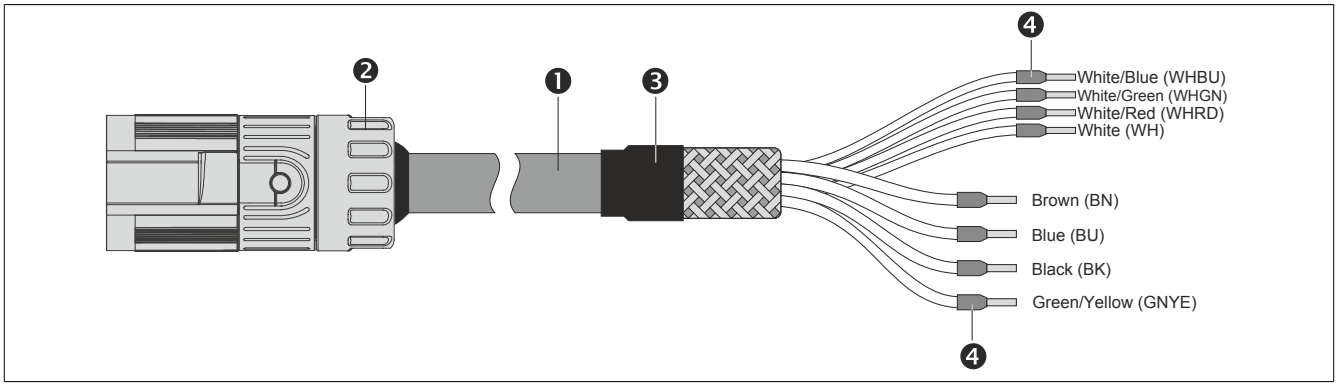
Model number	8BCM0002.3034C-0	8BCM0005.3034C-0	8BCM0007.3034C-0	8BCM0010.3034C-0	8BCM0015.3034C-0	8BCM0020.3034C-0	8BCM0025.3034C-0
General information							
Cable cross section	4x 0.75 mm² + 2x 2x 0.34 mm²						
Durability	Oil resistant TM5 in accordance with VDE 0281 part 1 / HD21.1S4 (test method in accordance with EN60811-2-1) Flame-retardant in accordance with IEC 60332-1-2 / UL 1581 (VW-1) / CSA C22.2 (FT-1)						
Listed	UL Style 2570 80°C 1000 V VW-1 E47573 and cUL AWM I/II A/B 80°C 1000 V FT-1						
Certification							
CE	Yes						
cULus	Yes						
Cable construction							
Power lines							
Quantity	4						
Wire insulation	PP						
Wire colors	Black, brown, blue, yellow/green						
Design	Tinned copper stranded wire						
Diameter	0.75 mm²						
Shield	No						
Stranding	No						
Signal lines							
Quantity	4						
Wire insulation	PP						
Wire colors	White, white/red, white/blue, white/green						
Design	Tinned copper stranded wire						
Diameter	0.34 mm²						
Shield	Separate shielding for 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						
Complete shielding	Tinned copper braiding, optical coverage >85% with foil shield						
Outer sheathing							
Material	PVC						
Color	Orange, similar to RAL 2003 flat						
Labeling	B&R 4x0.75+2x2x0.34 XX/YYYY E47543 cURus AWM STYLE 2570 I/II A/B 80°C 1000 V FT-1 [1]						
Electrical characteristics							
Test voltage							
Wire/Wire	4 kV						
Wire/Shield	3 kV						
Conductor resistance							
Power lines	≤0.05 Ω	≤0.13 Ω	≤0.19 Ω	≤0.27 Ω	≤0.4 Ω	≤0.53 Ω	≤0.67 Ω
Signal lines	≤0.12 Ω	≤0.29 Ω	≤0.41 Ω	≤0.58 Ω	≤0.87 Ω	≤1.17 Ω	≤1.46 Ω
Insulation resistance	>50 GΩ	>20 GΩ	>14.29 GΩ	>10 GΩ	>6.67 GΩ	>5 GΩ	>4 GΩ
Max. current load in accordance with IEC 60364-5-523 by installation type							
Wall mounting	9.8 A						
Installed in conduit or cable duct	8.5 A						
Installed in cable tray	10.4 A						
Environmental conditions							
Temperature							
Moving	0 to 60°C						
Static	-20 to 80°C						
Mechanical characteristics							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	10.6 mm ±0.4 mm						
Flex radius							
Single bend	>55 mm						
Moving	≥165 mm						
Weight	0.7 kg	1.2 kg	1.5 kg	2 kg	2.8 kg	3.6 kg	4 kg

Table 105: 8BCM0002.3034C-0, 8BCM0005.3034C-0, 8BCM0007.3034C-0, 8BCM0010.3034C-0, 8BCM0015.3034C-0, 8BCM0020.3034C-0, 8BCM0025.3034C-0 - Technical data

1) XX ... Week of manufacture; YYYY ... Year of manufacture

3.5.3.5.1.3 Wiring

Cable construction



Pos.	Quantity	Name	Note
1	1	Motor cable	4x 0.75 mm² + 2x 2x 0.35 mm²
2	1	8-pin motor connector	-
3	1	Heat shrink tubing	-
4	8	Wire end sleeve	-

Table 106: 0.75 mm² motor cables - Cable construction

Pinout

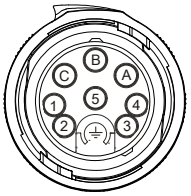
Male connector	Pin	Name	Function
	A	U	Motor connection U
	B	V	Motor connection V
	C	W	Motor connection W
	D	PE	Protective ground conductor
	1	T+	Temperature +
	2	T-	Temperature -
	3	B+	Brake +
	4	B-	Brake -
	5	---	---

Table 107: 0.75 mm² motor cables - Pinout

Cable diagram

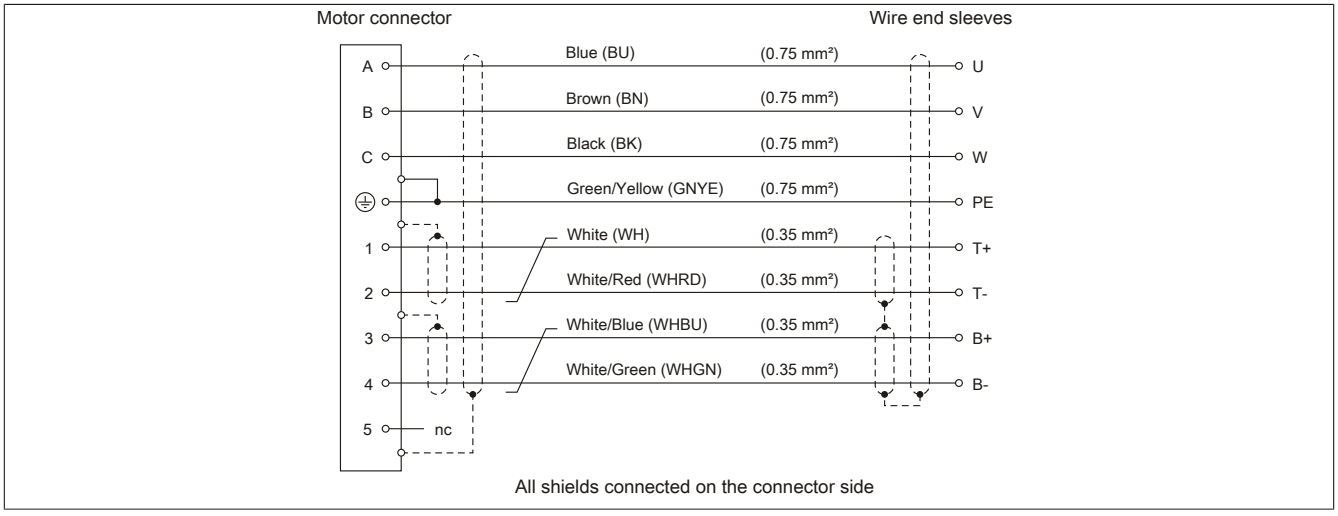


Figure 14: 0.75 mm² motor cables - Cable diagram

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

Model 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 connector, 9-pin male DSUB servo coupling, 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 connector, 9-pin male DSUB servo coupling, 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 connector, 9-pin male DSUB servo coupling, 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 connector, 9-pin male DSUB servo coupling, 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 connector, 9-pin male DSUB servo coupling, 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 connector, 9-pin male DSUB servo coupling, 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 connector, 9-pin male DSUB servo coupling, can be used in cable drag chains, UL/CSA listed	

Table 108: 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

Model 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 in accordance with VDE 0472 Part 803 as well as standard hydraulic oil						
Listed	UL AWM style 20671, 90°C, 30 V, E63216 and CSA AWM, 90°C, 30 V, I/II A/B FT1 LL46064						
Certification							
CE	Yes						
cULus	Yes						
Cable construction							
Signal lines							
Quantity	6						
Wire insulation	Special thermoplastic material						
Wire colors	White, brown, green, yellow, gray, pink						
Design	Tinned copper stranded wire						
Diameter	AWG 24 / AWG 19						
Shield	No						
Stranding	White with brown, green with yellow, gray with pink						
Cable stranding	The 3 pairs together covered by foil shield						
Complete shielding	Copper braiding, optical coverage ≥90% with foil shield						
Outer sheathing							
Material	PUR						
Color	RAL 6018						
Labeling	BERNECKER + RAINER 3x2x24 AWG FLEX UL AWM STYLE 20671 90°C 30 V E63216 CSA AWM 90°C 30 V I/II A/B FT1 LL46064						
Connector							
Type	Male resolver connector, female 12-pin springtec connector						
Connection cycles	>50						
Contacts	12						
Additional connectors	9-pin male DSUB servo connector Connection cycles: >50 Contacts: 9 EN 60529 protection: IP20 when connected						
EN 60529 protection	IP67 when connected						
Electrical characteristics							
Test voltage							
Wire/Wire	1.5 kV						
Wire/Shield	0.8 kV						
Conductor resistance							
Signal lines	≤0.17 Ω	≤0.43 Ω	≤0.6 Ω	≤0.86 Ω	≤1.29 Ω	≤1.72 Ω	≤2.15 Ω
Insulation resistance	>100 GΩ	>40 GΩ	>28.57 GΩ	>20 GΩ	>13.33 GΩ	>10 GΩ	>8 GΩ
Environmental conditions							
Temperature							
Moving	-10 to 80°C						
Static	-40 to 90°C						
Mechanical characteristics							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.5 mm ±0.2 mm						
Flex radius							
Single bend	≥20 mm						
Moving	≥50 mm						
Drag chain data							
Acceleration	<60 m/s²						
Flex cycles [1)]	≥3,000,000						
Speed	≤4 m/s						
Weight	0.16 kg	0.34 kg	0.44 kg	0.6 kg	0.85 kg	1.22 kg	1.5 kg

Table 109: 8BCR0002.1121A-0, 8BCR0005.1121A-0, 8BCR0007.1121A-0, 8BCR0010.1121A-0, 8BCR0015.1121A-0, 8BCR0020.1121A-0, 8BCR0025.1121A-0 - Technical data

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

3.5.3.5.2.2 Not for use in cable drag chains

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

Order data

Model 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 24 AWG (19x 0.127), 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 24 AWG (19x 0.127), 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 24 AWG (19x 0.127), 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 24 AWG (19x 0.127), 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 24 AWG (19x 0.127), 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 24 AWG (19x 0.127), 12-pin female springtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	

Table 110: 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.

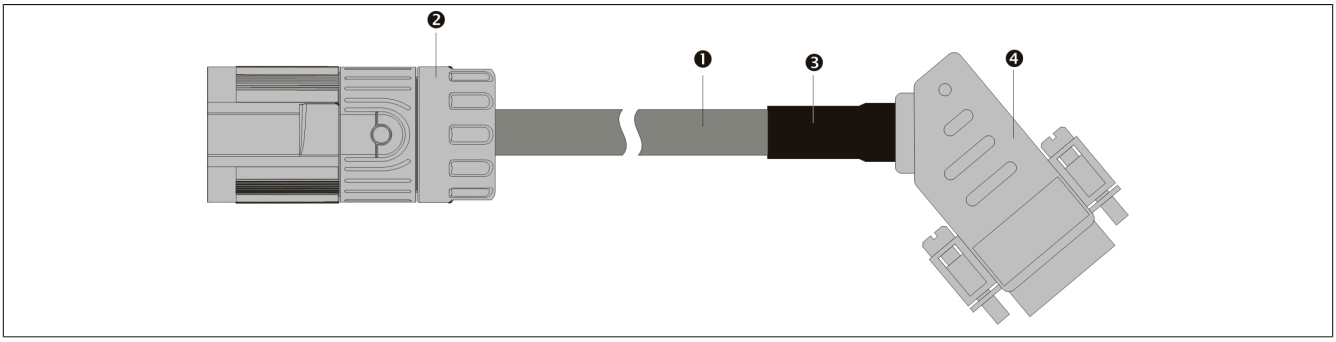
Technical data

Model 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 24 AWG						
Durability	Oil resistant in accordance with DIN VDE 0281-1 (TM5) (HD 21.1 / DIN EN 60811-1-1/2-1) Flame-retardant in accordance with IEC 60332-1-2						
Listed	UL AWM style 2637 90°C 30 V E130266 and CSA AWM I/II A/B 90°C 30 V, FT1						
Certification							
CE	Yes						
cULus	Yes						
Cable construction							
Signal lines							
Quantity	6						
Wire insulation	PVC						
Wire colors	White, brown, green, yellow, gray, pink						
Design	Tinned copper stranded wire						
Diameter	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						
Complete shielding	Copper braiding, optical coverage ≥90% with foil shield						
Outer sheathing							
Material	PVC						
Color	Green						
Labeling	B&R 3x2x0.22 * E130266 cURus AWM STYLE 2637 * AWM I/II A/B 90°C 30V FT1 * <Batch number>						
Connector							
Type	Male resolver connector, female 12-pin springtec connector						
Connection cycles	>50						
Contacts	12						
Additional connectors	9-pin male DSUB servo connector Connection cycles: >50 Contacts: 9 EN 60529 protection: IP20 when connected						
EN 60529 protection	IP67 when connected						
Electrical characteristics							
Test voltage							
Wire/Wire	1.5 kV						
Wire/Shield	0.8 kV						
Conductor resistance							
Signal lines	≤0.12 Ω	≤0.3 Ω	≤0.42 Ω	≤0.6 Ω	≤0.9 Ω	≤1.2 Ω	≤1.5 Ω
Insulation resistance	>10 GΩ	>4 GΩ	>2.86 GΩ	>2 GΩ	>1.33 GΩ	>1 GΩ	>0.8 GΩ
Environmental conditions							
Temperature							
Moving	-30 to 90°C						
Static	-30 to 90°C						
Mechanical characteristics							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.3 mm ±0.2 mm						
Flex radius							
Single bend	≥26 mm						
Moving	≥52 mm						
Weight	0.16 kg	0.34 kg	0.46 kg	0.64 kg	0.94 kg	1.24 kg	1.54 kg

Table 111: 8BCR0002.3121A-0, 8BCR0005.3121A-0, 8BCR0007.3121A-0, 8BCR0010.3121A-0, 8BCR0015.3121A-0, 8BCR0020.3121A-0, 8BCR0025.3121A-0 - Technical data

3.5.3.5.2.3 Wiring

Cable construction



Pos.	Quantity	Name	Note
1	1	Encoder cable	3x 2x 24 AWG/19
2	1	12-pin female resolver connector, contact connector	-
3	1	Kink protection	-
4	1	DSUB housing 45°, metal-plated, 9-pin connector	-

Table 112: Resolver cables - Construction

Pinout

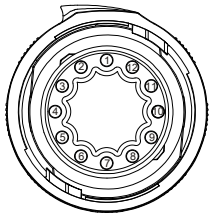
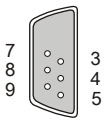
Male connector	Pin	Name	Function	Pin	Male connector
	1	---	Coded contact	---	
	2	---	---	---	
	3	---	---	---	
	4	---	---	---	
	5	---	---	---	
	6	R1	Reference output inverted	9	
	7	---	---	---	
	8	S4	Sine input +	3	
	9	S2	Sine input -	7	
	10	S3	Cosine input +	8	
	11	S1	Cosine input -	4	
	12	R2	Reference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

Table 113: Resolver cables - Pinout

Cable diagram

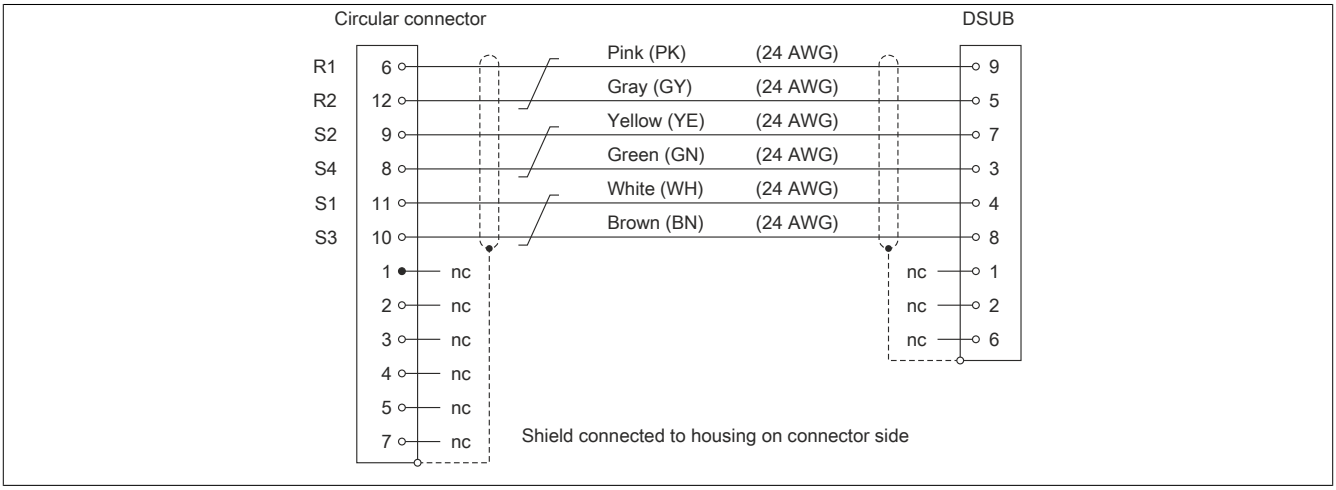


Figure 15: Resolver cables - Cable diagram

3.5.3.5.3 EnDat 2.2 cables

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

Order data

Model 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, 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	
8BCF0007.1221B-0	EnDat 2.2 cable, length 7 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	
8BCF0010.1221B-0	EnDat 2.2 cable, length 10 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	
8BCF0015.1221B-0	EnDat 2.2 cable, length 15 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	
8BCF0020.1221B-0	EnDat 2.2 cable, length 20 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	
8BCF0025.1221B-0	EnDat 2.2 cable, length 25 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	

Table 114: 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

Model 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	1x 4x 0.14 mm² + 4x 0.35 mm²						
Durability	In accordance with DIN EN 50363-10-2 (VDE 0207-363-10-2) [1]			Valid at an ambient temperature of 20°C and bend radius of 75 mm. [1]	In accordance with DIN EN 50363-10-2 (VDE 0207-363-10-2) [1]		
Listed	UR AWM style 20963, 80°C, 30 V, E63216 [1]						
Certification							
CE	Yes						
cULus	Yes						
Cable construction							
Supply lines							
Quantity	4						
Wire insulation	Special thermoplastic material						
Wire colors	White/Green, brown/green, blue, white						
Design	Tinned copper stranded wire						
Diameter	0.35 mm²						
Shield	No						
Stranding	No						
Signal lines							
Quantity	4						
Wire insulation	Polyolefin foam						
Wire colors	Yellow, gray, pink, violet						
Design	Tinned copper stranded wire						
Diameter	0.14 mm²						
Shield	No						
Stranding	4 wires around a filler material in the core						
Cable stranding	With foil shield						
Complete shielding	Copper/Tin braiding, optical coverage ≥ 85%						
Outer sheathing							
Material	PUR						
Color	Green						
Labeling	B&R 4x0.14 + 4x0.35 FLEX UR AWM STYLE 20963 80°C 30V E63216 [1]						
Connector							
Type	EnDat 12-pin female springtec connector						
Connection cycles	>50						
Contacts	12						
Additional connectors	9-pin male DSUB servo connector Connection cycles: >50 Contacts: 9 EN 60529 protection: IP20 when connected						
EN 60529 protection	IP67 when connected						
Electrical characteristics							
Operating voltage	≤30 V						
Test voltage							
Wire/Wire	1 kV						
Wire/Shield	0.5 kV						
Conductor resistance							
Supply lines	≤55 Ω/km						
Signal lines	≤134 Ω/km						
Insulation resistance	>200 MΩ * km					>200 MΩ * km	>200 MΩ * km
Environmental conditions							
Temperature							
Moving	-10 to 80°C						
Static	-40 to 80°C						
Mechanical characteristics							
Dimensions							
Length	2 m	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6 mm ±0.2 mm						
Flex radius							
Single bend	≥18 mm						
Moving	≥75 mm						

Table 115: 8BCF0002.1221B-0, 8BCF0005.1221B-0, 8BCF0007.1221B-0, 8BCF0010.1221B-0, 8BCF0015.1221B-0, 8BCF0020.1221B-0, 8BCF0025.1221B-0 - Technical data

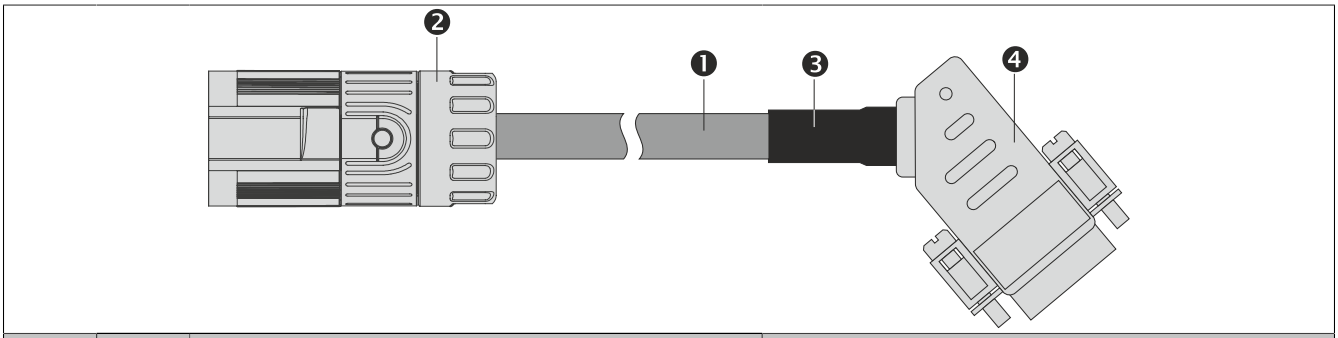
Model number	8BCF0002. 1221B-0	8BCF0005. 1221B-0	8BCF0007. 1221B-0	8BCF0010. 1221B-0	8BCF0015. 1221B-0	8BCF0020. 1221B-0	8BCF0025. 1221B-0
Drag chain data							
Acceleration	≤60 m/s²						
Flex cycles	≥3,000,000 2)						
Speed	≤4 m/s						
Weight	0.15 kg	0.33 kg	0.42 kg	0.6 kg	0.9 kg	1.4 kg	1.8 kg

Table 115: 8BCF0002.1221B-0, 8BCF0005.1221B-0, 8BCF0007.1221B-0, 8BCF0010.1221B-0, 8BCF0015.1221B-0, 8BCF0020.1221B-0, 8BCF0025.1221B-0 - Technical data

1) Specified values refer to the raw cable being used.
2) Valid at an ambient temperature of 20°C and bend radius of 75 mm.

3.5.3.5.3.2 Wiring

Construction



Pos.	Pieces	Name	Note
1	1	Encoder line	1x 4x 0.14 mm² + 4x 0.34 mm²
2	1	12-pin circular connector	ESTB 002 NN00 10 0001 000
3	1	DSUB housing 45°, metal plated, 9-pin connector	
4	1	Heat shrink tubing	

Table 116: Construction - 8BCF EnDat 2.2 cable

Pinout

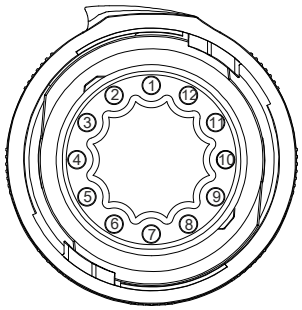
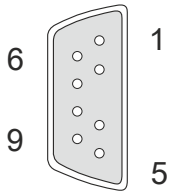
Circular connector	Pin	Name	Function	Pin	DSUB connector
	1	U+	Encoder power supply +12.5 V	1	
	2	D	Data input	4	
	3	D\	Data input inverted	8	
	4	T	Clock output	5	
	5	T\	Clock output inverted	9	
	6	COM (2)	Battery supply 0 V	7	
	7	COM (1)	Encoder power supply 0 V	6	
	8	---			
	9	---			
	10	---			
	11	---			
	12	VBATT	Battery supply	2	

Table 117: 8BCF EnDat 2.2 cables - Pinout

Cable diagram

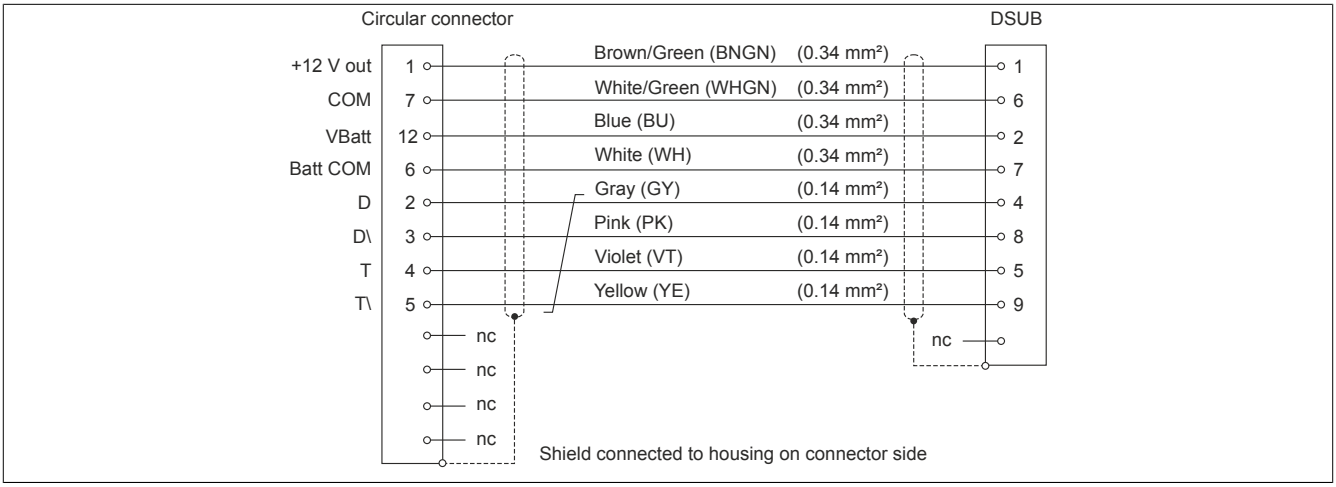


Figure 16: 8BCF EnDat 2.2 cables - Cable diagram

3.5.3.5.4 LinMot hybrid cables

3.5.3.5.4.1 80CMxx016.77-01 - LinMot hybrid cables

Order data



Model 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 on the 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 on the 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 on the 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 on the 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 on the 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 on the 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 on the motor side, can be used in cable drag chains, UL/CSA listed

Table 118: 80CM01016.77-01, 80CM02016.77-01, 80CM03016.77-01, 80CM05016.77-01, 80CM10016.77-01, 80CM15016.77-01, 80CM20016.77-01 - Order data

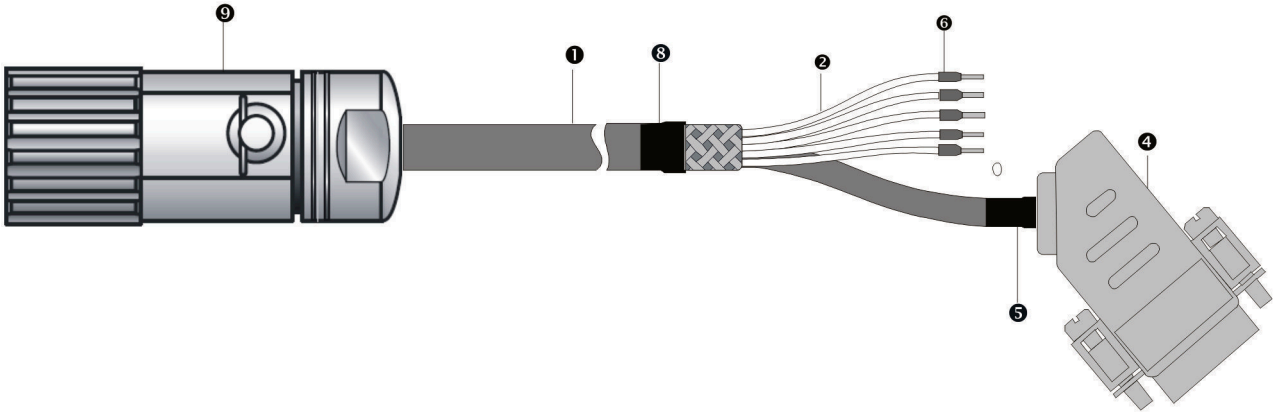
Technical data

Model 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						
Design	0.14 mm² tinned copper braid						
Diameter	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						
Complete shielding	Tinned copper braid						
Outer sheathing							
Material	PUR						
Color	Jet black						
Labeling	Linear motor cable KS05						
Electrical characteristics							
Test voltage							
Wire/Wire	2000 V						
Wire/Shield	1200 V						
Mechanical characteristics							
Dimensions							
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m
Diameter	9.5 mm						
Flex radius							
Single bend	5x wire diameter						
Moving	10x wire diameter						
Can be used in cable drag chains	Yes						

Table 119: 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	Name
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 120: Components

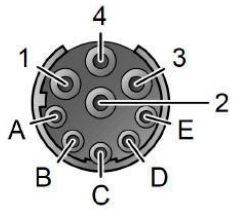
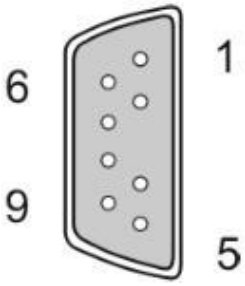
Connection	Pin	Name	Color	Function	Pin	Connection
	1	Ph1+	Red	Motor connection Ph1+		
	2	Ph1-	Pink	Motor connection Ph1-		
	3	Ph2+	Blue	Motor connection Ph2+		
	4	Ph2-	Gray	Motor connection Ph2-		
	A	+5 VDC	White	Encoder power supply 5 V	1	
	B	AGND	Inner shield	Encoder power supply 0 V	6	
	C	+Sin	Yellow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

Table 121: Pinout

Cable diagram

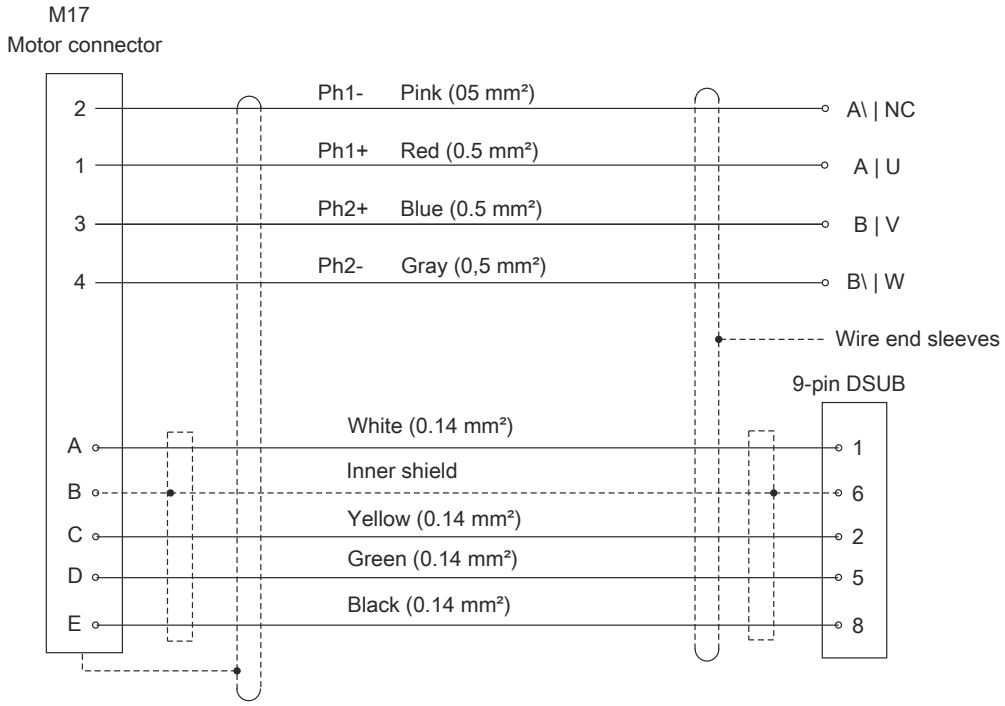


Table 122: Cable diagram

3.5.3.5.4.2 80CMxx016.87-01 - LinMot hybrid cables

Order data



Model 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 123: 80CM01016.87-01, 80CM02016.87-01, 80CM03016.87-01, 80CM05016.87-01, 80CM10016.87-01, 80CM15016.87-01, 80CM20016.87-01 - Order data

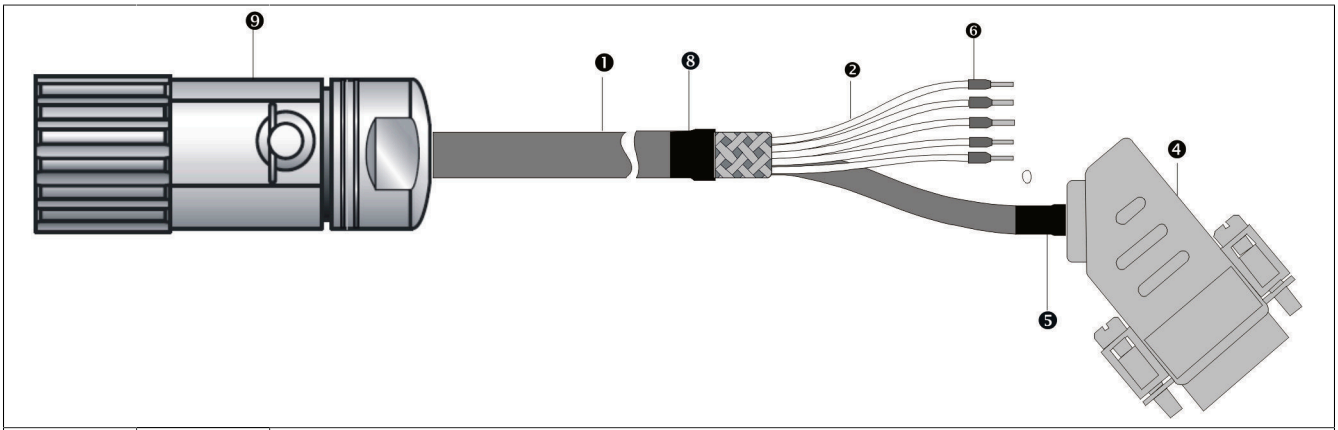
Technical data

Model 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						
Design	0.14 mm² tinned copper braid						
Diameter	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						
Complete shielding	Tinned copper braid						
Outer sheathing							
Material	PUR						
Color	Jet black						
Labeling	Linear motor cable KS010						
Electrical characteristics							
Test voltage							
Wire/Wire	2000 V						
Wire/Shield	1200 V						
Mechanical characteristics							
Dimensions							
Length	1 m	2 m	3 m	5 m	10 m	15 m	20 m
Diameter	10.8 mm						
Flex radius							
Single bend	5x wire diameter						
Moving	10x wire diameter						
Can be used in cable drag chains	Yes						

Table 124: 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	Name
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 125: Components

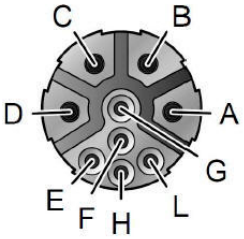
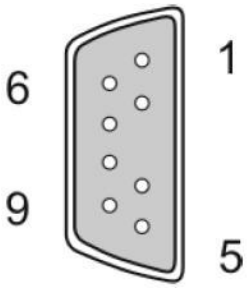
Connection	Pin	Name	Color	Function	Pin	Connection
	A	Phase1+	Red	Motor connection Ph1+		
	B	Phase1-	Pink	Motor connection Ph1-		
	C	Phase2+	Blue	Motor connection Ph2+		
	D	Phase2-	Gray	Motor connection Ph2-		
	E	+5 VDC	White	Encoder power supply 5 V	1	
	F	AGND	Inner shield	Encoder power supply 0 V	6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

Table 126: Pinout

Cable diagram

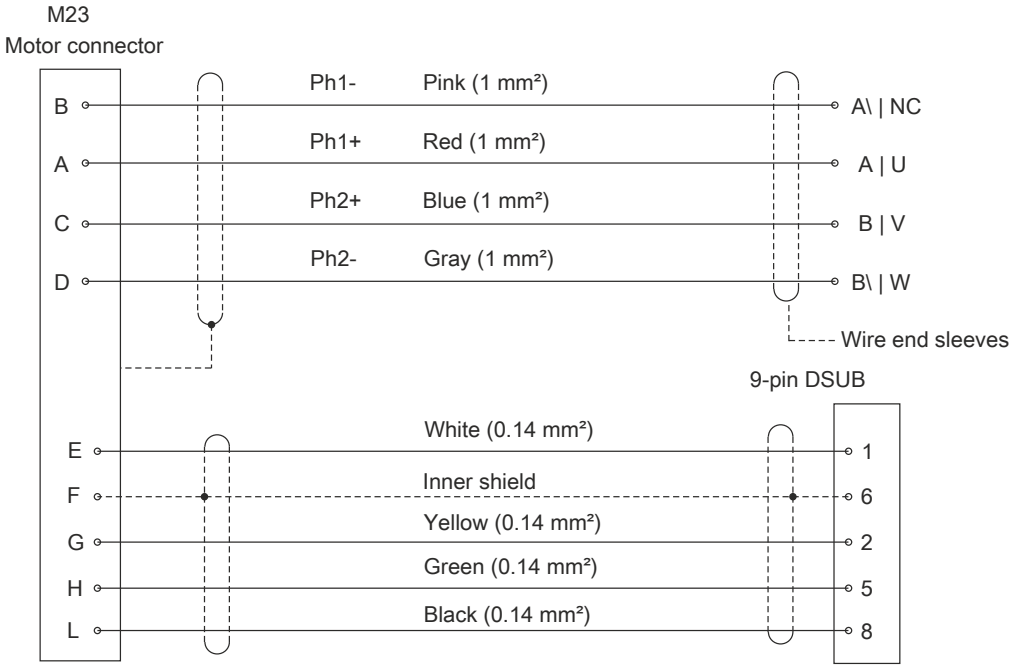


Table 127: Cable diagram

3.5.4 Cable extensions

3.5.4.1 Cable extension for 0.75 mm² motor cables with springtec connector

3.5.4.1.1 Order data



Model number	Short description
	Motor cables 0.75 mm² SpringTec connector
8BCM0005.10360-0	Cable extension for 0.75 mm² motor cable 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 cable 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 cable 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 cable 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 cable 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 cable 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 cable 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 cable with springtec connector, length 25 m, can be used in cable drag chains, UL/CSA listed

Table 128: 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

Model 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 0.35 mm²							
Durability	Oil resistance in accordance with VDE 0472 Part 803 as well as standard hydraulic oil							
Listed	UL AWM style 20234, 80°C, 1000 V, E63216 as well as CSA AWM I/II A/B, 90°C, 1000 V, FT2 LL46064							
Certification								
CE	Yes							
UL	cULus E225616 Power Conversion Equipment							
Cable construction								
Power lines								
Quantity	4							
Wire insulation	Special thermoplastic material							
Wire colors	Black, brown, blue, yellow/green							
Design	Tinned copper stranded wire							
Diameter	0.75 mm²							
Shield	No							
Stranding	No							
Signal lines								
Quantity	4							
Wire insulation	Special thermoplastic material							
Wire colors	White, white/red, white/blue, white/green							
Design	Tinned copper stranded wire							
Diameter	0.35 mm²							
Shield	Separate shielding for 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							
Complete shielding	Tinned copper braiding, optical coverage >85% with foil shield							
Outer sheathing								
Material	PUR							
Color	Orange, similar to RAL 2003 flat							
Labeling	BERNECKER + RAINER 4x0.75+2x2x0.35 FLEX UL AWM STYLE 20234 80°C 1000 V E63216 CSA AWM I/II A/B 90°C 1000 V FT2 LL46064							
Connector								
Type	springtec connector							
Connection cycles	>50							
Contacts	8							
EN 60529 protection	IP67 when connected							

Table 129: 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

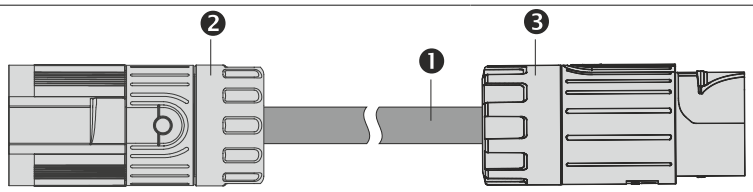
Model number	8BCM0005. 10360-0	8BCM0006. 10360-0	8BCM0007. 10360-0	8BCM0010. 10360-0	8BCM0015. 10360-0	8BCM0017. 10360-0	8BCM0020. 10360-0	8BCM0025. 10360-0
Electrical characteristics								
Test voltage								
Wire/Wire	3 kV							
Wire/Shield	3 kV							
Conductor resistance								
Power lines	≤0.15 Ω	≤0.17 Ω	≤0.2 Ω	≤0.29 Ω	≤0.44 Ω	≤0.49 Ω	≤0.58 Ω	≤0.73 Ω
Signal lines	≤0.28 Ω	≤0.33 Ω	≤0.39 Ω	≤0.55 Ω	≤0.83 Ω	≤0.94 Ω	≤1.1 Ω	≤1.36 Ω
Insulation resistance	>40 GΩ	>33.33 GΩ	>28.57 GΩ	>20 GΩ	>13.33 GΩ	>11.76 GΩ	>10 GΩ	>8 GΩ
Max. current-carrying capacity in accordance with IEC 60364-5-523 by installation type								
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 80°C							
Static	-40 to 90°C							
Mechanical characteristics								
Dimensions								
Length	5 m	6 m	7 m	10 m	15 m	17 m	20 m	25 m
Diameter	10.9 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	0.95 kg	1.13 kg	1.32 kg	1.89 kg	2.84 kg	3.21 kg	3.78 kg	4.73 kg

Table 129: 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) At an ambient temperature of 20°C and bend radius of 125 mm.

3.5.4.1.3 Wiring

3.5.4.1.3.1 Cable construction



Pos	Pieces	Name	Note
1	1	Motor line	4x 0.75 mm² + 2x 2x 0.35 mm²
2	1	9-pin circular connector	
3	1	9-pin coupling	

3.5.4.1.3.2 Pinout

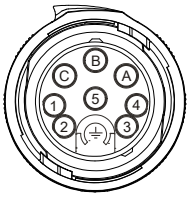
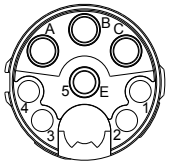
Male connector	Pin	Name	Function	Coupling
	A	U	Motor connection U	
	B	V	Motor connection V	
	C	W	Motor connection W	
	⏚	PE	Protective ground conductor	
	1	T+	Temperature +	
	2	T-	Temperature -	
	3	B+	Brake +	
	4	B-	Brake -	
	5	---	---	

Table 130: 0.75 mm² motor cable extension - Pinout

3.5.4.1.3.3 Cable diagram

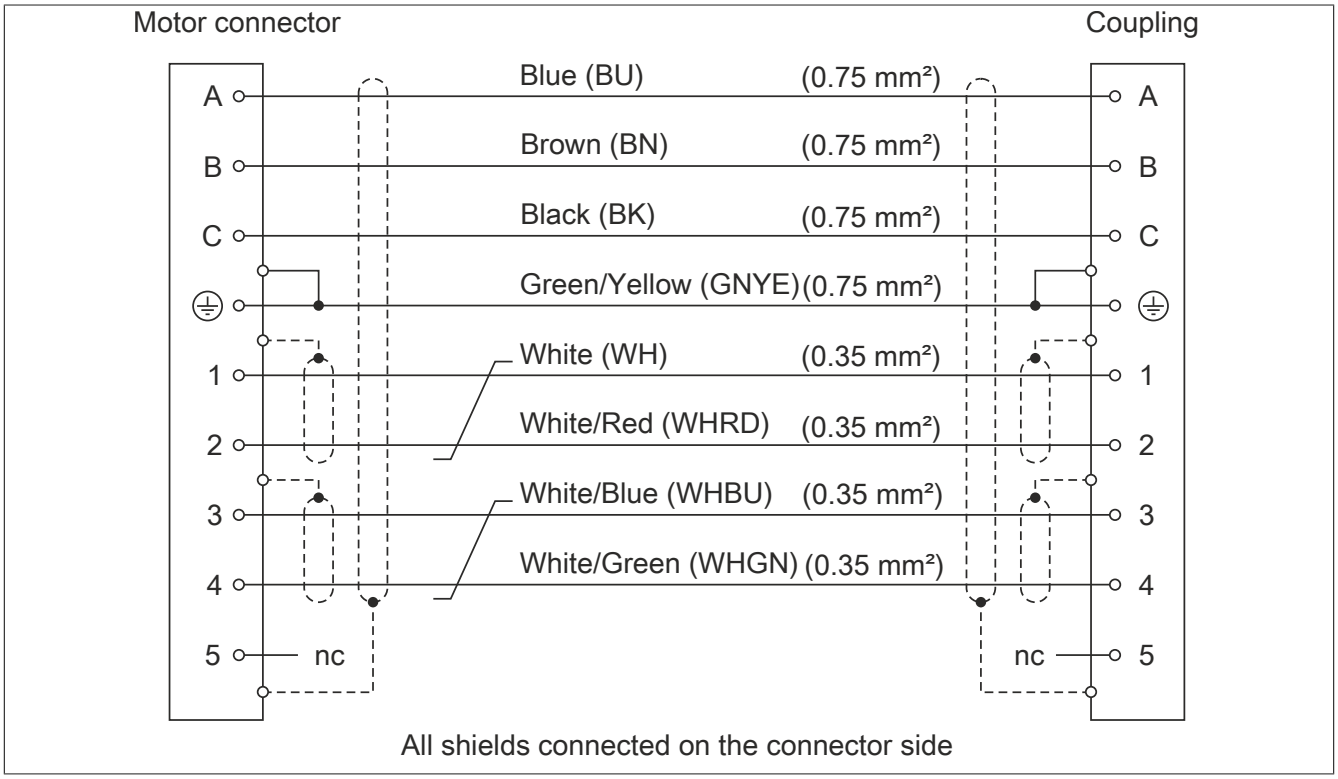


Figure 17: Motor cable extension with male springtec connector - Cable diagram

3.5.4.2 Cable extension for resolver cables with springtec connector

3.5.4.2.1 Order data



Model 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 131: 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

Model 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 in accordance with VDE 0472 Part 803 as well as standard hydraulic oil						
Listed	UL AWM style 20671, 90°C, 30 V, E63216 and CSA AWM, 90°C, 30 V, I/II A/B FT1 LL46064						
Certification							
CE	Yes						
UL	cULus E225616 Power Conversion Equipment						

Table 132: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0017.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Technical data

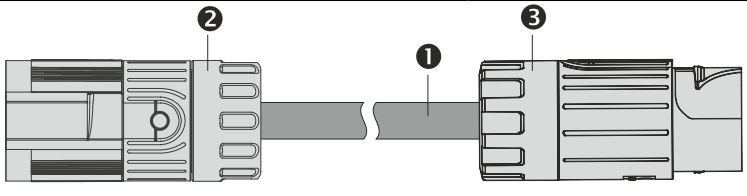
Model number	8BCR0005. 11230-0	8BCR0007. 11230-0	8BCR0010. 11230-0	8BCR0015. 11230-0	8BCR0017. 11230-0	8BCR0020. 11230-0	8BCR0025. 11230-0
Cable construction							
Signal lines							
Quantity	6						
Wire insulation	Special thermoplastic material						
Wire colors	White, brown, green, yellow, gray, pink						
Design	Tinned copper stranded wire						
Diameter	AWG 24 / AWG 19						
Shield	No						
Stranding	White with brown, green with yellow, gray with pink						
Cable stranding	The 3 pairs together covered by foil shield						
Complete shielding	Copper braiding, optical coverage ≥90% with foil shield						
Outer sheathing							
Material	PUR						
Color	RAL 6018						
Labeling	BERNECKER + RAINER 3x2x24 AWG FLEX UL AWM STYLE 20671 90°C 30 V E63216 CSA AWM 90°C 30 V I/II A/B FT1 LL46064						
Connector							
Type	12-pin female springtec circular connector						
Connection cycles	>50						
Contacts	12						
Additional connectors	12-pin male coupling Connection cycles: >50 Contacts: 12 Protection in accordance with EN 60529: IP67 when connected						
EN 60529 protection	IP67 when connected						
Electrical characteristics							
Test voltage							
Wire/Wire	1.5 kV						
Wire/Shield	0.8 kV						
Conductor resistance							
Signal lines	≤0.43 Ω	≤0.6 Ω	≤0.86 Ω	≤1.29 Ω	≤0.43 Ω	≤1.72 Ω	≤2.15 Ω
Insulation resistance	>40 GΩ	>28.57 GΩ	>20 GΩ	>13.33 GΩ	>40 GΩ	>10 GΩ	>8 GΩ
Environmental conditions							
Temperature							
Moving	-10 to 80°C						
Static	-40 to 90°C						
Mechanical characteristics							
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	<60 m/s²						
Flex cycles [1]	≥3,000,000						
Speed	≤4 m/s						
Weight	0.33 kg	0.46 kg	0.65 kg	0.98 kg	1.1 kg	1.30 kg	1.63 kg

Table 132: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0017.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Technical data

1) 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	Pieces	Name	Note
1	1	Encoder line	3 x 2 x 24 AWG/19
2	1	12-pin circular connector	ESTA 002 NN00 31 0001 000
3	1	12-pin coupling	EKUA 001 NN00 31 0001 000

3.5.4.2.3.2 Pinout

Male connector	Pin	Name	Function	Pin	Coupling
	1	---	Coded 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 133: 12-pin male springtec connector - Pinout

3.5.4.2.3.3 Cable diagram

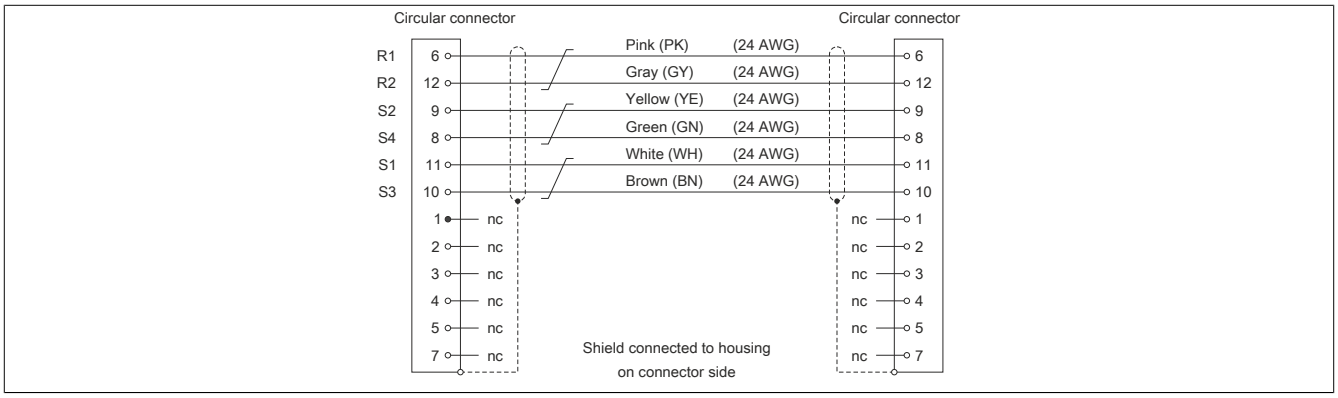


Figure 18: Resolver cable extension with male springtec connector - Cable diagram

3.5.5 Braking resistors

3.5.5.1 80XBR0025.010-11

3.5.5.1.1 Order data

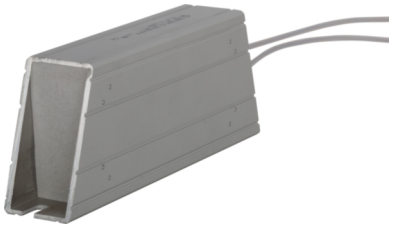
Model number	Short description	Figure
	Braking resistor	
80XBR0025.010-11	Braking resistor for power supply module 80PS080X3.10-01, 2.5 Ω, 100 W	

Table 134: 80XBR0025.010-11 - Order data

3.5.5.1.2 Technical data

Model 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 135: 80XBR0025.010-11 - Technical data

3.5.5.1.3 Dimensions

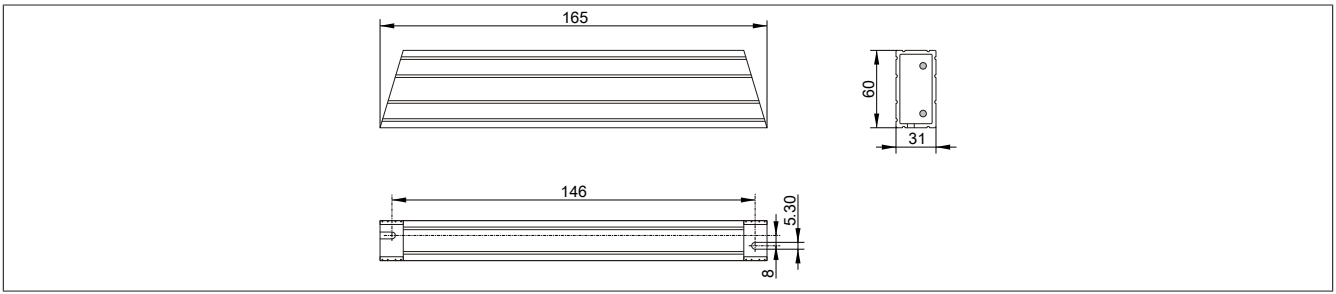


Figure 19: Dimensions

3.5.5.2 80XBR0055.010-11

3.5.5.2.1 Order data

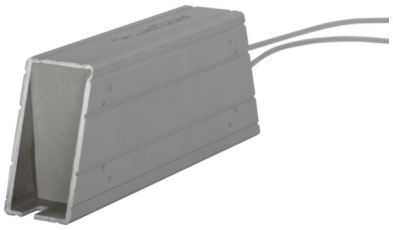
Model number	Short description	Figure
	Braking resistor	
80XBR0055.010-11	Braking resistor for ACOPOSmicro 5.5 Ω 100 W	

Table 136: 80XBR0055.010-11 - Order data

3.5.5.2.2 Technical data

Model 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 137: 80XBR0055.010-11 - Technical data

3.5.6 Hose clamps

Order data

Model 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 138: 80XSC0000.00-01, 80XSC0000.00-10 - Order data

3.5.7 Backup battery

Order data

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

Table 139: 80XB120A2.36-00 - Order data

3.5.8 Accessories included in delivery

Brief description of accessories delivered with the ACOPOSmicro
Accessory set for EMC-compatible installation of the X2X Link cable and the PE connection Additional information in this documentation: ▪ Using the accessory set in section 6 "Wiring": → "Protective ground connection for stepper motor modules" on page 227 → "Protective ground connection for inverter modules" on page 242 ▪ "EMC-compatible installation" on page 211
ACOPOSmicro multilingual warning stickers

3.5.8.1 ACOPOSmicro multilingual warning stickers



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

4 Installation

4.1 General information

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 Level II as specified in the IEC 60664 standard.

Normally, an IP54 housing provides protection up to Pollution Level II, but operation in condensing relative humidity is NOT allowed.

Danger!

Pollution levels higher than specified by Pollution Level II in the IEC 60664 standard can result in hazardous failures. It is extremely important that you ensure a proper operating environment.

4.2 ACOPOSmicro with cold plate

4.2.1 Dimension diagram for ACOPOSmicro with cold plate

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

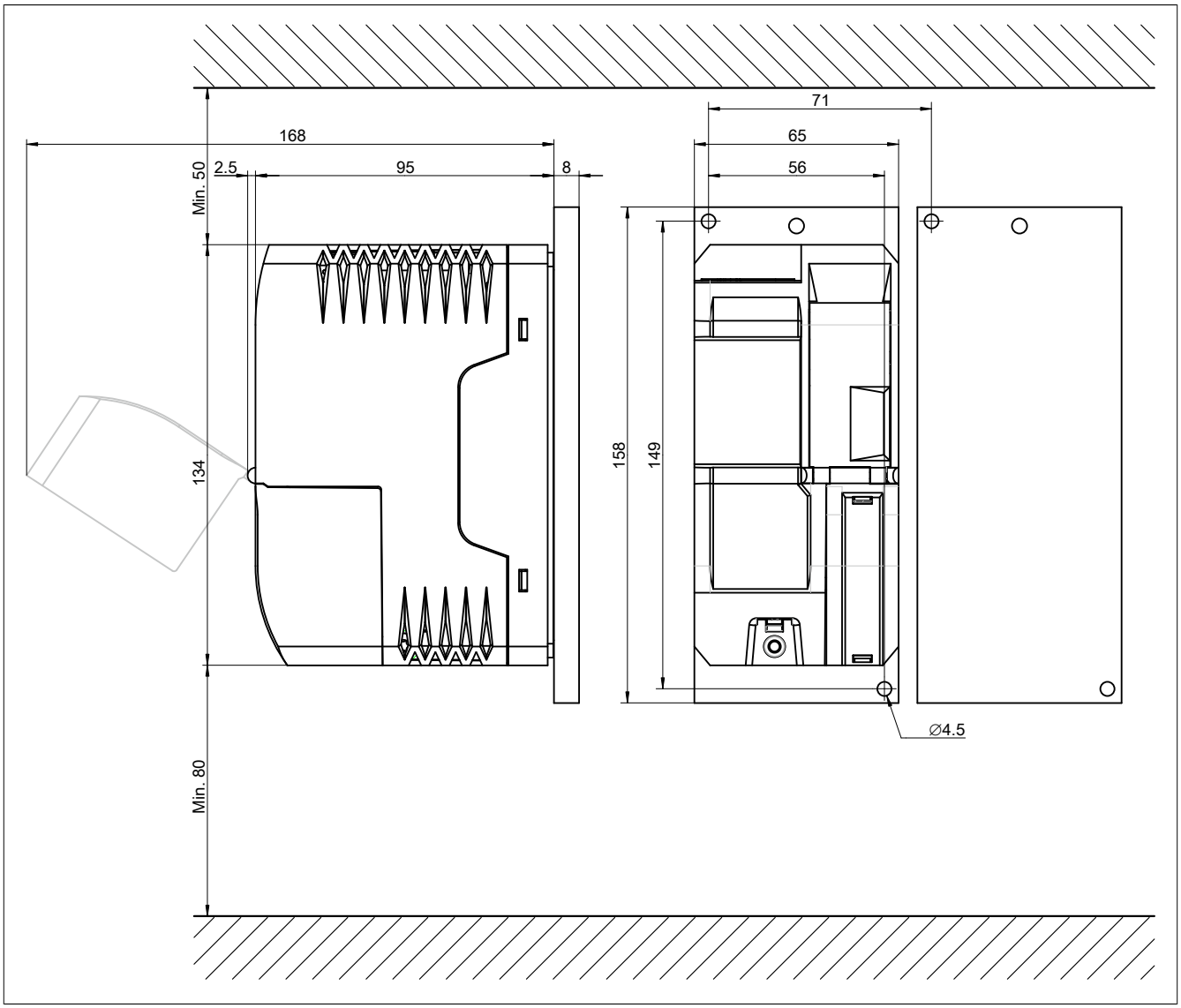


Figure 20: Dimension diagram and installation dimensions for ACOPOSmicro modules with cold plate

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 cabling problems.

Sufficient space must be left above (at least 50 mm) and below (at least 80 mm) the ACOPOSmicro modules in order to ensure proper air circulation.

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

4.2.2 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.

Spacing for mounting and ventilation of ACOPOSmicro modules can be found in section "Dimension diagram for ACOPOSmicro with cold plate" on page 201.

Caution!

The heat spreader must cover the entire mounting surface!

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

4.2.3 Unmounting from the cold plate

If heat conductive paste was used when mounting the ACOPOSmicro to a cold plate, then the drive module can be separated from the cold plate using an M6 screw.

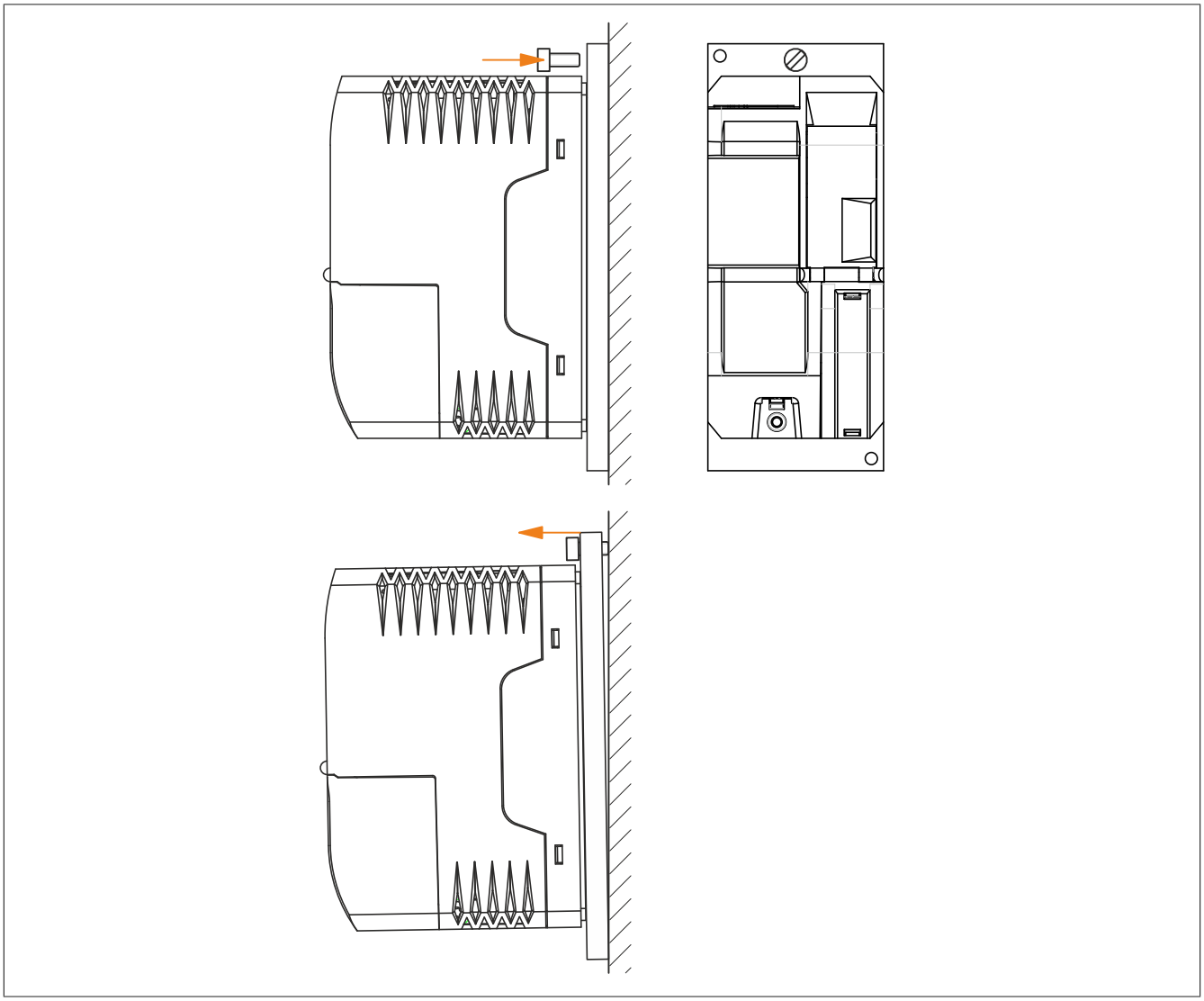


Figure 21: Removing an ACOPOSmicro from the cold plate

4.3 ACOPOSmicro with heat sink

4.3.1 Dimension diagram for ACOPOSmicro with heat sink

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

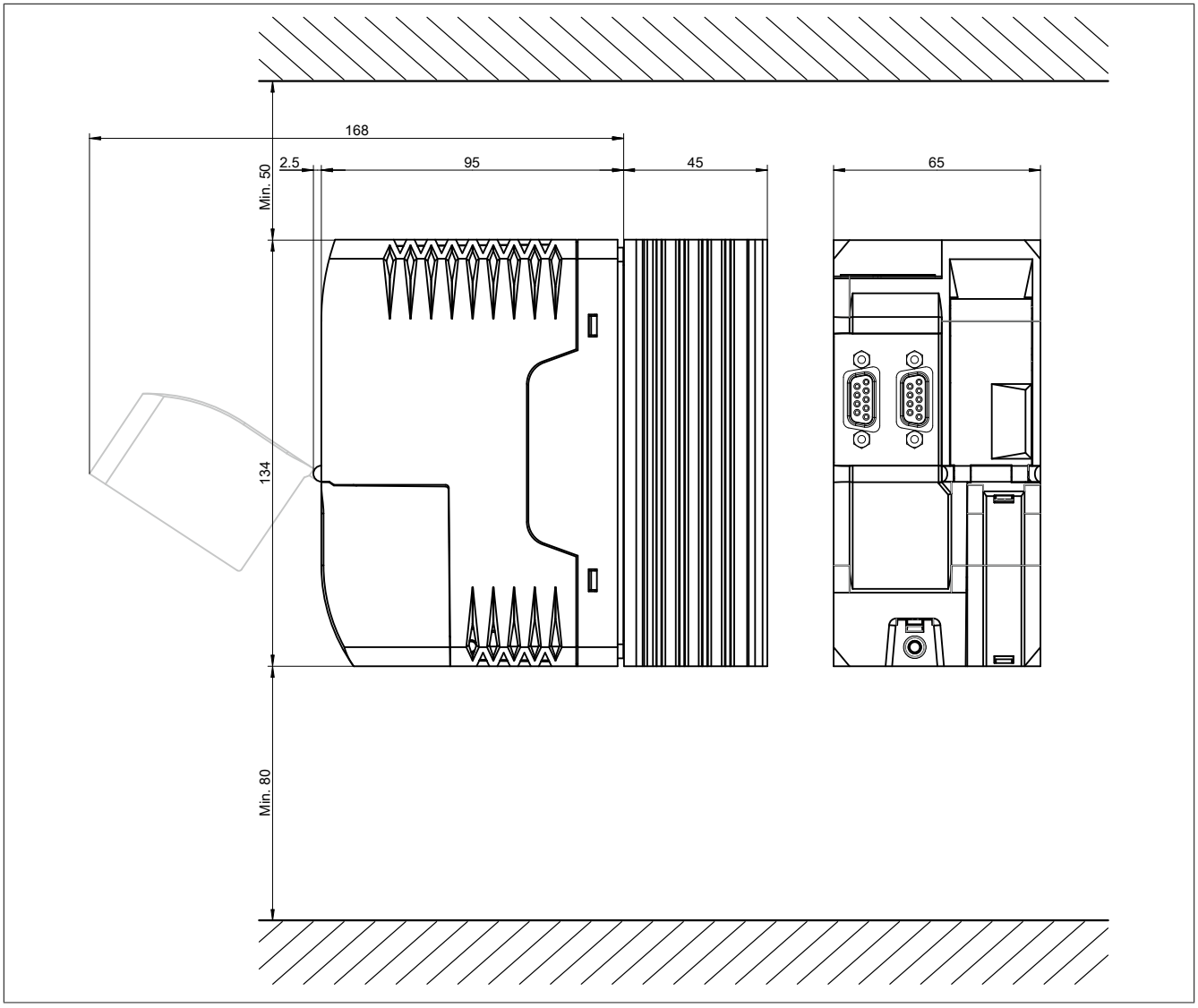


Figure 22: Dimension diagram and installation dimensions for ACOPOSmicro modules with heat sink

4.3.2 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

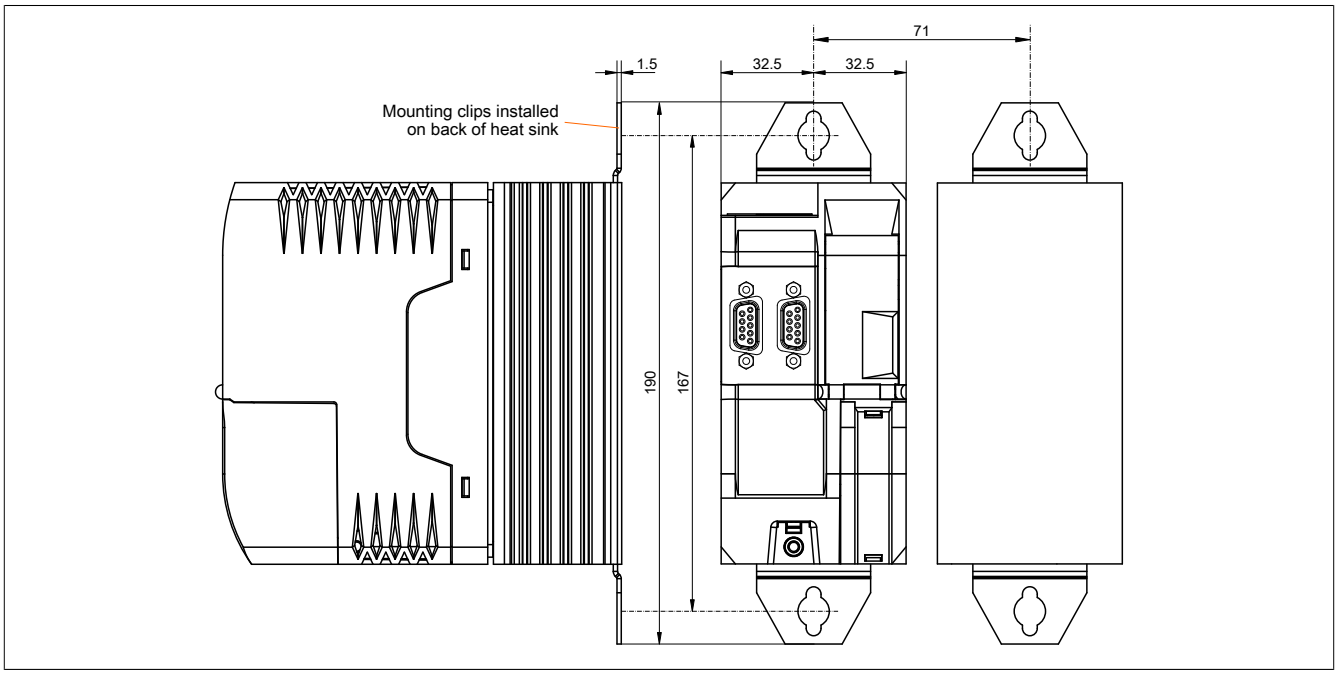


Figure 23: Frontal wall mounting

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

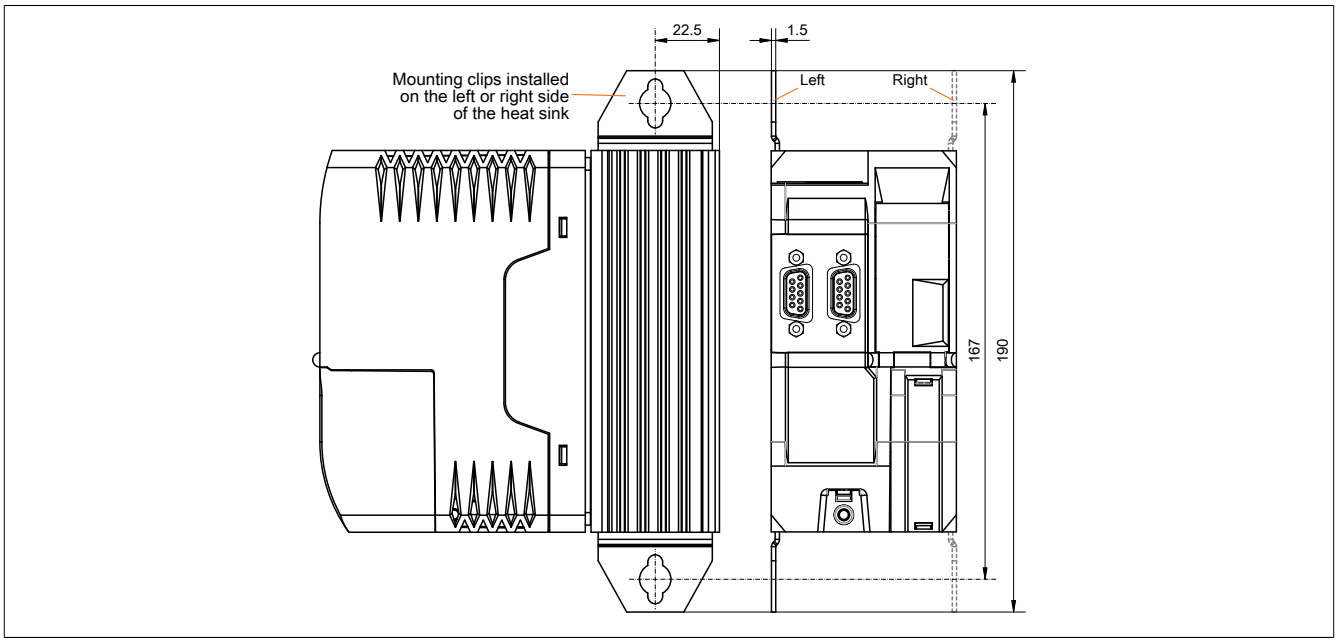
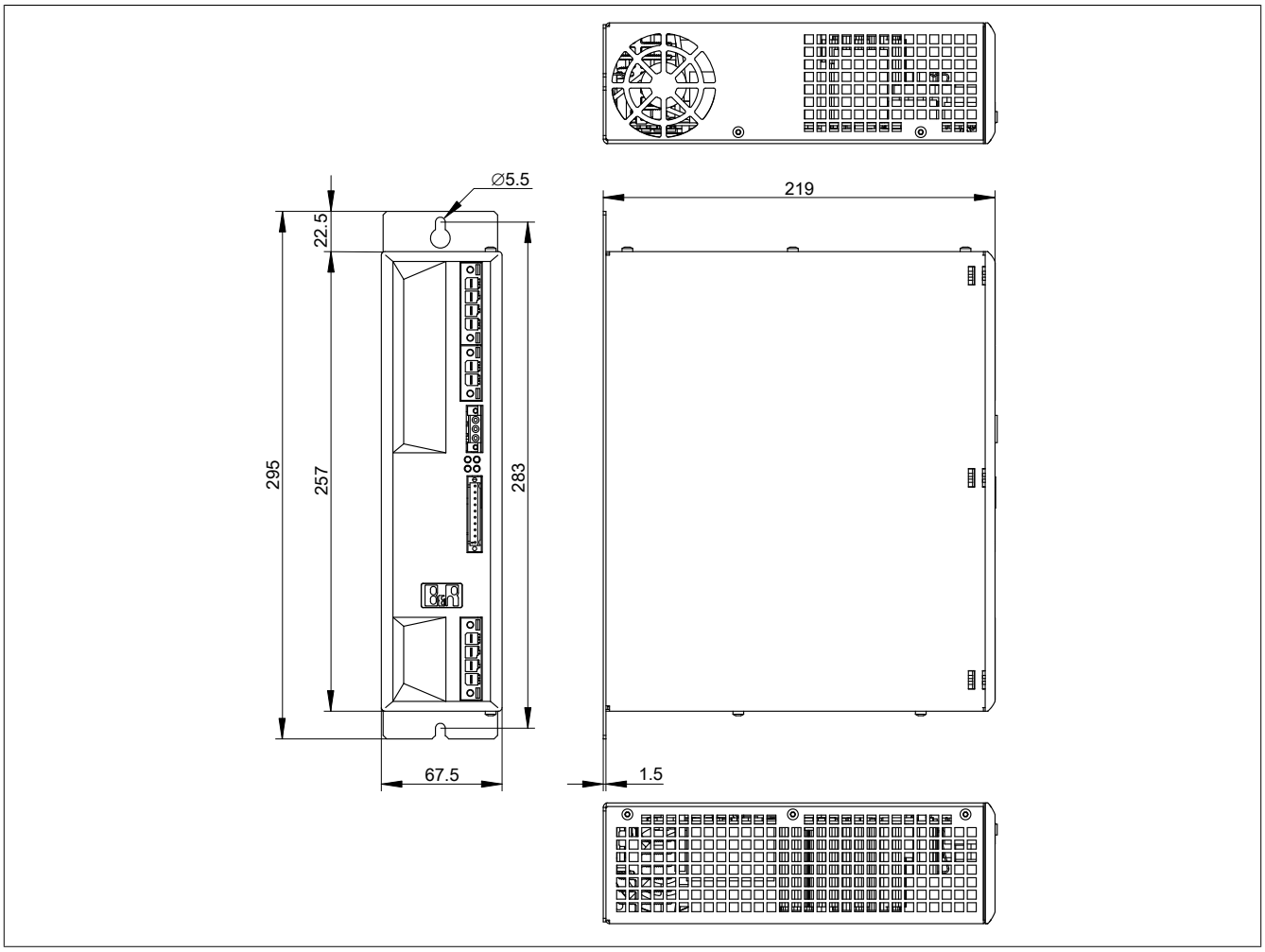


Figure 24: Side wall mounting

4.4 Power supply modules

4.4.1 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 overcurrent protection used are chosen according to the current-carrying capacity so that the permitted current-carrying capacity of the selected cable cross section (based on the type of wiring, see table) is greater than or equal to the current-carrying capacity in the mains power input. The rated current of the fuse must be less than or equal to the permitted current-carrying capacity of the selected cable cross section (depending on the how it is laid, see table):

I_{Mains}	≤	I_b	≤	I_Z
Mains	≤	Fuse	≤	Line/cable

Wire cross section [mm²]	I_Z / I_b ratio according to the type of installation in an ambient air temperature of +40°C in accordance with IEC 60204-1			
	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 140: 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 in accordance with IEC60204-1	
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 141: 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 "CPU power supply" on page 70) 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:

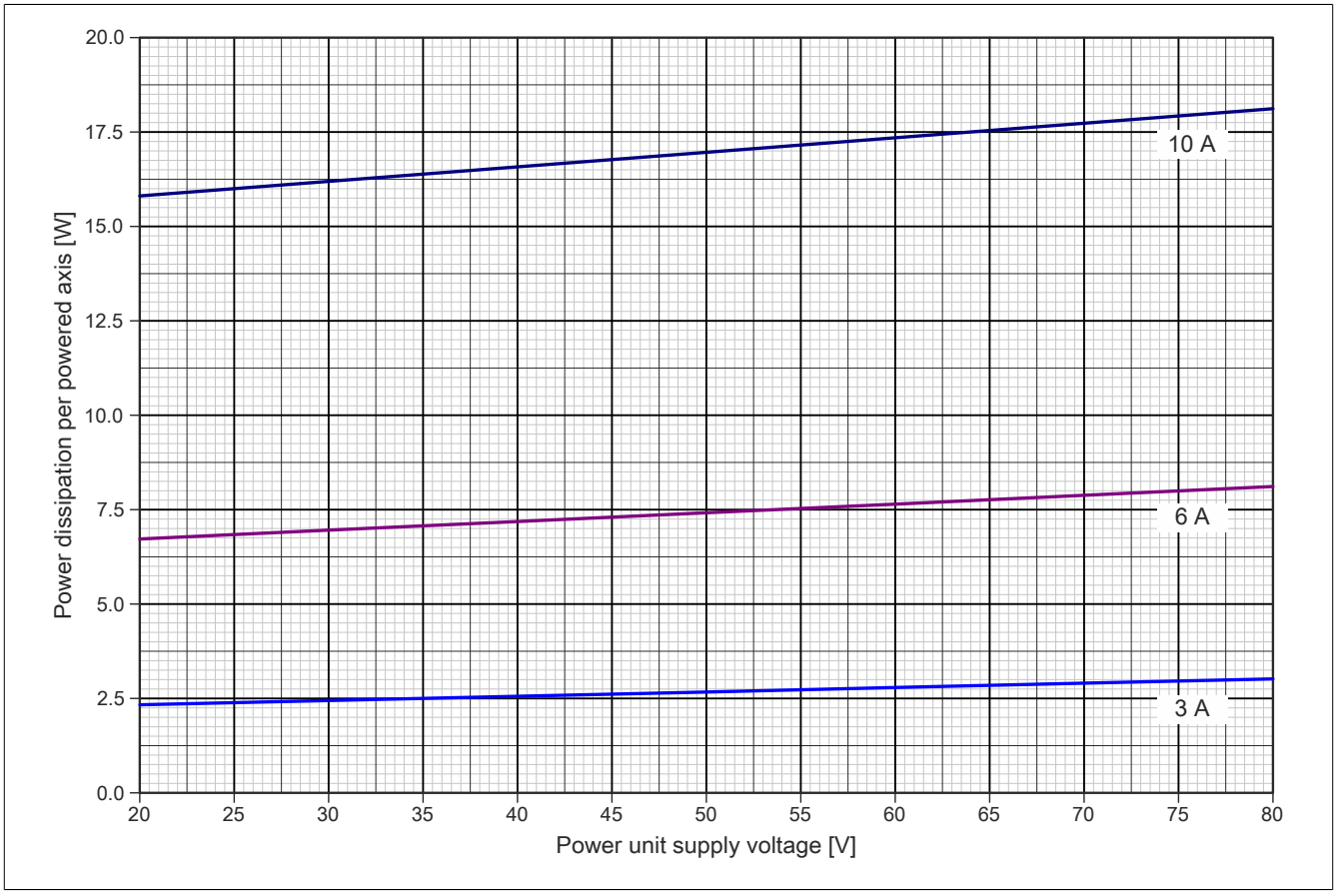


Figure 25: Dimensioning - Dissipated power from the power unit for each powered axis

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 model 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
Total	**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
Total	**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
Total	**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

In general, values for power dissipation are listed in section "Power consumption - Stepper motor modules with cold plate" on page 208. 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 current must be provided to the heat sink or
- the ambient temperature must 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:

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

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

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

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

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

$$t_{8A} \geq 4{,}47\ min$$

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.**

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.

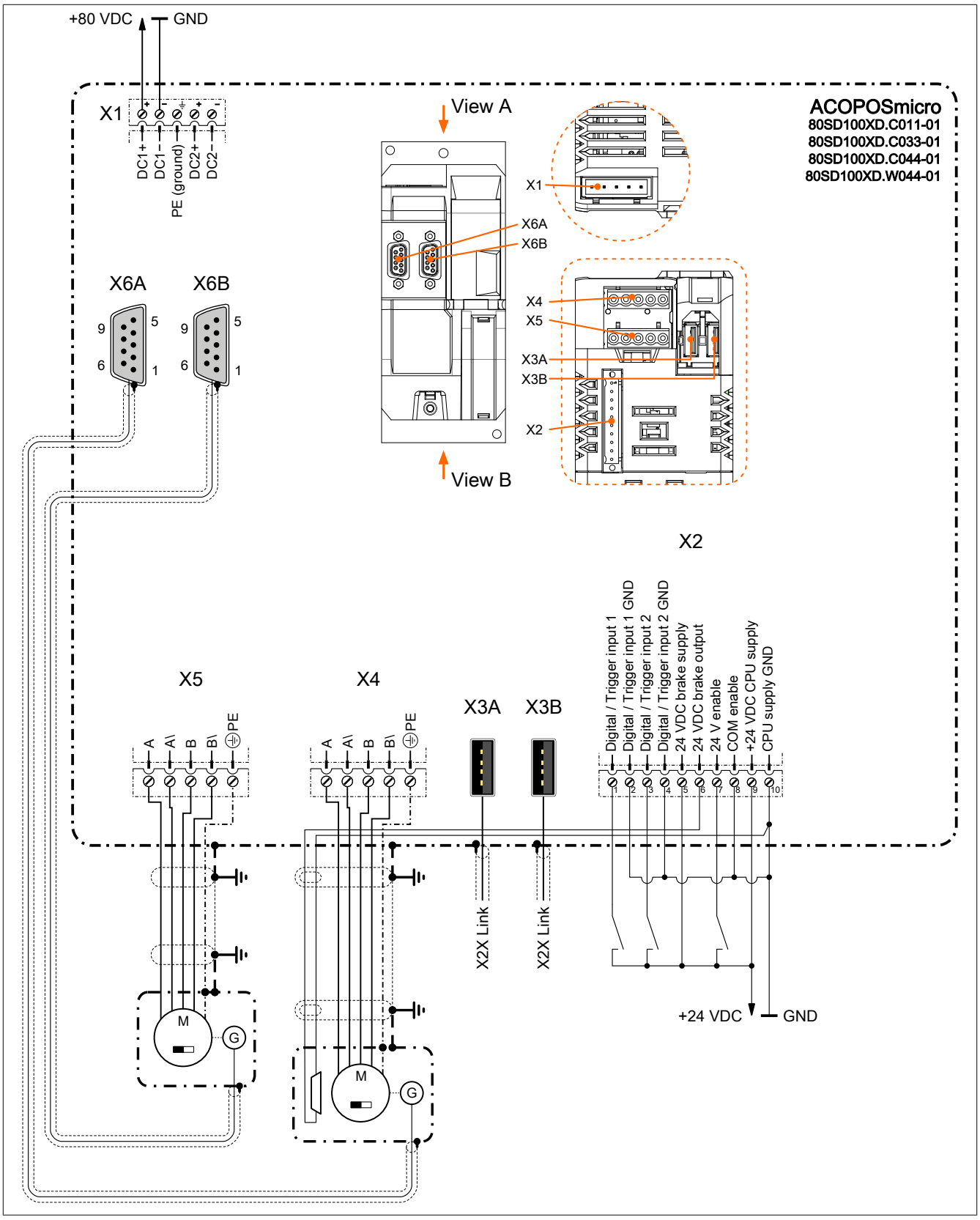
6.1.2 Installation notes

1. The control cabinet or system must be constructed properly.
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 connection clamps and the connector housing.
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.

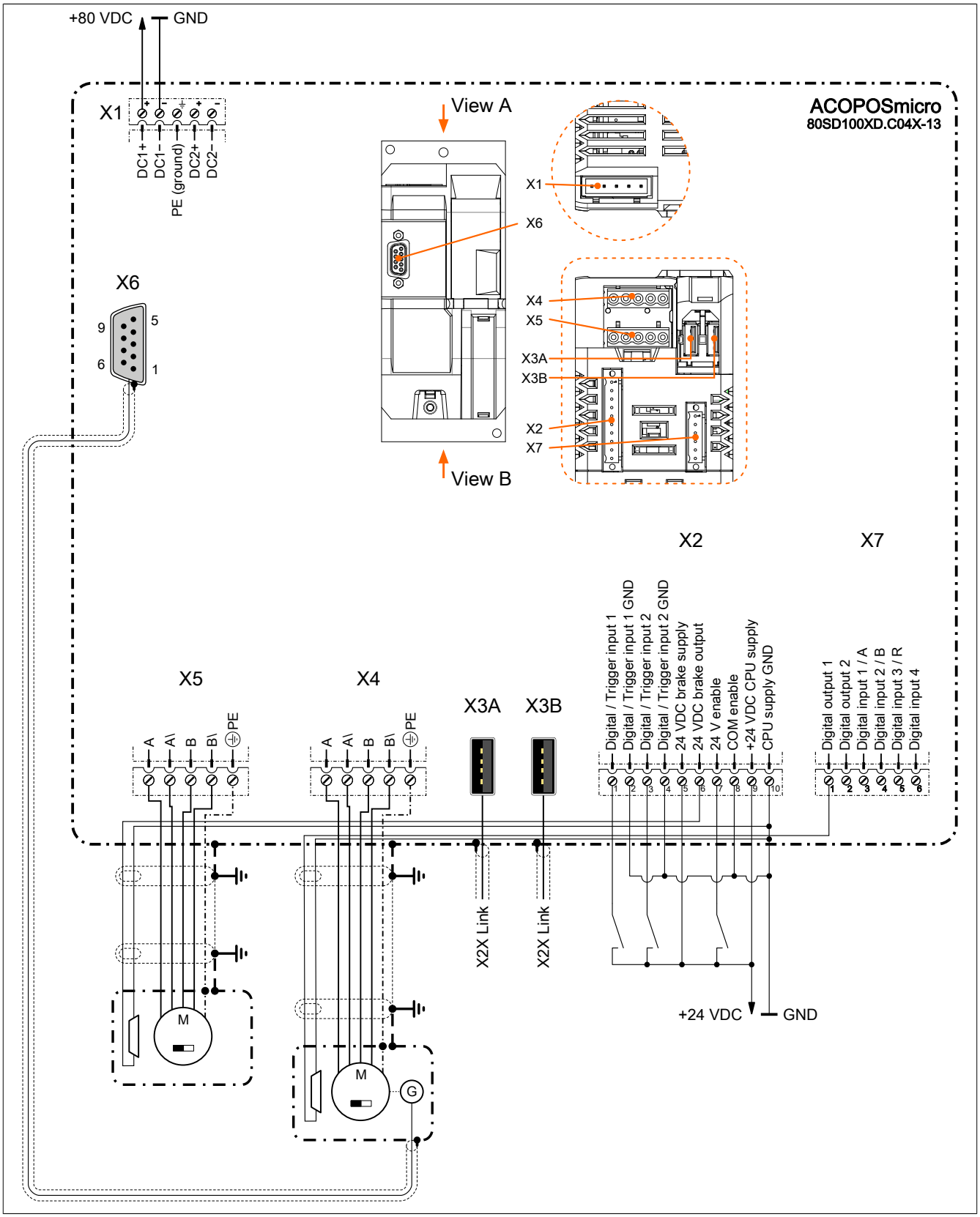
6.2 Stepper motor modules

6.2.1 Pinout overview

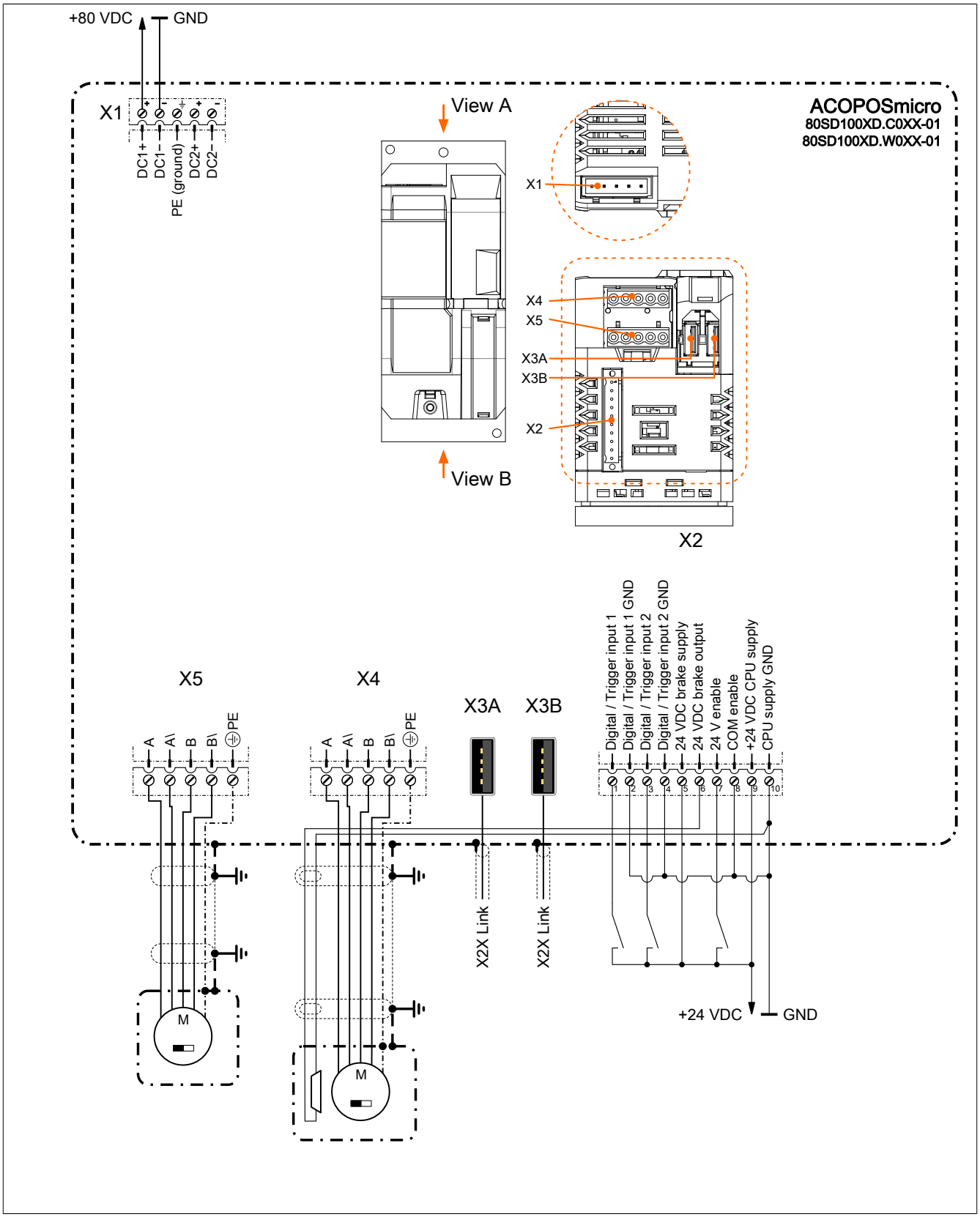
6.2.1.1 80SD100XD.C011-01, 80SD100XD.C033-01, 80SD100XD.C044-01, 80SD100XD.W044-01



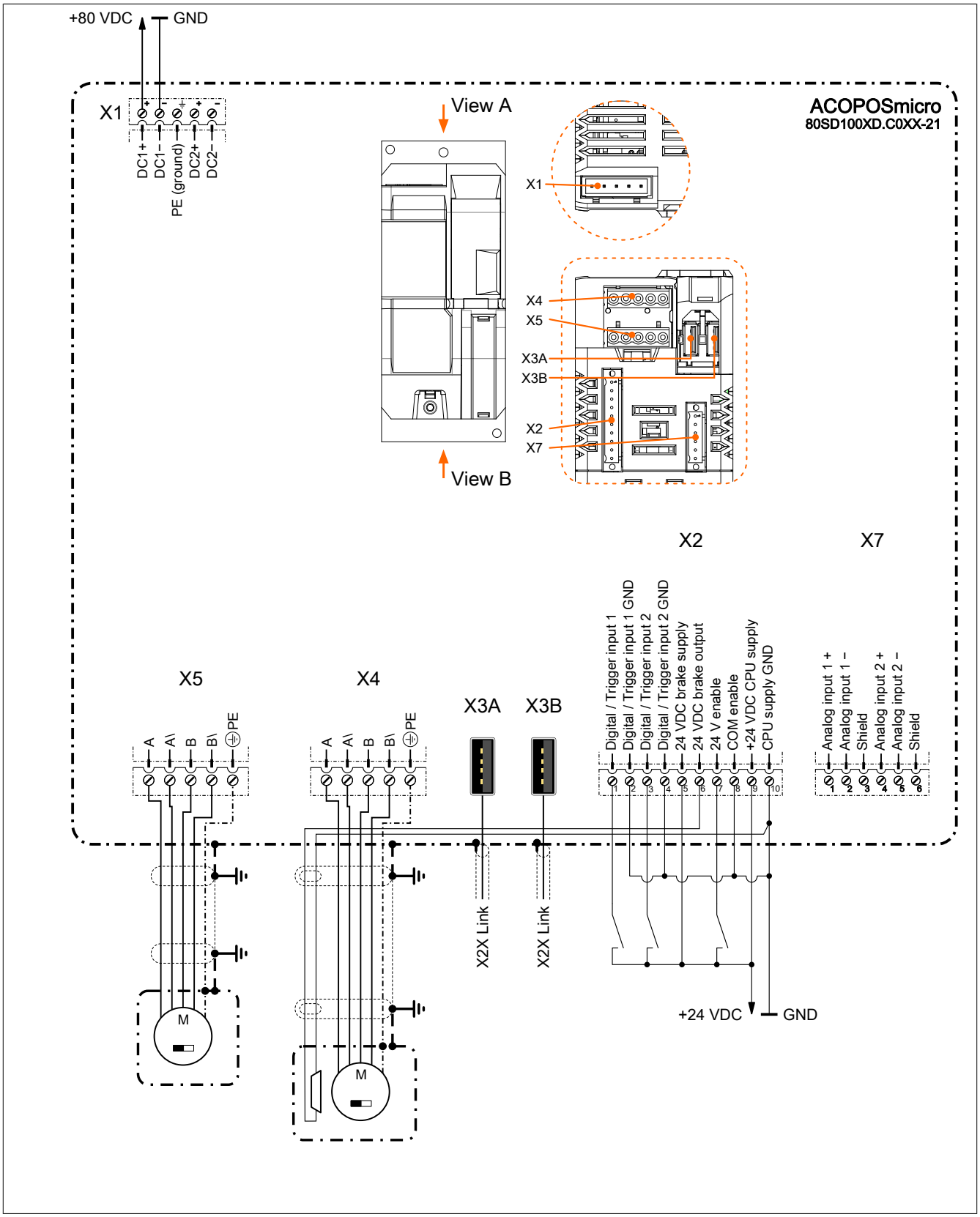
6.2.1.2 80SD100XD.C04X-13



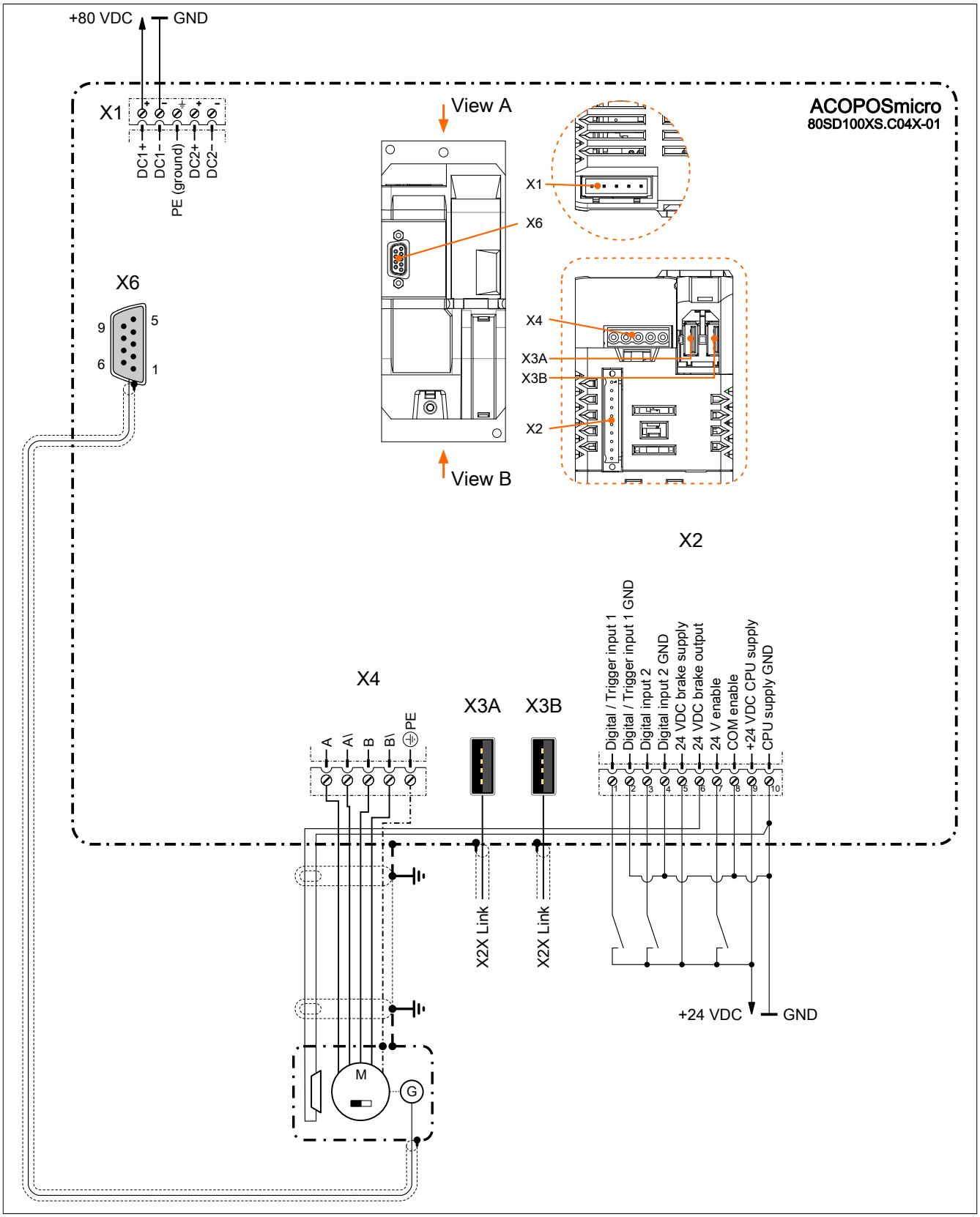
6.2.1.3 80SD100XD.C0XX-01, 80SD100XD.W0XX-01



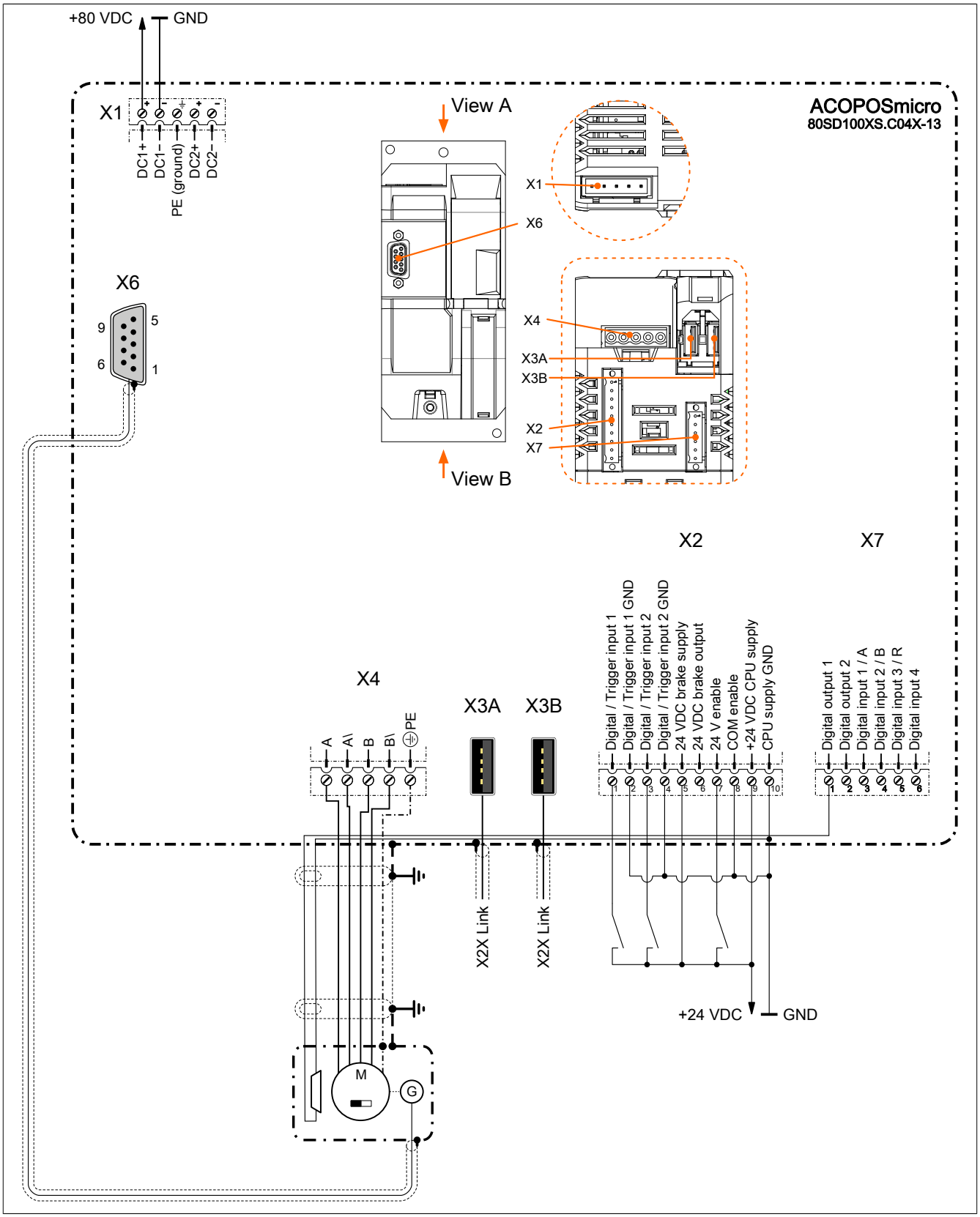
6.2.1.4 80SD100XD.C0XX-21



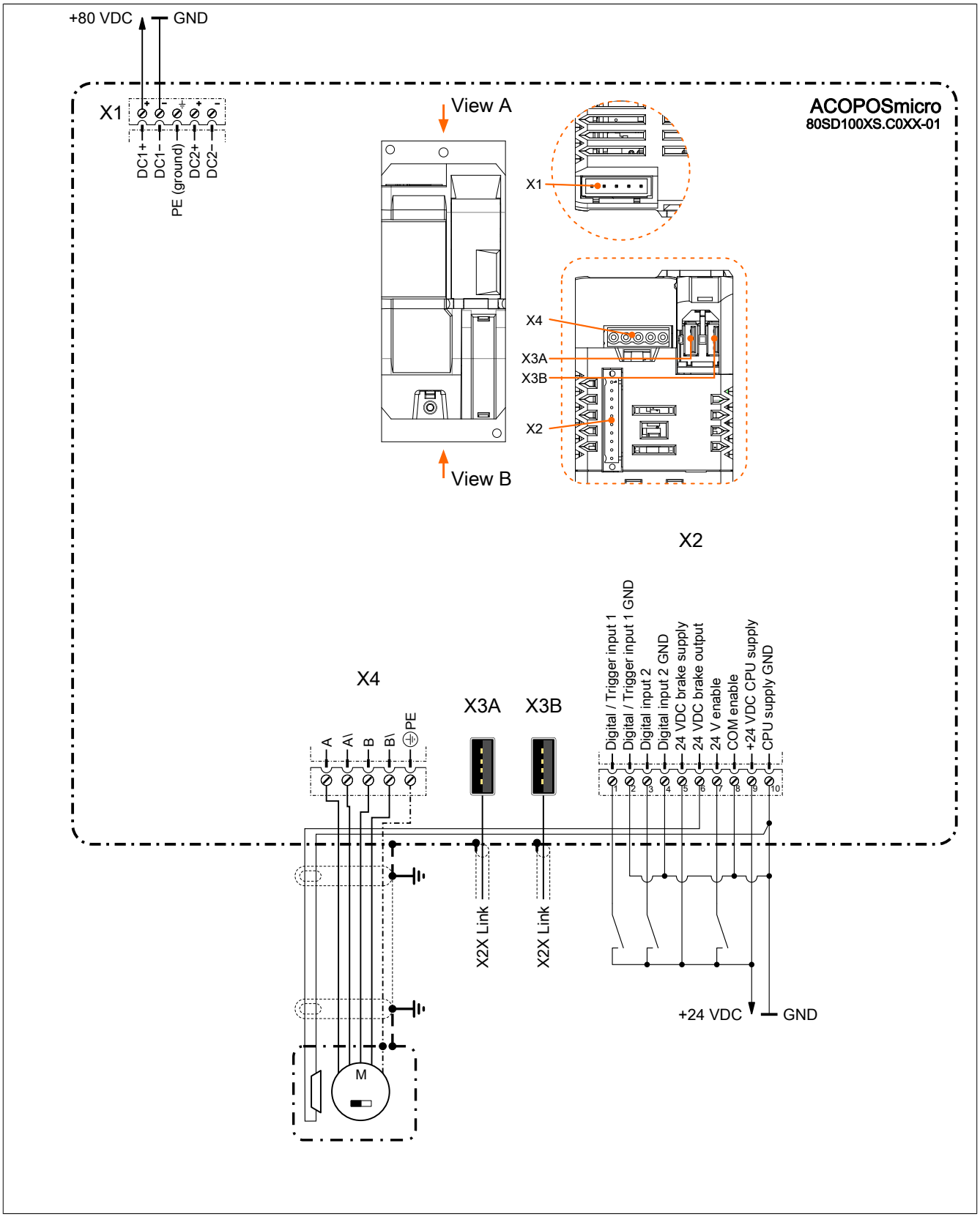
6.2.1.5 80SD100XS.C04X-01



6.2.1.6 80SD100XS.C04X-13



6.2.1.7 80SD100XS.C0XX-01



6.2.2 X1 - Power supply

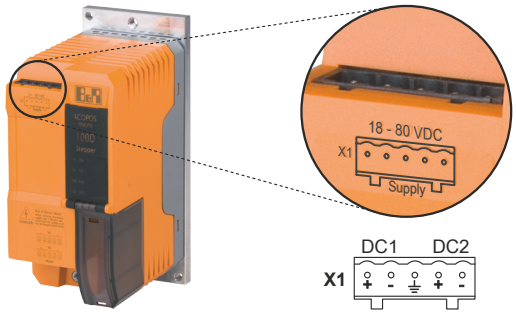
Figure	Pinout	
	Pin	Name
	+	DC1+
	-	DC1-
	⏚	PE (ground)
	+	DC2+
	-	DC2−
	The supply connection for the power unit is made using the 0TB2105.9021 or 0TB2105.9121-01 terminal block. See section "Terminal blocks for the connection of power supply units" on page 131.	

Table 142: 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

Information about safeguarding the lines can be found in section "Dimensioning" of the under "Fuse protection" on page 207.

Information:

B&R power supply module 80PS080X3.10-01 must be used for the DC bus supply voltage on X1 in order to adhere to the limit values for "Disturbance voltage on mains connections".

6.2.2.1 X1 - Input circuit diagram for the power supply

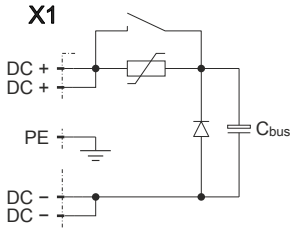


Figure 26: X1 connection - Input circuit diagram for the power supply

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

Figure	Pinout	
	**Pin**	**Name**
	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
	7	24 V enable
	8	COM enable
	9	24 VDC - CPU supply
	10	GND - CPU supply
	The 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 128.	

Table 143: X2 connection - Power supply for the CPU and digital inputs/outputs

1) Reference potential: GND for CPU power supply (pin 10)

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 figure).

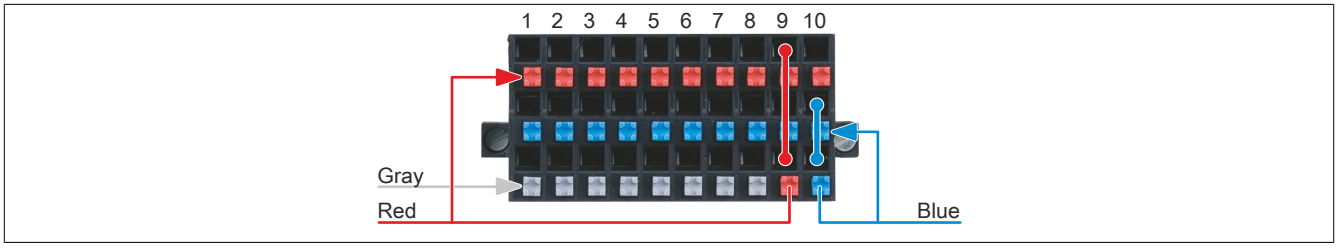


Figure 27: X2 connection - CPU supply via the 0TB1310.3100 terminal

6.2.3.1 X2 - Input/Output circuit diagram

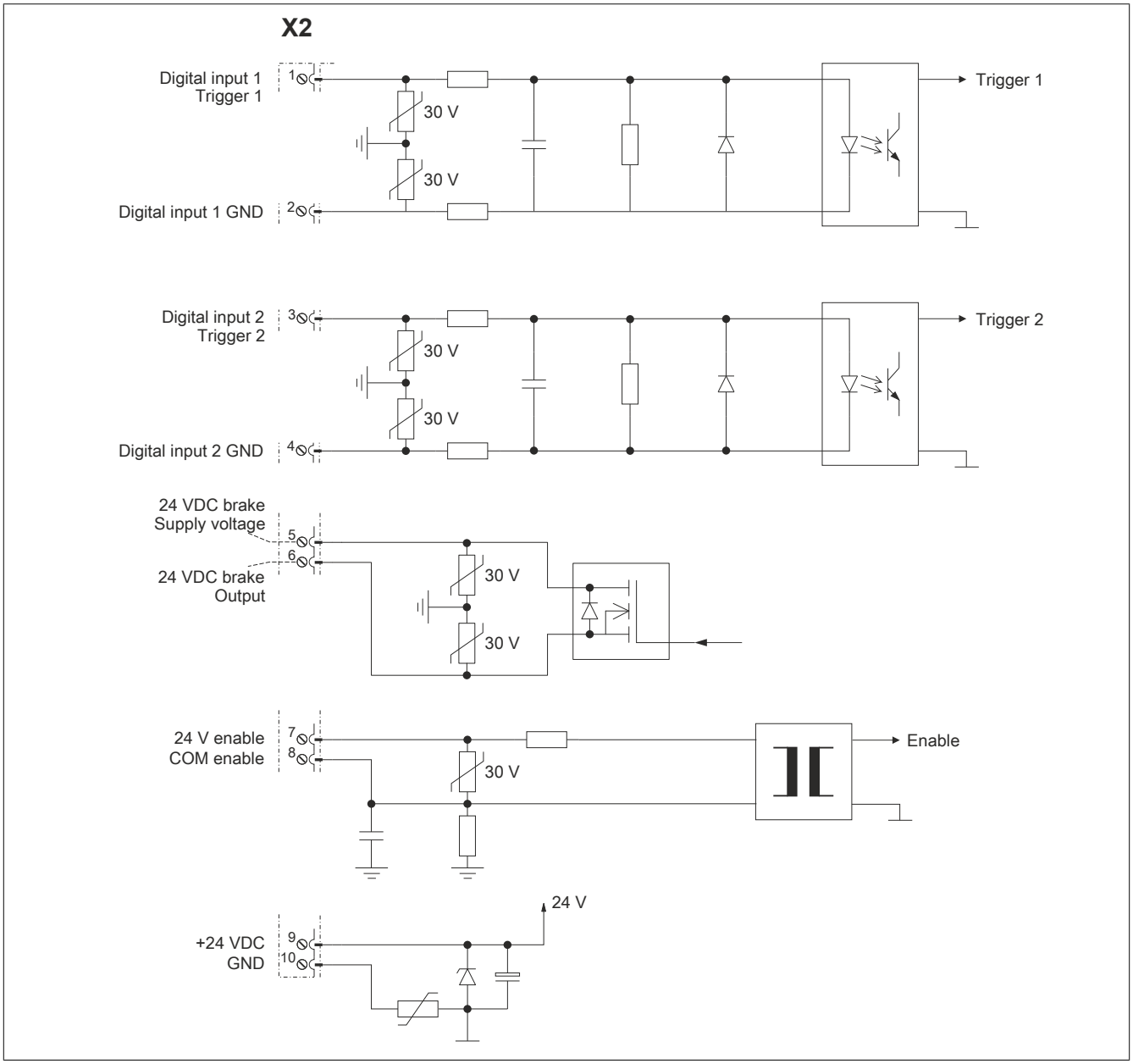


Figure 28: X2 connection - Input/Output circuit diagram

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 in accordance with EN 954-1.

Additional measures are necessary to achieve higher safety categories.

6.2.4 X3A/X3B - X2X Link connections

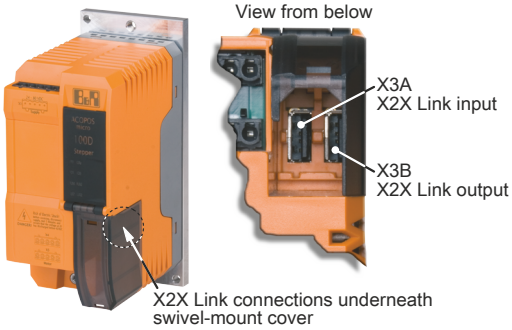
Figure	X2X Link connections
	The X2X Link connection is made using pre-assembled cables. Information about these cables can be found in section 3.5.3.3 "X2X Link cables" on page 142. **Information:** **Make sure that the X2X Link cable is properly connected and that the input and output are not mixed up by mistake. Female and male connectors are keyed accordingly to prevent this.**

Table 144: 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:

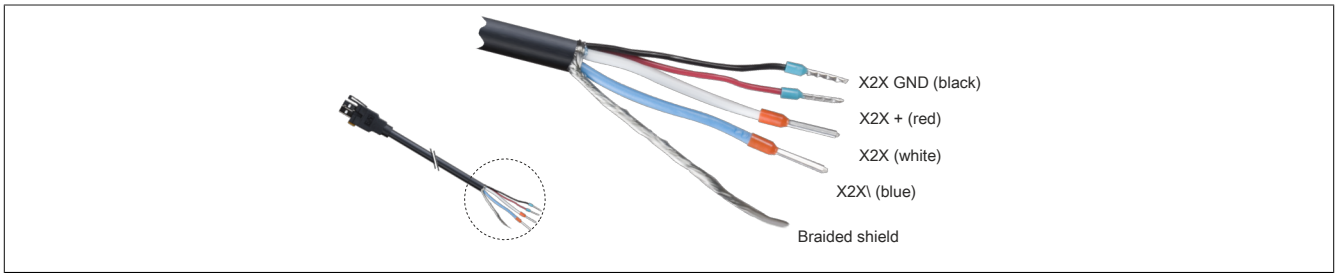


Figure 29: X3A/X3B connections - X2X Link device attachment cable - Wire colors

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:

By default, the X2X Link device attachment cable (see 3.5.3.3.1 "X20CA0X48.xxxx - X2X Link device attachment cables" on page 142) is keyed for the connection to the X2X Link input X3A. In order to use this cable on the X2X Link output X3B of the ACOPOSmicro, its keying must be changed accordingly.

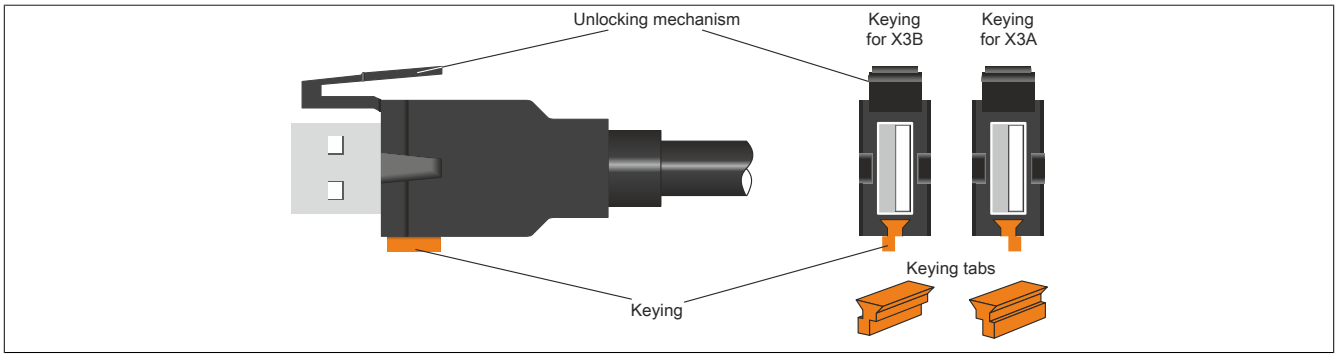
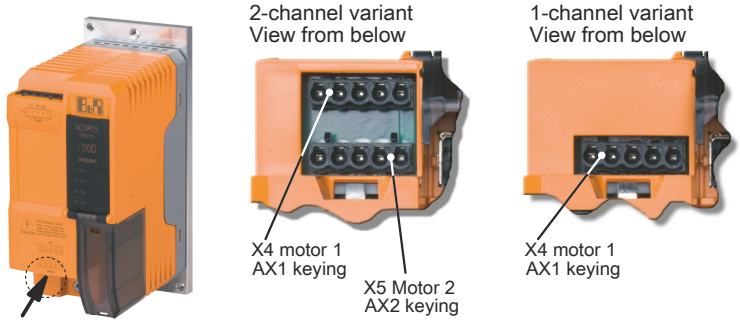


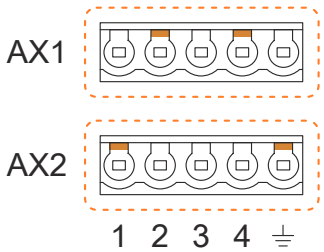
Figure 30: X2X Link connector with keying tabs

6.2.5 X5 - Stepper motor connection

Figure



Pinout



Pin		Name	
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.
Information about the 0TB2105.4x1x terminal block can be found in section 3.5.2.3 "Terminal blocks for connecting motors" on page 129.

Table 145: X4/X5 connections - Stepper motor

Danger!

Motor connectors, terminal blocks and all other connections must not be connected or disconnected when voltage is applied and/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 for the motor connections are keyed, be sure that the corresponding terminal blocks with the proper keying are being used. For more information, see the description in section 3.5.2.3 "Terminal blocks for connecting motors" on page 129.

6.2.5.1 X4/X5 - Output diagram - Stepper motor connection

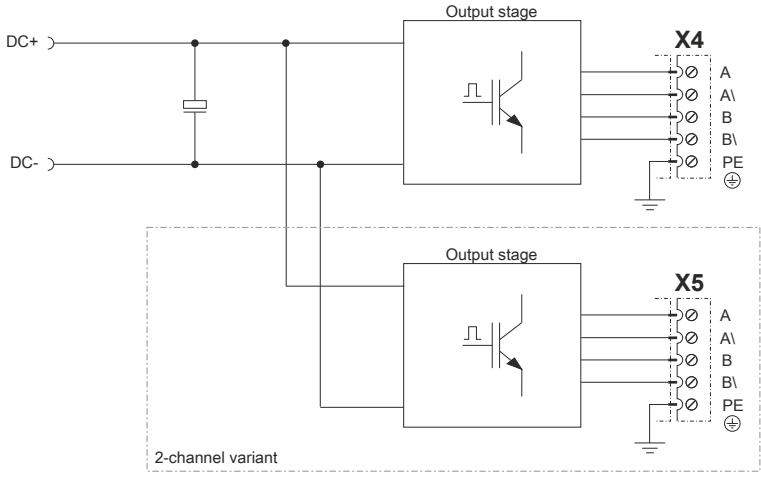


Figure 31: X4/X5 - Output diagram - Stepper motor connection

6.2.6 X6 - Encoder inputs

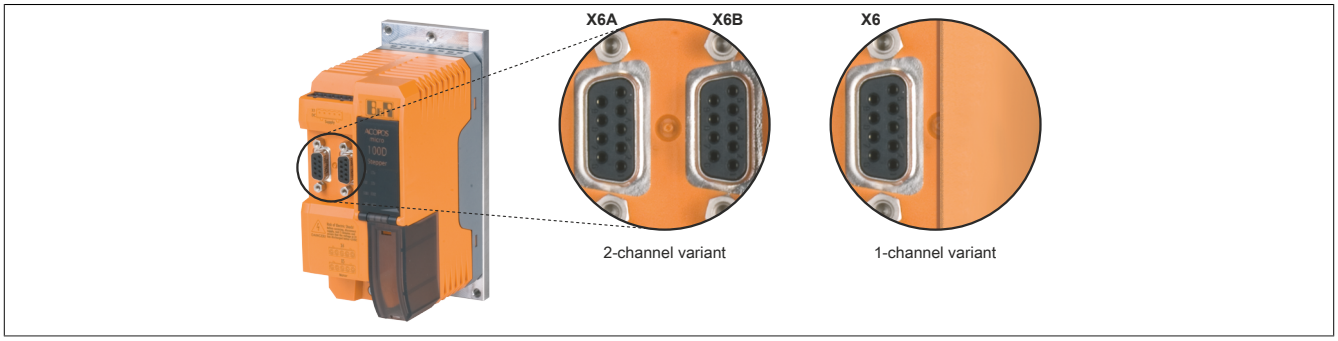


Figure 32: X6 - Encoder inputs

6.2.6.1 Incremental encoder input

6.2.6.1.1 Pinout

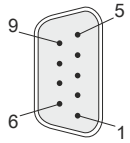
X6	Pin	Name	
	1	A	Channel A
	2	NC	Not connected
	3	B	Channel B
	4	NC	Not connected
	5	R	Channel R
	6	NC	Not connected
	7	Temp	Temperature measurement
	8	U+	+24 VDC encoder power supply output
	9	GND	GND - CPU power supply

Table 146: Incremental encoder input - Pinout

6.2.6.1.2 Input circuit diagram

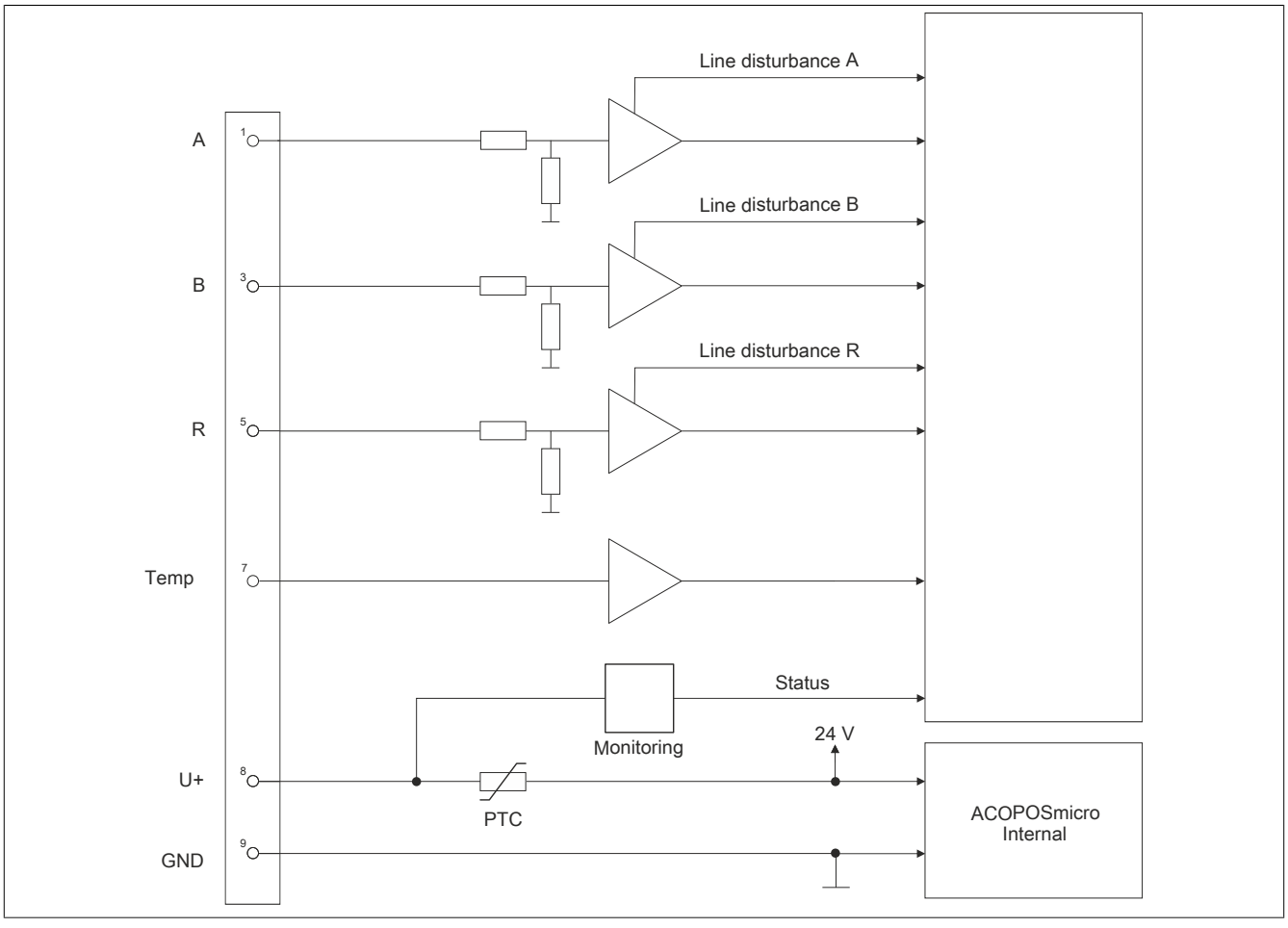


Figure 33: Incremental encoder input - Input circuit diagram

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.

6.2.6.2 HIPERFACE encoder input

6.2.6.2.1 Pinout

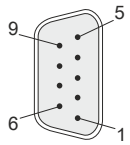
X6	Pin	Name	
	1	U+	Encoder power supply - Output
	2	SIN	Channel SIN
	3	REF SIN	REF SIN channel
	4	D\	Data input inverted
	5	COS	Channel COS
	6	GND	Encoder power supply 0 V
	7	NC	Not connected
	8	D	Data input
	9	REF COS	REF COS channel

Table 147: HIPERFACE encoder input - Pinout

6.2.6.2.2 Input/Output circuit diagram

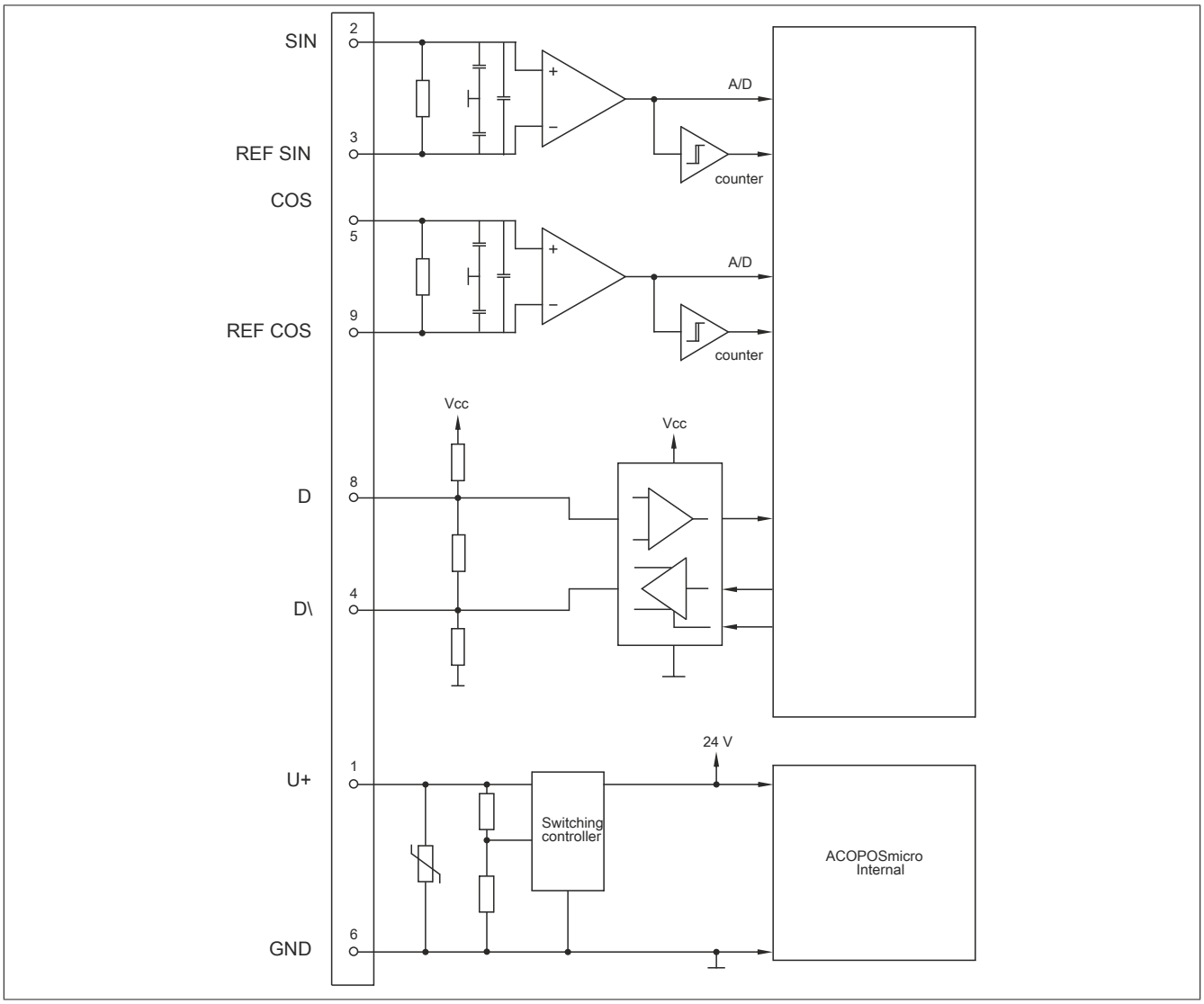


Figure 34: HIPERFACE encoder input - Input/Output circuit diagram

6.2.6.3 SSI encoder input

6.2.6.3.1 Pinout

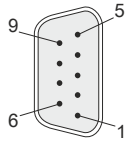
X6	Pin	Name	
	1	D	Data input D
	2	D\	Data input inverted D\
	3	---	Reserved
	4	T	Clock output
	5	T\	Clock output inverted T\
	6	---	Reserved
	7	---	Reserved
	8	U+	Encoder power supply 24 V
	9	GND	Encoder power supply 0 V

Table 148: SSI encoder input - Pinout

Information:

Reserved pins are not permitted to be connected!

6.2.6.3.2 Input/Output circuit diagram

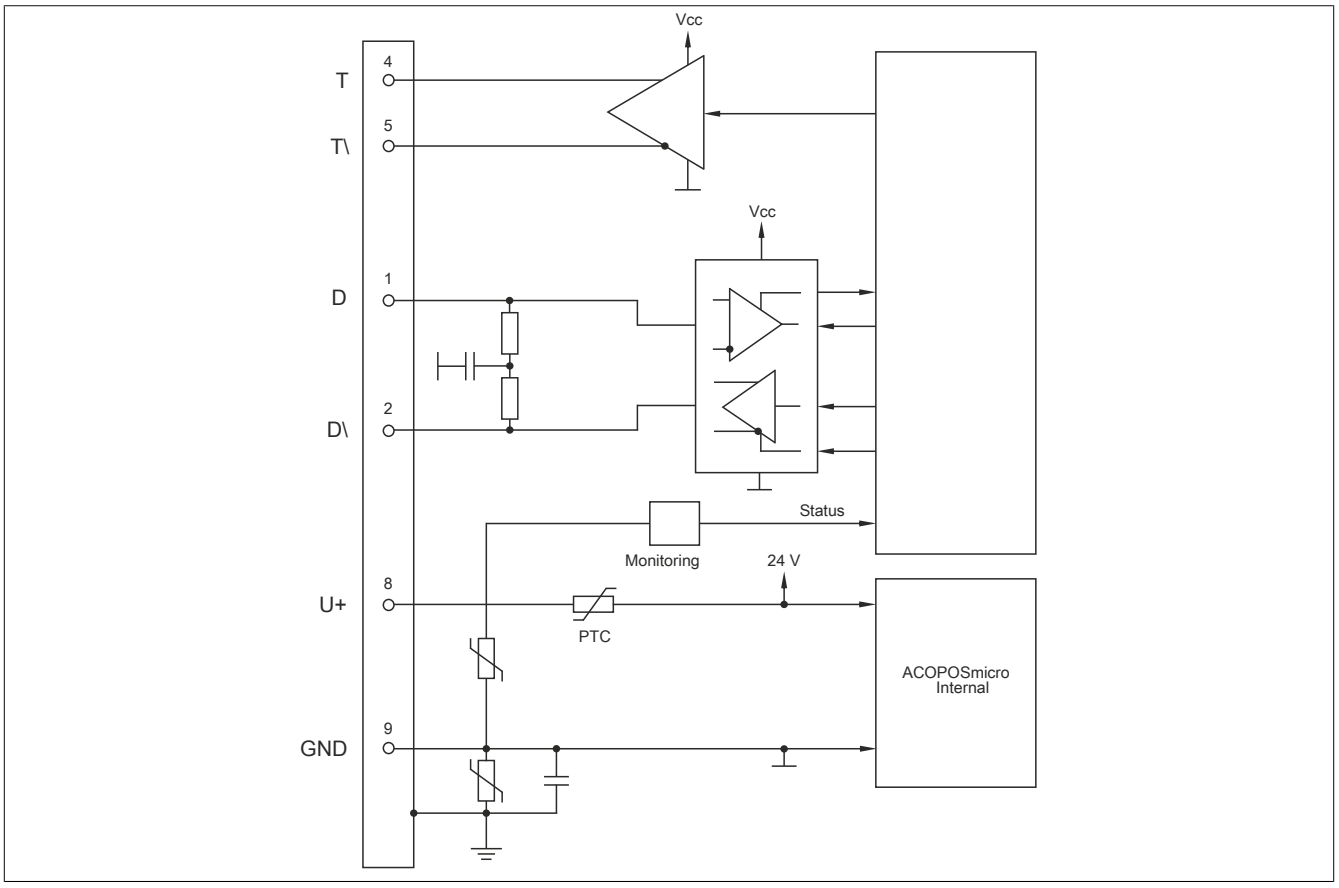


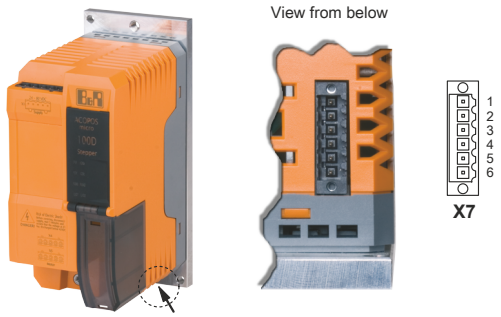
Figure 35: SSI encoder input - Input/Output circuit diagram

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.

6.2.7 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).
Information about these terminal blocks can be found in section 3.5.2.1 "Terminal block for connecting additional inputs/outputs" on page 127.

Table 149: X7 - Additional inputs/outputs - Pinout

1) Pinout for each ACOPOSmicro variant

6.2.7.1 Input circuit diagram for additional digital inputs

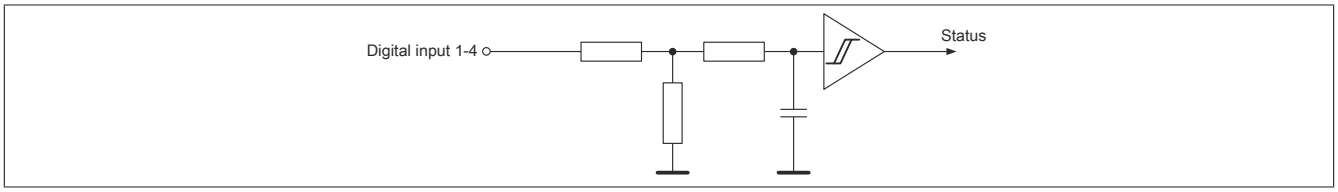


Figure 36: X7 connection - Input circuit diagram for additional digital inputs

6.2.7.2 Output circuit diagram for additional digital outputs

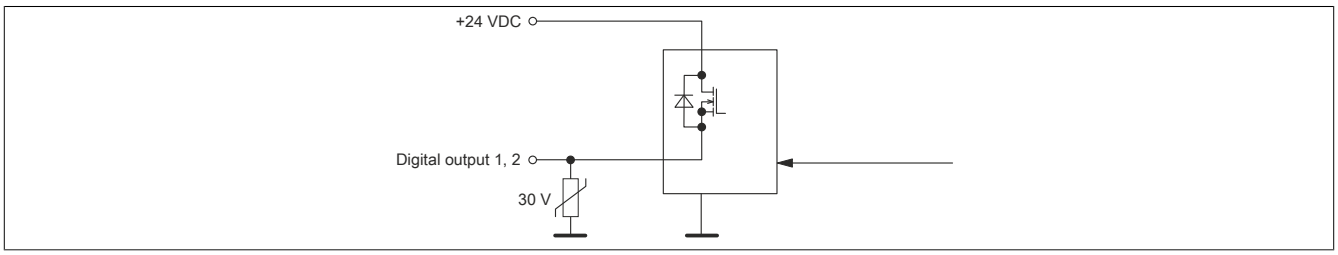


Figure 37: X7 connection - Output circuit diagram for additional digital outputs

6.2.7.3 Input circuit diagram for additional analog inputs

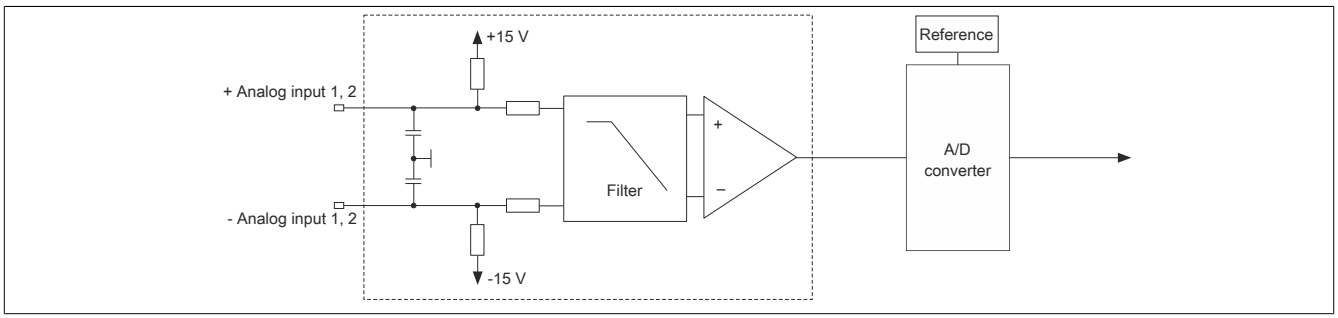


Figure 38: X7 connection - Input circuit diagram for additional analog inputs

6.2.8 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 219), 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.

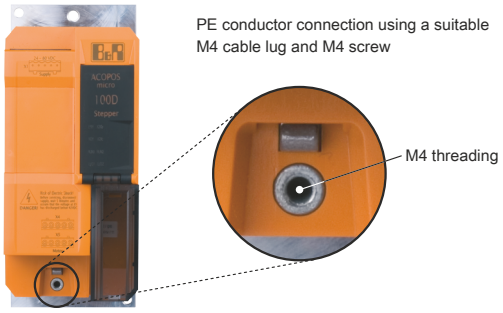


Figure 39: PE conductor connection

Danger!

Before turning on the inverter module, it is important to make sure that the housing is properly connected to ground (PE rail). The ground connection must be established even when testing or operating the drive for a short time!

Information:

For EMC-compatible installations, the X2X Link 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!

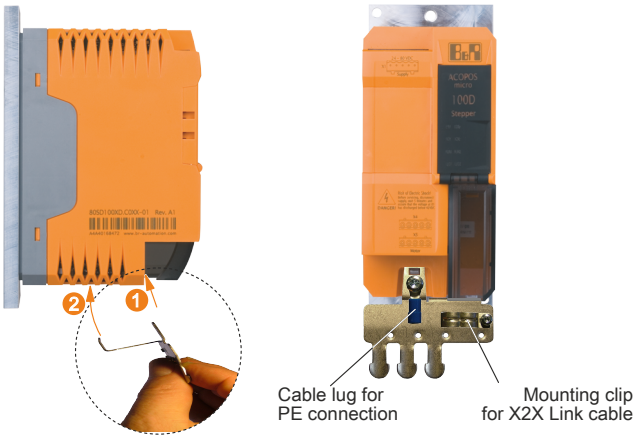
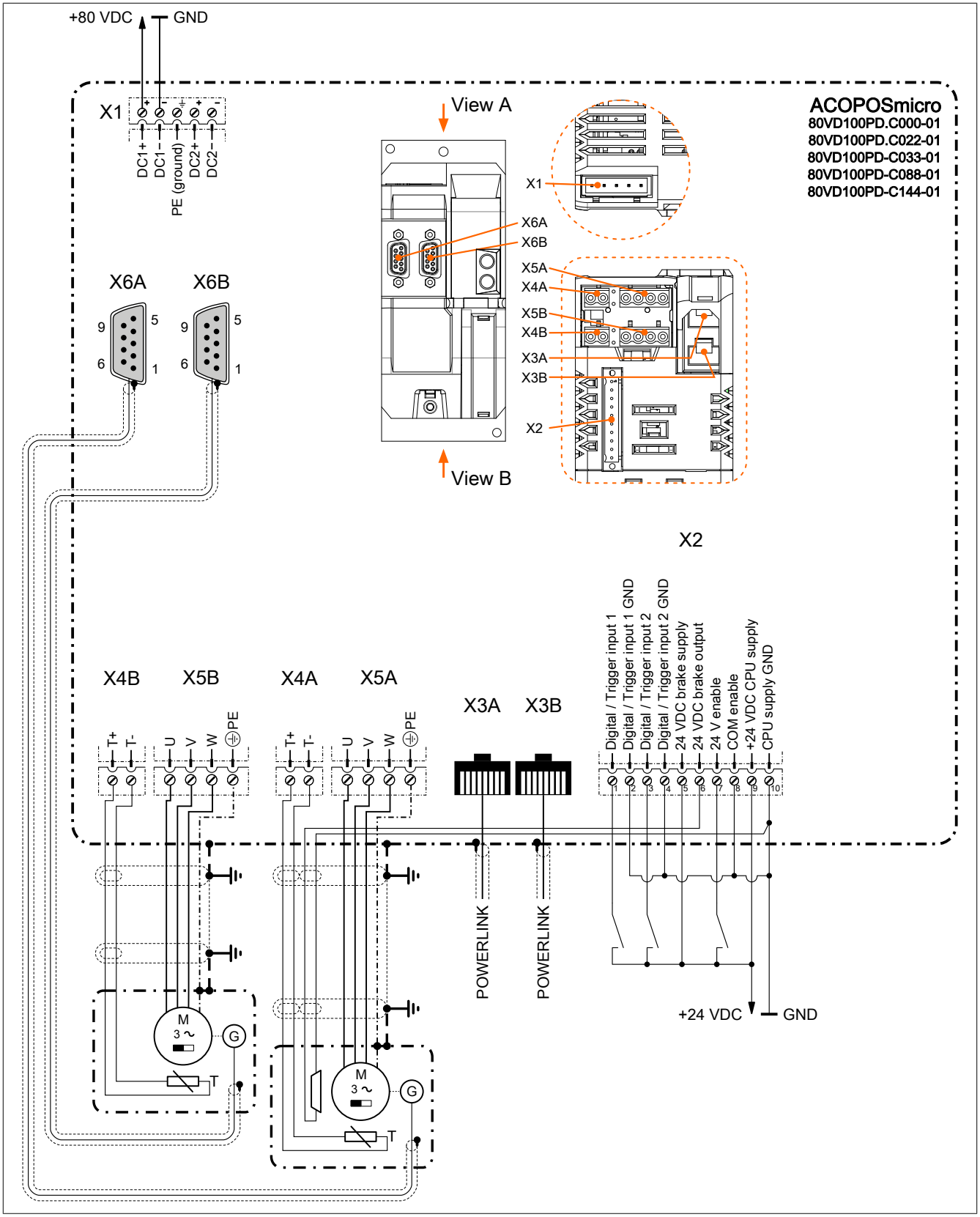


Figure 40: EMC-compatible X2X Link cable connection

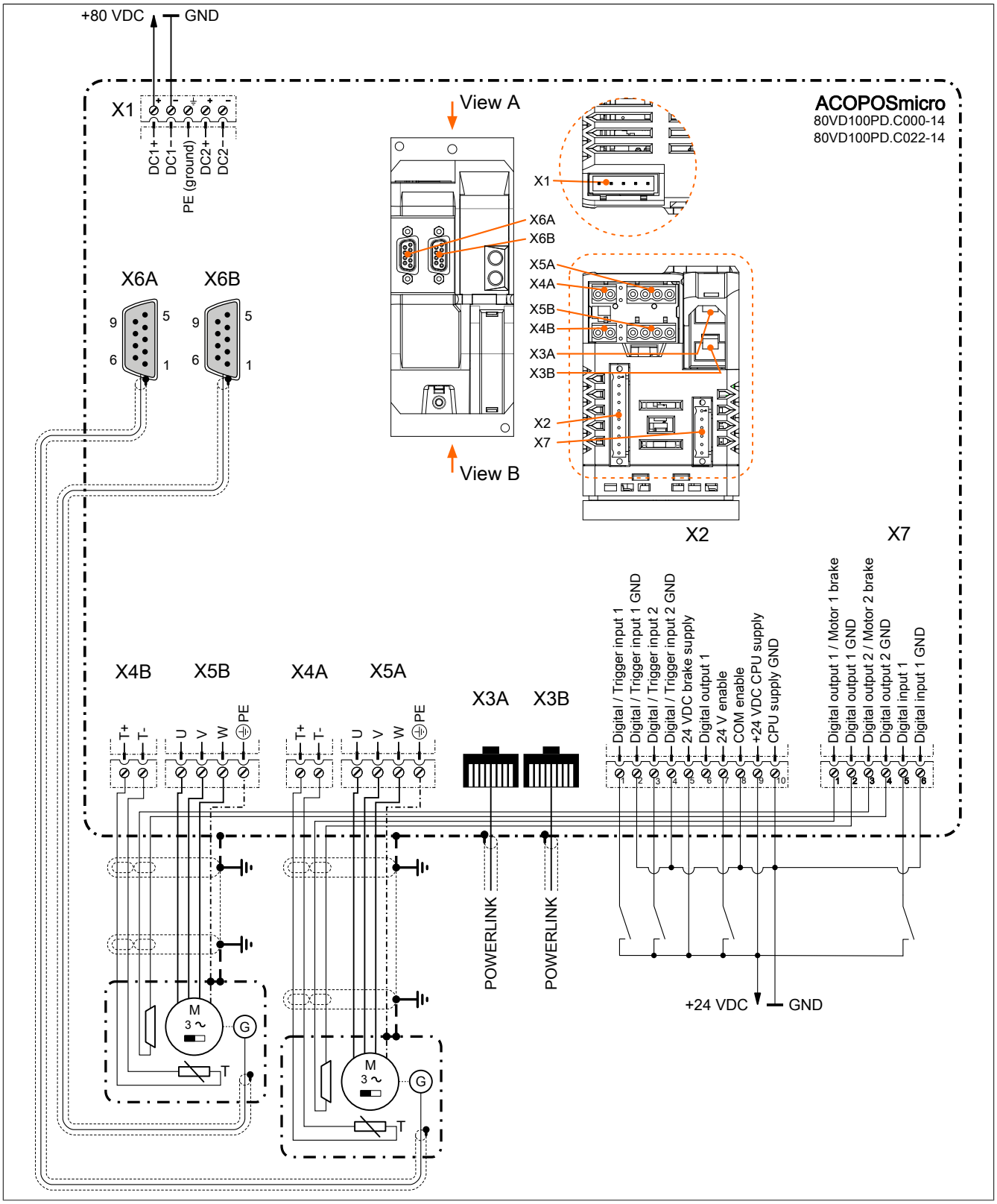
6.3 Inverter modules

6.3.1 Pinout overview

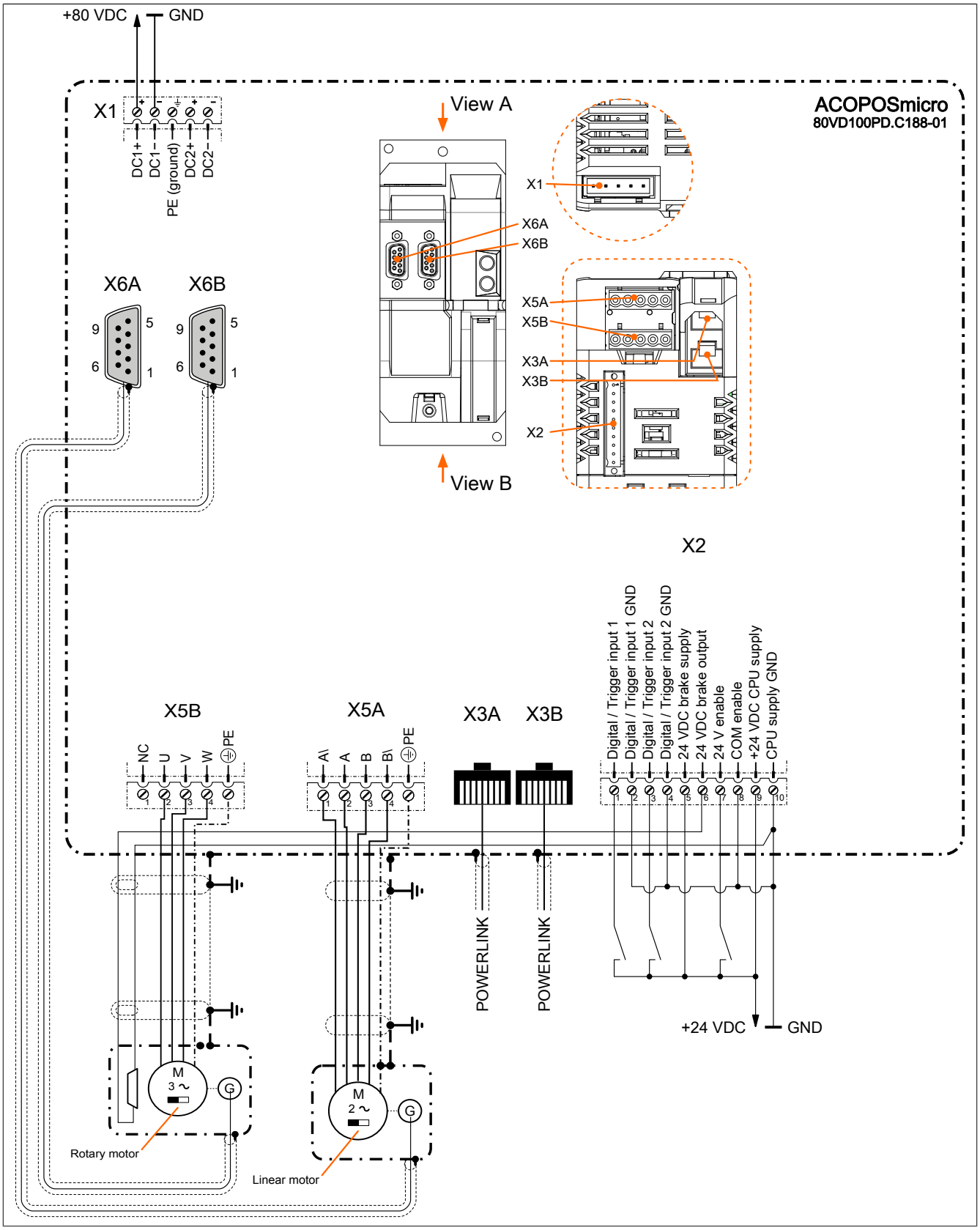
6.3.1.1 80VD100PD.C000-01, 80VD100PD.C022-01, 80VD100PD.C033-01, 80VD100PD.C088-01, 80VD100PD.C144-01



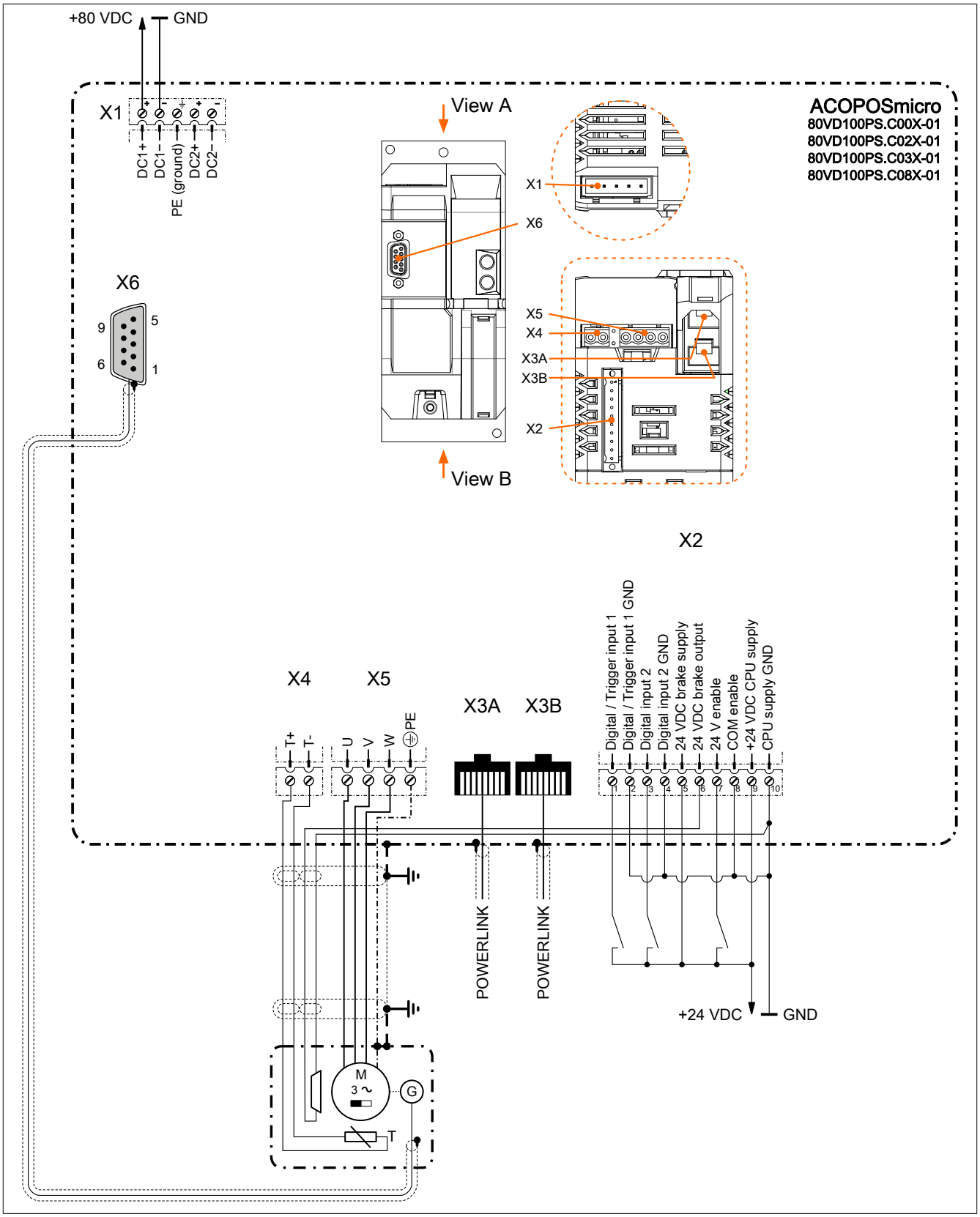
6.3.1.2 80VD100PD.C000-14, 80VD100PD.C022-14



6.3.1.3 80VD100PD.C188-01 -



6.3.1.4 80VD100PS.C00X-01, 80VD100PS.C02X-01, 80VD100PS.C03X-01, 80VD100PS.C08X-01



6.3.2 X1 - Power supply

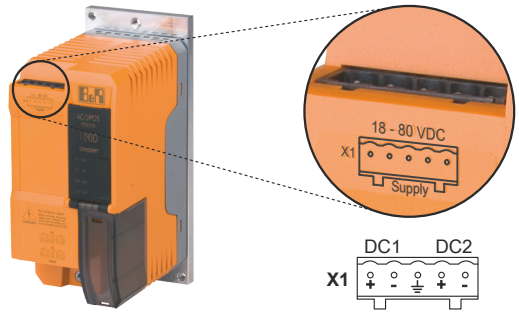
Figure	Pinout	
	Pin	Name
	+	DC1+
	-	DC1-
	⏚	PE (ground)
	+	DC2+
	-	DC2−
	The supply connection for the power unit is made using the 0TB2105.9021 or 0TB2105.9121-01 terminal block. See section "Terminal blocks for the connection of power supply units" on page 131.	

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

Information about safeguarding the lines can be found in section "Dimensioning" of the under "Fuse protection" on page 207.

Information:

B&R power supply module 80PS080X3.10-01 must be used for the DC bus supply voltage on X1 in order to adhere to the limit values for "Disturbance voltage on mains connections".

6.3.2.1 X1 - Input circuit diagram for the power supply

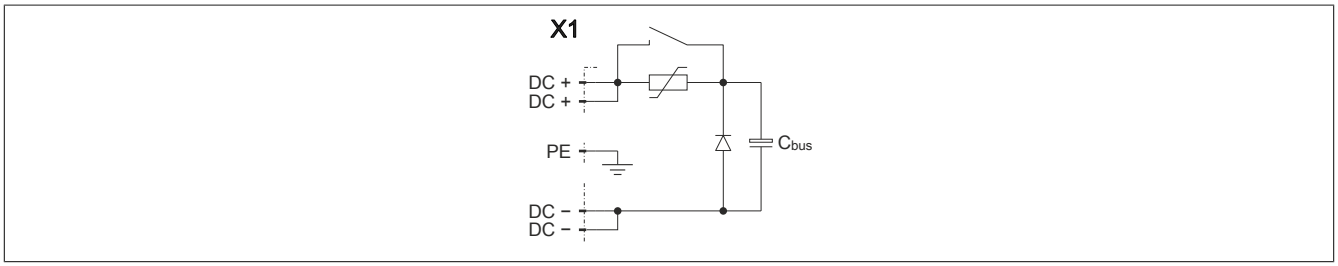


Figure 41: X1 connection - Input circuit diagram for the power supply

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

Figure	Pinout	
	**Pin**	**Name**
	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
	7	24 V enable
	8	COM enable
	9	24 VDC - CPU supply
	10	GND - CPU supply
	The 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 128.	

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

1) Reference potential: GND for CPU power supply (pin 10)

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 figure).

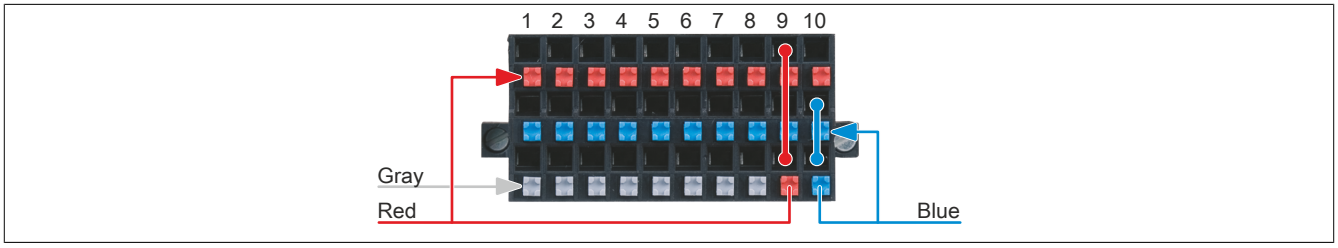


Figure 42: X2 connection - CPU supply via the 0TB1310.3100 terminal

6.3.3.1 X2 - Input/Output circuit diagram

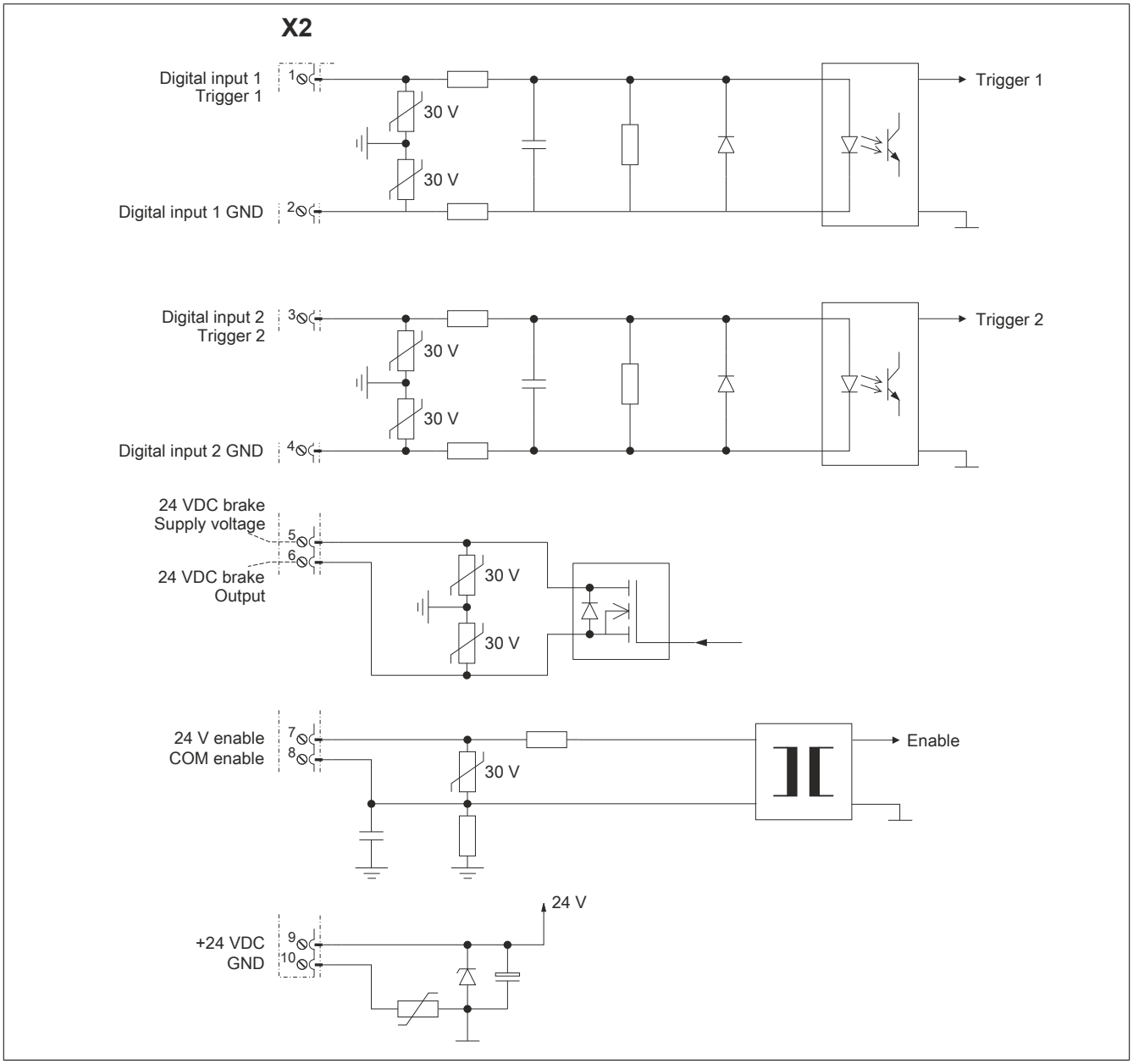


Figure 43: X2 connection - Input/Output circuit diagram

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 in accordance with EN 954-1.

Additional measures are necessary to achieve higher safety categories.

6.3.4 X3 - POWERLINK connections

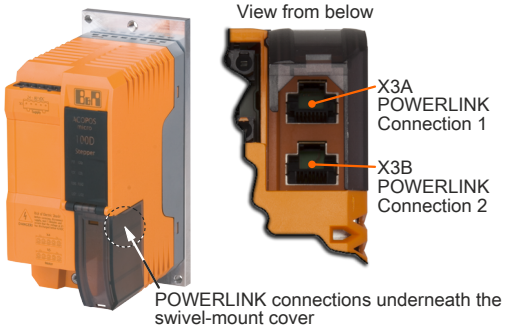
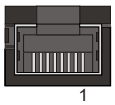
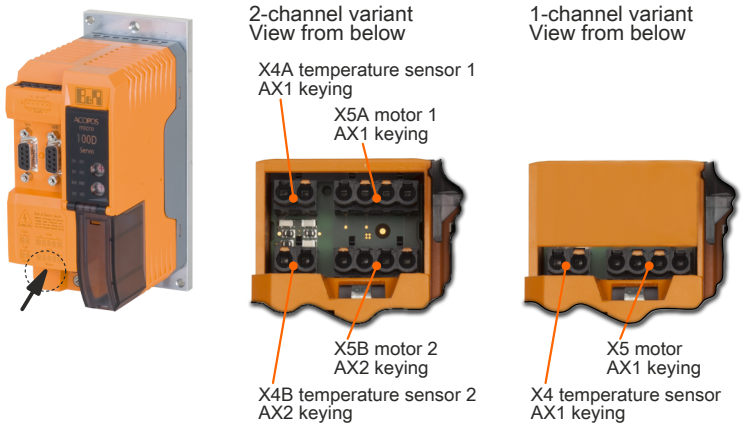
Figure	POWERLINK connections		
	X3	Pin	Name
		1	RXD
		2	RXD\
		3	TXD
		4	Termination
		5	Termination
		6	TXD\
		7	Termination
		8	Termination
	Connecting to a POWERLINK network is done using pre-assembled cables. See section "POWERLINK cables" on page 135.		

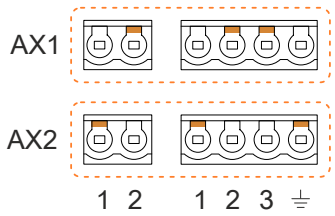
Table 152: X3 - POWERLINK connections

6.3.5 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.
Information about terminal blocks can be found in section 3.5.2.3 "Terminal blocks for connecting motors" on page 129.

Table 153: X4/X5 - Servo motor connection

Danger!

Motor connectors, terminal blocks and all other connections must not be connected or disconnected when voltage is applied and/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 for the motor and temperature sensor connections are keyed, take care that the terminal blocks with the right keying are used. For more information, see the description in section 3.5.2.3 "Terminal blocks for connecting motors" on page 129.

6.3.5.1 X4/X5 - Input/Output circuit diagram - Temperature sensor / Servo motor connection

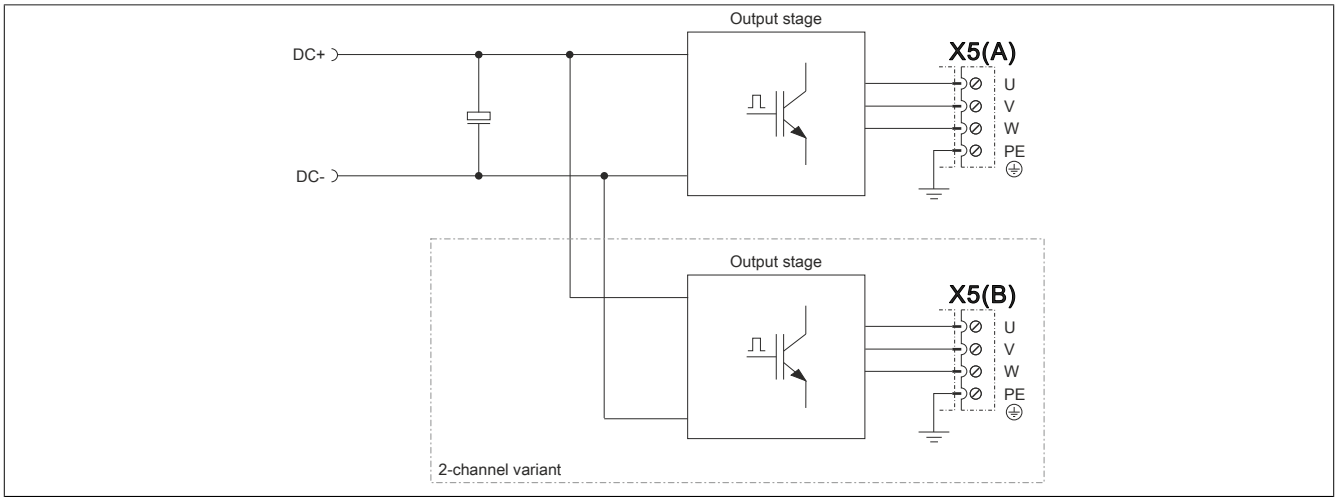


Figure 44: X5 - Output diagram - Servo motor connection

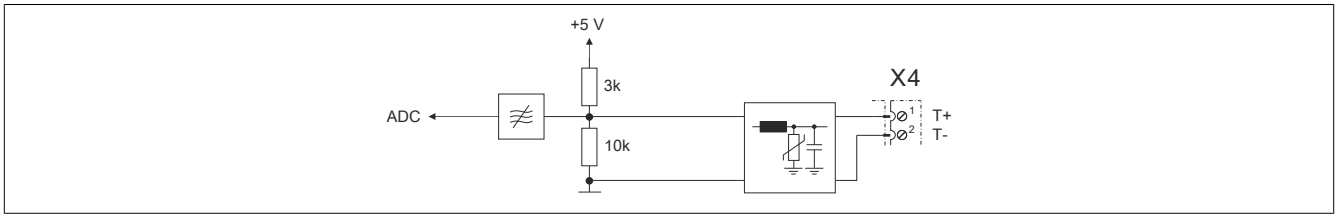


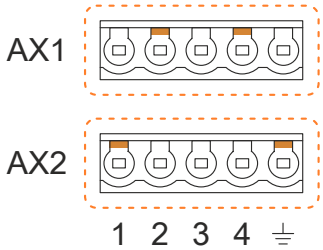
Figure 45: X4 - Output diagram - Servo motor temperature sensor connection

6.3.6 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 129.

Table 154: X5 - Linear/Rotary motor connection

Danger!

Motor connectors, terminal blocks and all other connections must not be connected or disconnected when voltage is applied and/or during operation.

Information:

The female connectors for connecting the motor are keyed, so it is necessary to ensure that terminal blocks with appropriate keying are used (see section 3.5.2.3 "Terminal blocks for connecting motors" on page 129).

Information:

For additional information about LinMot®, see www.linmot.com.

6.3.7 X6 - Encoder inputs

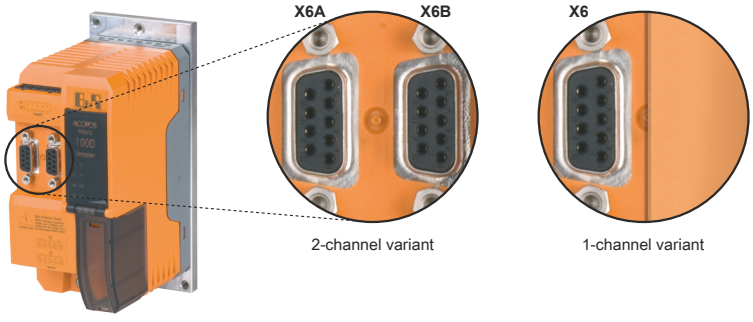


Figure 46: X6 - Encoder inputs

6.3.7.1 EnDat 2.2 encoder input

6.3.7.1.1 Pinout

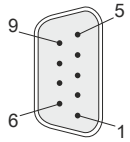
X6	Pin	Name	
	1	U+	Encoder power supply +12.5 V
	2	VBATT	Battery backup power supply
	3	NC	Not connected
	4	D	Data input
	5	T	Clock output
	6	GND 1	Encoder power supply GND
	7	GND 2	Battery backup power supply GND
	8	D\	Data input inverted
	9	T\	Clock output inverted

Table 155: EnDat 2.2 encoder input - Pinout

6.3.7.1.2 Input/Output circuit diagram

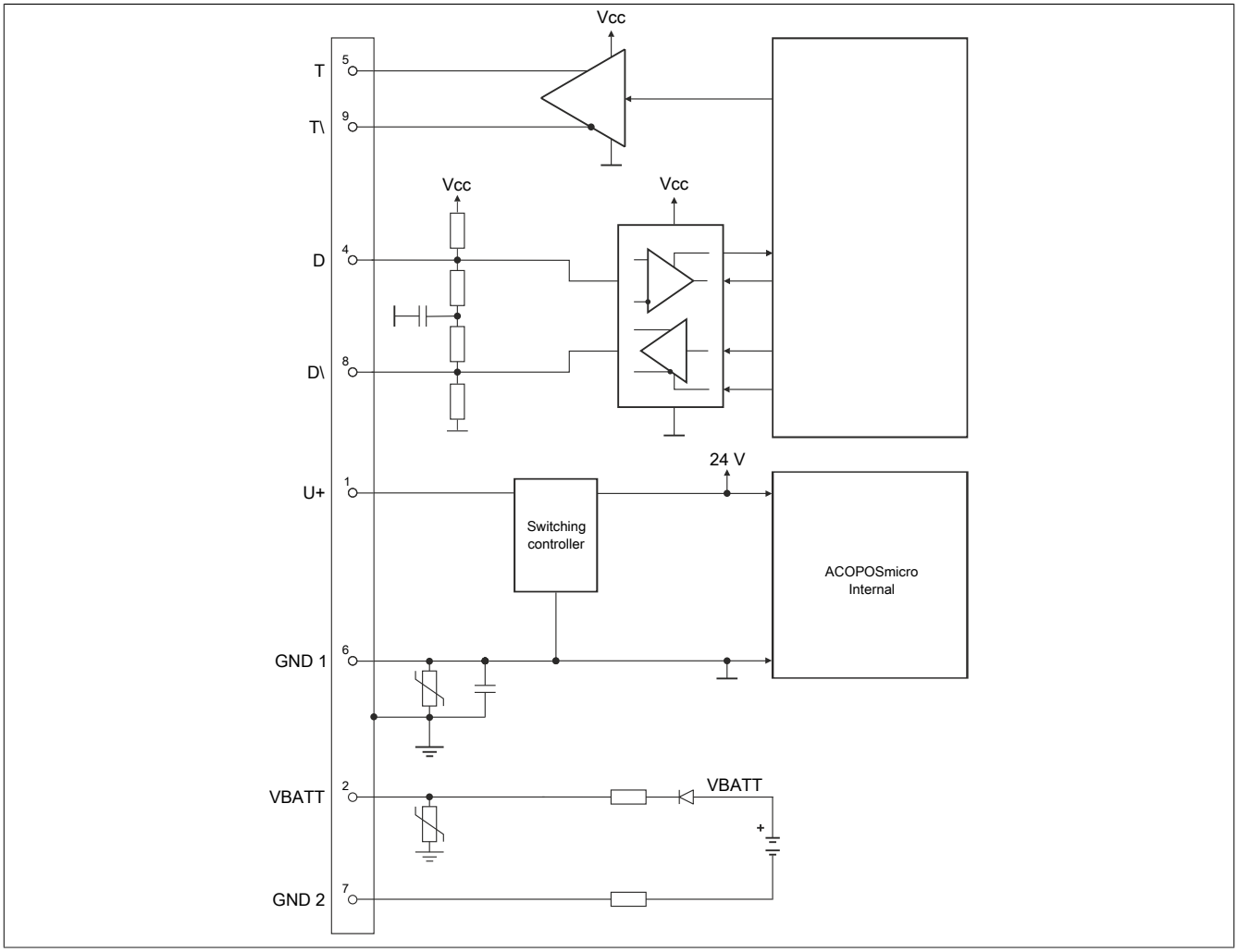


Figure 47: EnDat 2.2 encoder input - Input/Output circuit diagram

6.3.7.2 Resolver encoder input

6.3.7.2.1 Pinout

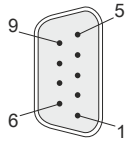
X6	Pin	Name	
	1	NC	Not connected
	2	NC	Not connected
	3	SIN	Channel SIN
	4	COS\	Channel COS inverted
	5	REF	Channel REF
	6	NC	Not connected
	7	SIN\	Channel SIN inverted
	8	COS	Channel COS
	9	REF\	Channel REF inverted

Table 156: Resolver encoder input - Pinout

6.3.7.2.2 Input circuit diagram

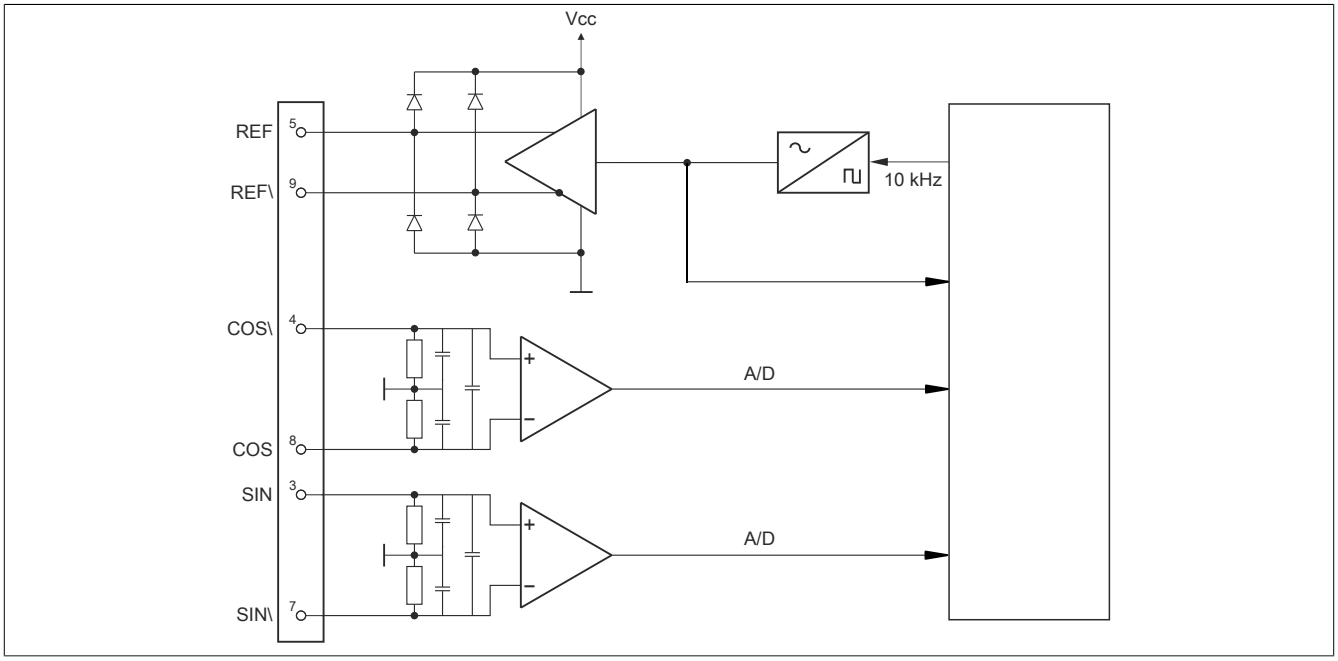


Figure 48: Resolver encoder input - Input circuit diagram

6.3.7.3 Incremental encoder input

6.3.7.3.1 Pinout

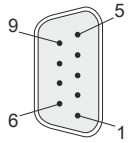
X6	Pin	Name	
	1	A	Channel A
	2	A\	Channel A inverted
	3	B	Channel B
	4	B\	Channel B inverted
	5	R	Channel R
	6	R\	Channel R inverted
	7	U+	+24 VDC encoder power supply output
	8	GND	GND - CPU power supply
	9	Shield	Shield connection

Table 157: Incremental encoder input - Pinout

6.3.7.3.2 Input/Output circuit diagram

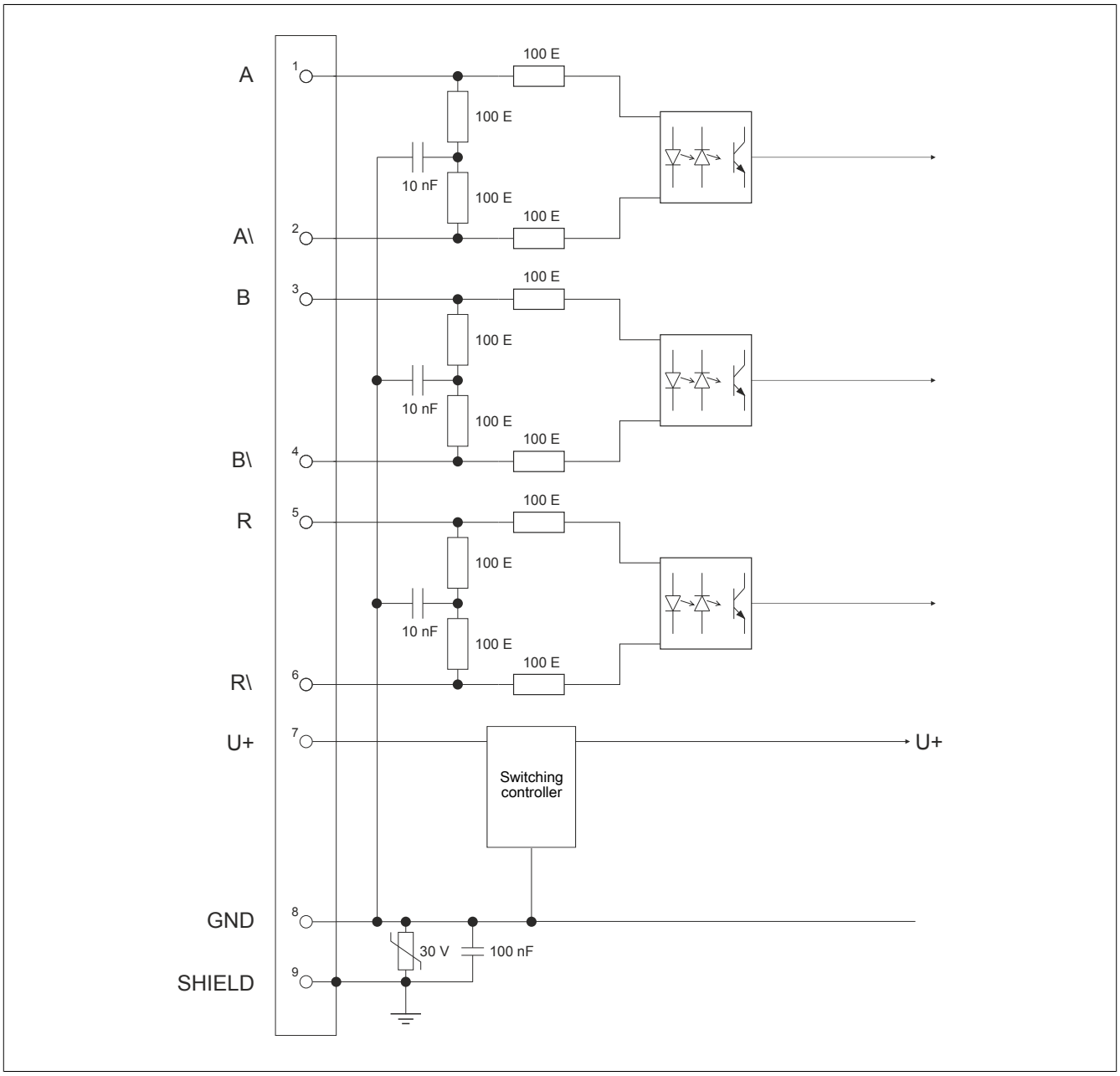


Figure 49: Incremental encoder - Input/Output circuit diagram

6.3.7.4 SSI encoder input

6.3.7.4.1 Pinout

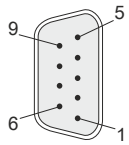
X6	Pin	Name	
	1	U+	Encoder power supply 5 V ±5%
	2	---	NC
	3	---	NC
	4	D	Data input
	5	T	Clock output
	6	GND 1	Encoder power supply GND
	7	---	NC
	8	D\	Data input inverted
	9	T\	Clock output inverted

Table 158: SSI absolute encoder - Pinout

6.3.7.4.2 Input/Output circuit diagram

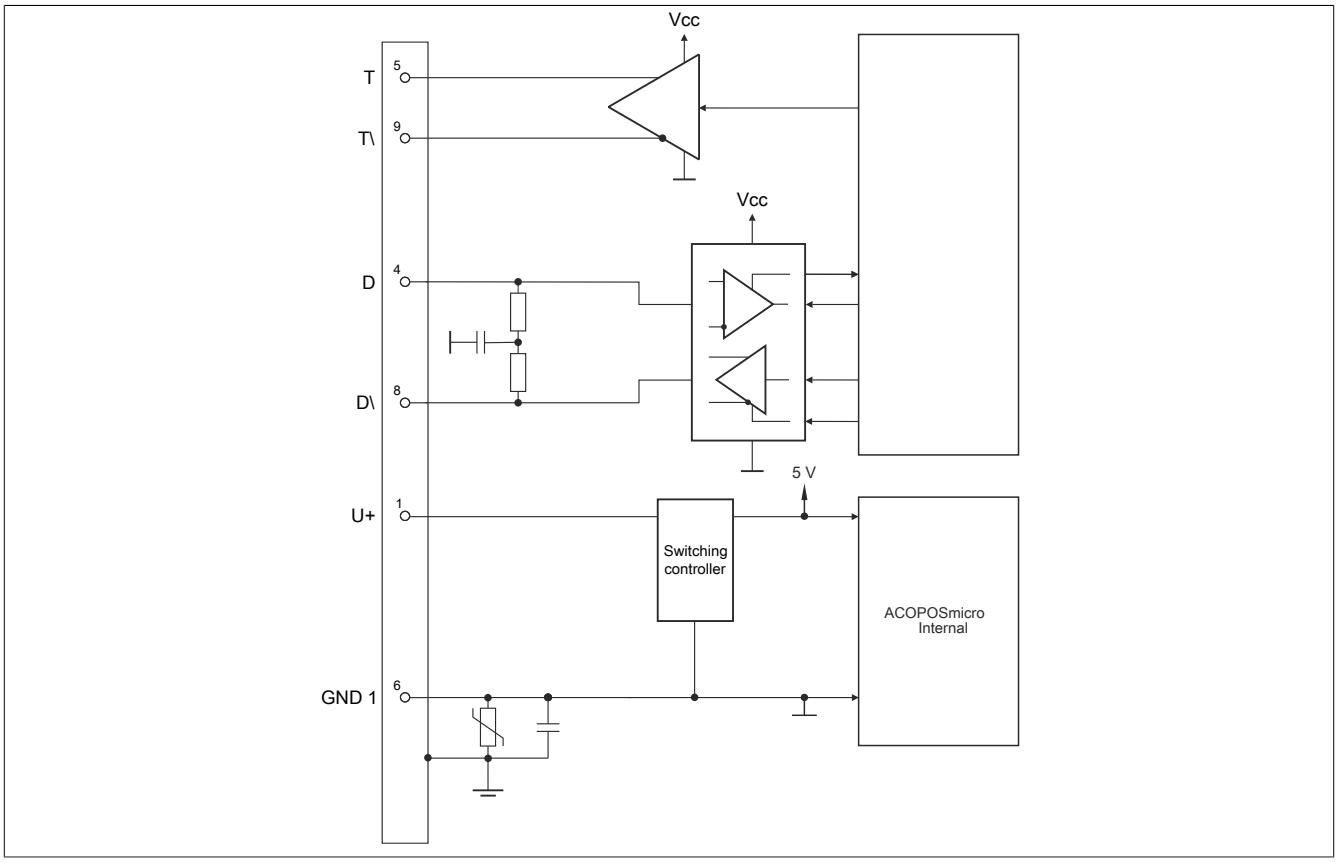


Figure 50: SSI absolute encoder - Input/Output circuit diagram

6.3.7.5 SinCos encoder

6.3.7.5.1 Pinout

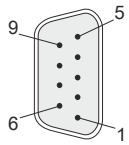
X6	Pin	Name	
	1	Sense\	Sense -
	2	R	Reference pulse +
	3	B	Cos +
	4	A	Sin +
	5	5 V	Encoder power supply 5 V
	6	R\	Reference pulse -
	7	B\	Cos -
	8	A\	Sin -
	9	GND	Encoder power supply GND

Table 159: SinCos encoder - Pinout

6.3.7.6 LinMot® encoder input

Information:

For additional information about LinMot®, see www.linmot.com.

6.3.7.6.1 Pinout

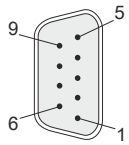
X6	Pin	Name
	1	Encoder power supply 5 V
	2	Sine input +
	3	NC
	4	NC
	5	Cosine input +
	6	GND encoder power supply
	7	NC
	8	Temperature input
	9	NC

Table 160: LinMot® encoder input - Pinout

Information:

The connector pinout differs from the standard LinMot® pinout.

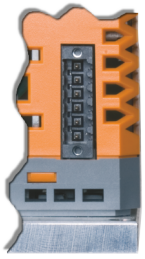
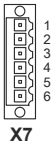
Information:

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.

6.3.8 X7 - Additional inputs/outputs

Figure		
	View from below 	

Pinout[1]	
Additional digital inputs/outputs 80VD100PD.C022-01 and 80VD100PD.C000-14	
Pin	**Digital inputs/outputs**
1	Digital output for brake channel 1 (motor cable B+)
2	GND
3	Digital output for brake channel 2 (motor cable B+)
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). Information about these terminal blocks can be found in section 3.5.2.1 "Terminal block for connecting additional inputs/outputs" on page 127.	

Table 161: X7 - Additional inputs/outputs - Pinout

1) Pinout for each ACOPOSmicro variant

6.3.8.1 Input circuit diagram for additional digital inputs

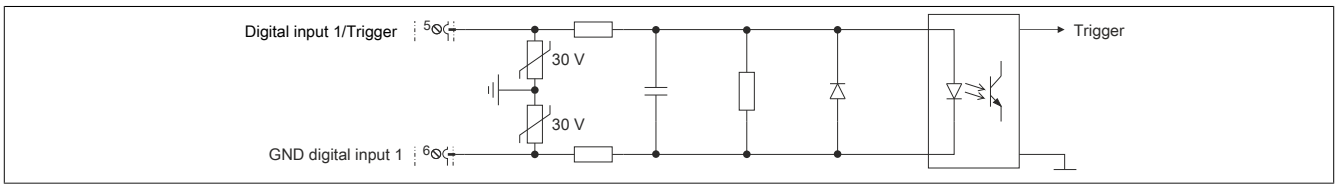


Figure 51: X7 connection - Input circuit diagram for additional digital inputs

6.3.8.2 Output circuit diagram for additional digital outputs

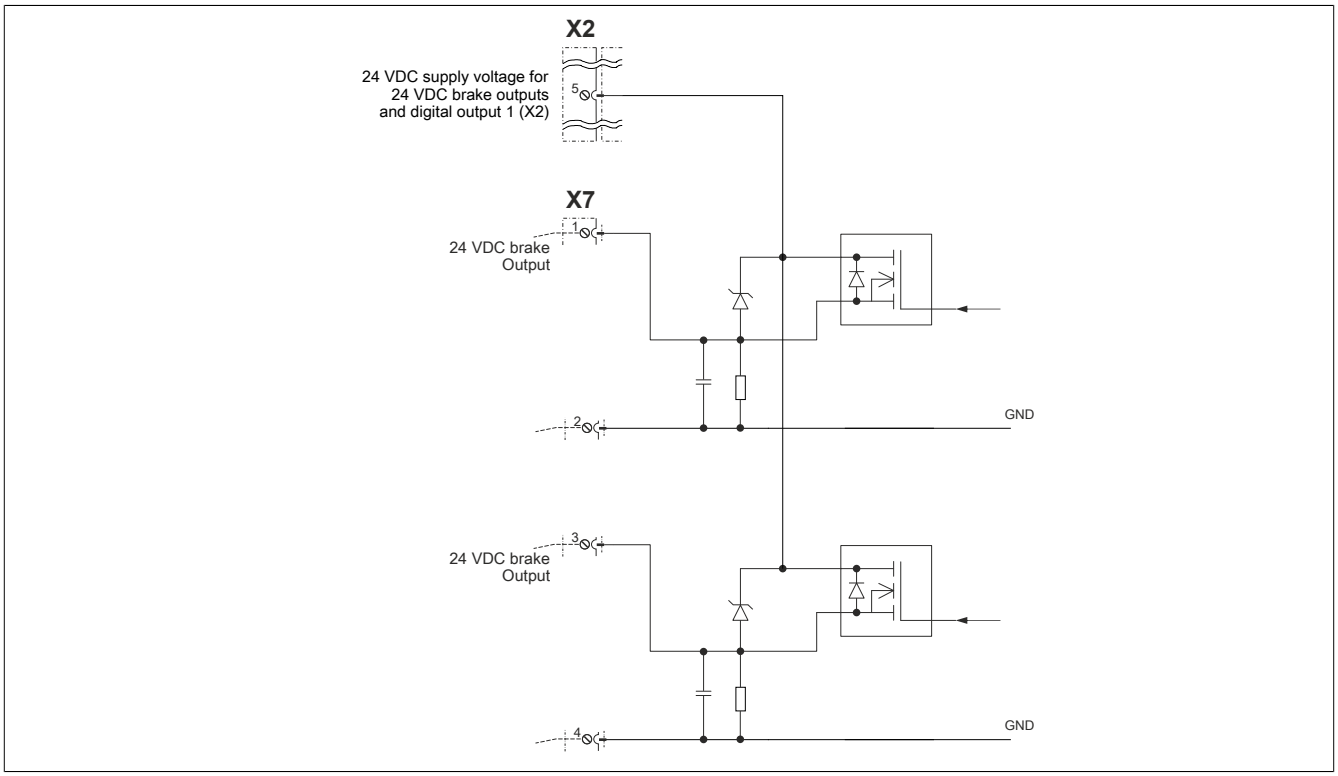


Figure 52: X7 connection - Output circuit diagram for additional digital outputs

6.3.9 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 219), 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.

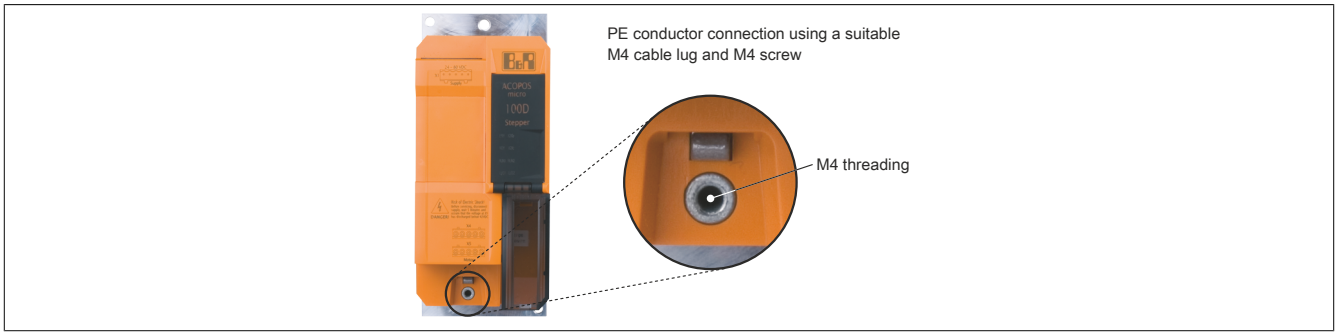


Figure 53: PE conductor connection

Danger!

Before turning on the inverter module, it is important to make sure that the housing is properly connected to ground (PE rail). The ground connection must be established even when testing or operating the drive for a short time!

Information:

For EMC-compatible installations, the POWERLINK 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!

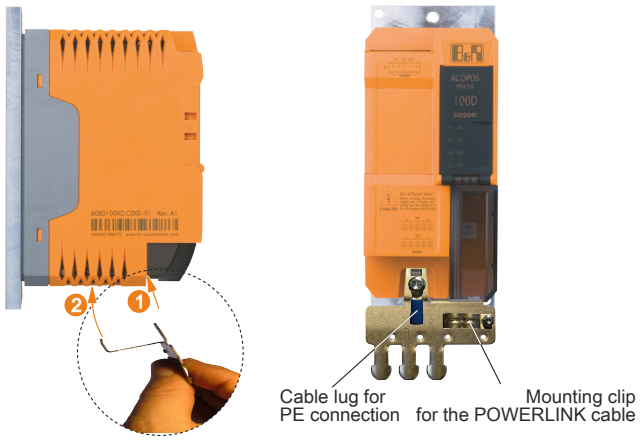
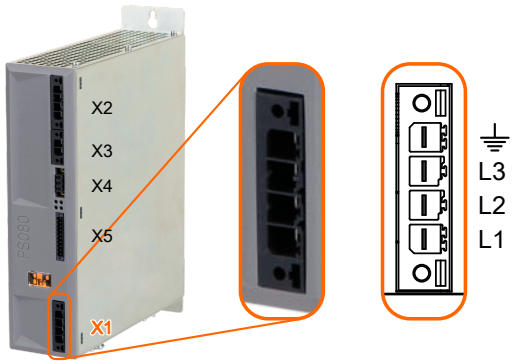


Figure 54: EMC-compatible POWERLINK cable connection

6.4 Power supply modules

6.4.1 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 using terminal block 0TB3104-7022 (see section "Terminal blocks" on page 126).

Table 162: X1 connector - Mains input

Information:

Max. load per pin: 41 A @ T_U = 20°C, 36 A @ T_U = 40°C

6.4.1.1 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).

When using ungrounded IT power systems (three-phase power systems with neutral isolated from ground or neutral grounded through impedance) or corner-grounded TN-S power systems with protective ground conductor, isolation transformers must be used. 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 the power supply housing. Three-phase isolation transformers with the corresponding input and output voltages and a vector group with secondary neutral can be used (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!

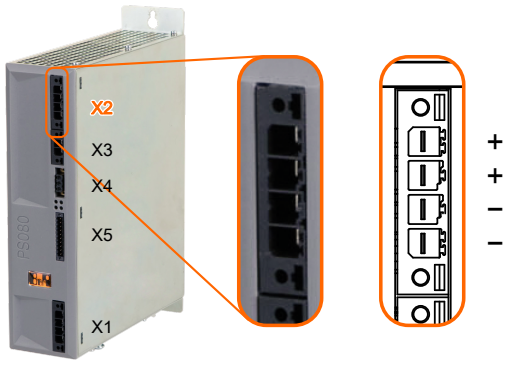
The power supply is not permitted to be operated directly on IT power systems and corner-grounded TN-S power systems with a protective ground conductor!

Warning!

The power supply is 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.

6.4.2 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 126).

Table 163: X2 connector - Power output 24 to 80 VDC

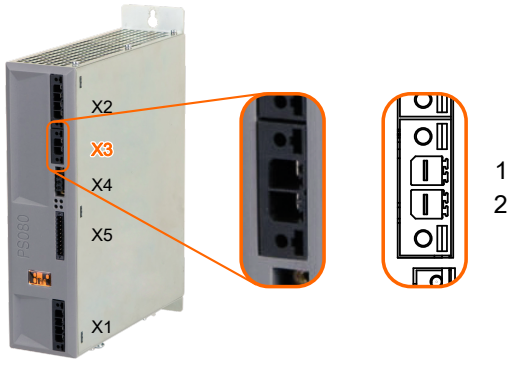
Information:

Max. load per pin: 41 A @ T_U = 20°C, 36 A @ T_U = 40°C

Cabling for parallel operation: see 3.4.5 "Parallel operation" on page 117.

6.4.3 X3 - Chopper output

Figure



Pinout



Pin	Description
1	Output +
2	Chopper resistance

The connection is made using terminal block 0TB3102-7010 (see section "Terminal blocks" on page 126).

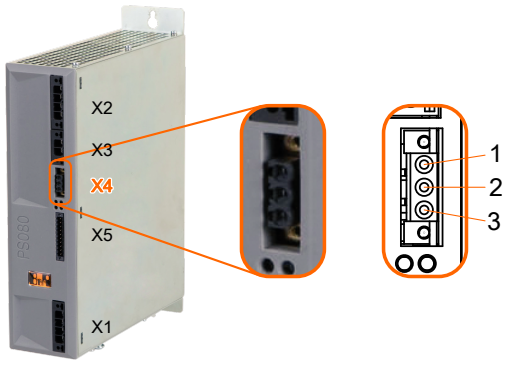
Table 164: X3 connector - Chopper output

Information:

Max. load per pin: 41 A @ T_U = 20°C, 36 A @ T_U = 40°C

6.4.4 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 using terminal block 0TB103.3 (see section "Terminal blocks" on page 126).	

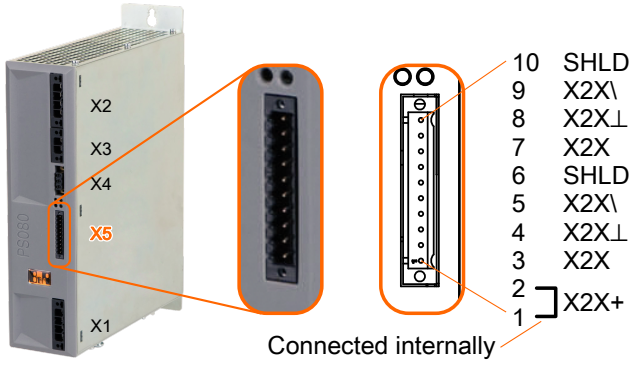
Table 165: X4 connector - Voltage output 24 VDC / 2 A

Warning!

Voltage output X4 is not permitted to be connected in parallel with other 80PS080X3.10-01 modules!

6.4.5 X5 - X2X Link interface

Figure



Pinout



Pin	Name	
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 using terminal block 0TB1110.8010 (see section "Terminal blocks" on page 126).		

Table 166: 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.

7 Operation - Stepper motor modules

7.1 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).

7.1.1 Minimum cycle time

The minimum cycle time defines how far the bus cycle can be reduced without communication errors occurring. Note that very fast cycles decrease the idle time available for handling monitoring, diagnostics and acyclic commands.

	Minimum cycle time
Standard function model	250 µs
Function model "Ramp"	250 µs

7.1.2 Minimum I/O update time

The minimum I/O update time defines how far the bus cycle can be reduced while still allowing an I/O update to take place in each cycle.

	Minimum I/O update time
Standard function model	250 µs
Function model "Ramp"	
Inputs	250 µs
Outputs[1)]	25 ms

1) Depends on the configuration of the motion profile generator.General configuration

7.1.3 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 other	Function model "Ramp"

7.2 Function model "Standard without SDC"

Function model "Standard without SDC" (smart device controller).

7.2.1 Register overviews

7.2.1.1 80SD100XD.C011-01 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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 rising edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on falling edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on rising edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on falling 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 167: 80SD100XD.C011-01 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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	Station 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 167: 80SD100XD.C011-01 - Registers in function model "Standard without SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.2.1.2 80SD100XD.C033-01 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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 rising edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on falling edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on rising edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on falling 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 168: 80SD100XD.C033-01 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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 168: 80SD100XD.C033-01 - Registers in function model "Standard without SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.2.1.3 80SD100XD.C044-01, 80SD100XD.W044-01 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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 rising edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on falling edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on rising edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on falling 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 169: 80SD100XD.C044-01, 80SD100XD.W044-01 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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 encoder									
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 169: 80SD100XD.C044-01, 80SD100XD.W044-01 - Registers in function model "Standard without SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.2.1.4 80SD100XD.C04X-13 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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 rising edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on falling edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on rising edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on falling 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 170: 80SD100XD.C04X-13 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
334		BrakeConfig01		Configuration of the brake output	USINT				•
Incremental encoder									
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 170: 80SD100XD.C04X-13 - Registers in function model "Standard without SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.2.1.5 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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 rising edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on falling edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on rising edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on falling 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 171: 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Registers in function model "Standard without SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.2.1.6 80SD100XD.C0XX-21 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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 rising edge of trigger input 1	BOOL				
		TriggerEdgeNeg01		Bit 2: Latches on falling edge of trigger input 1	BOOL				
		StartLatch02		Bit 4: Switches latch function on/off for channel 2	BOOL				
		TriggerEdgePos02		Bit 5: Latches on rising edge of trigger input 2	BOOL				
		TriggerEdgeNeg02		Bit 6: Latches on falling 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 172: 80SD100XD.C0XX-21 - Registers in function model "Standard without SDC"

Register (dec.)		Name				Cyc.		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 172: 80SD100XD.C0XX-21 - Registers in function model "Standard without SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.2.1.7 80SD100XS.C04X-01 - Registers in function model "Standard without SDC"

Register (dec.)	Name	Description	DT	Cyc.		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 on channel 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 rising edge of trigger input 1	BOOL				
	TriggerEdgeNeg01	Bit 2: Latches on falling 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 encoder							
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 173: 80SD100XS.C04X-01 - Registers in function model "Standard without SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.2.1.8 80SD100XS.C04X-13 - Registers in function model "Standard without SDC"

Register (dec.)	Name	Description	DT	Cyc.		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 on channel 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 rising edge of trigger input 1	BOOL				
	TriggerEdgeNeg01	Bit 2: Latches on falling 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 encoder							
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				

Table 174: 80SD100XS.C04X-13 - Registers in function model "Standard without SDC"

Register (dec.)	Name	Description	DT	Cyc.		Acyc.	
				R	W	R	W
	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 174: 80SD100XS.C04X-13 - Registers in function model "Standard without SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.2.1.9 80SD100XS.C0XX-01 - Registers in function model "Standard without SDC"

Register (dec.)	Name	Description	DT	Cyc.		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 on channel 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 rising edge of trigger input 1	BOOL				
	TriggerEdgeNeg	Bit 2: Latches on falling 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 175: 80SD100XS.C0XX-01 - Registers in function model "Standard without SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

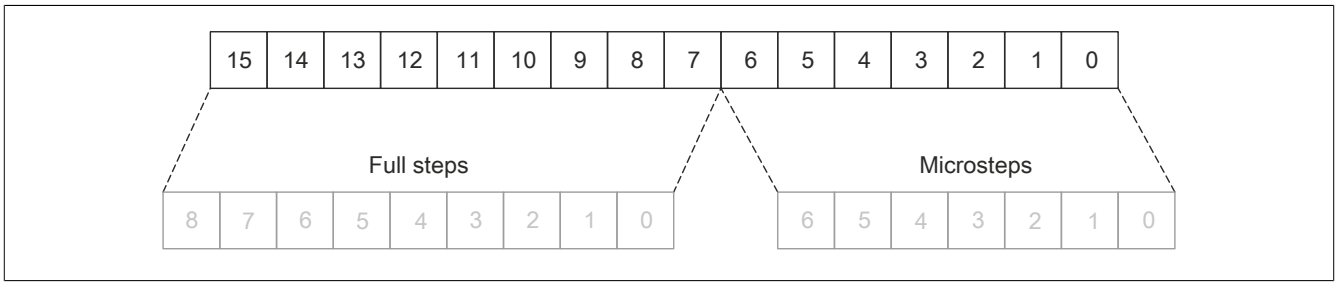
7.2.2 Register for all ACOPOSmicro

7.2.2.1 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 266).

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 298).

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

7.2.2.2 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
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	

Bit	Description[1]	
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, then bit 15 is always 0, regardless of whether or not the power unit is supplied.

1) On ACOPOSmicro 1-channel models, 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 7.2.2.7 "Error acknowledgment / Digital output of motor brake" on page 266). 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 within the valid range.
- 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).

7.2.2.3 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 7.2.2.1 "Position" on page 263) 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 7.2.2.5 "Holding current, nominal current, maximum current" on page 265) 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	**Function**
	0	No motor identifier available (after turning on for as long as the measurement conditions are not met)

Table 176: Notes about motor identification

Notes about motor identification	
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

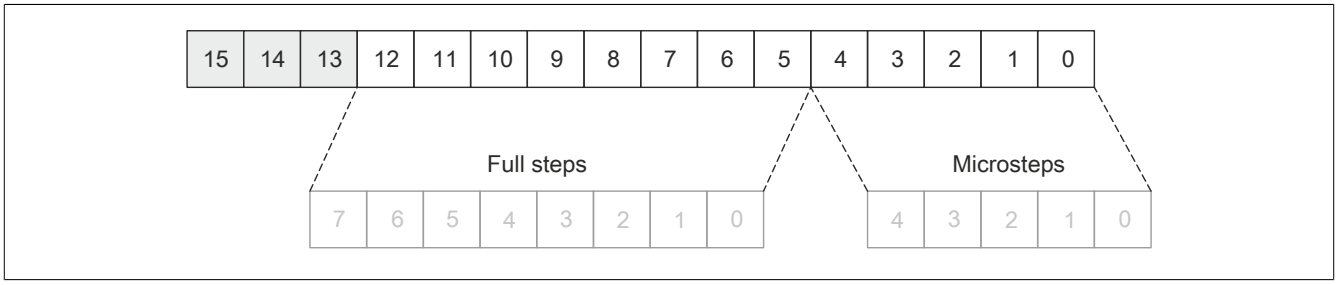
Table 176: Notes about motor identification

7.2.2.4 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 7.2.2.5 "Holding current, nominal current, maximum current" on page 265). 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 266 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 ... Maximum current 01 ... Nominal current 10 ... Holding current 11 ... Motor not powered

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 and 4 (see "Module configuration" on page 266). If only one transfer value (bits 3 and 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 266)		
	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

7.2.2.5 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 265).

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).

Supplying the motor with current:

In order to operate the motor, the DriveEnable bit must be set (evaluation is edge-sensitive).

The module provides the motor with current and sets the DrvOk bit after the motor settling time expires if no errors occur. If the DriveEnable bit is reset or an error occurs during operation, then the motor is shut down and DrvOk is set to FALSE.

Current can be reapplied to the motor on 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.

7.2.2.6 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 265): 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 265 and "Position" on page 263.
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.

7.2.2.7 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

7.2.2.8 Position latch

The position counter (internal position counter) is applied to this register when a latch event occurs (see "Latch trigger status" on page 267).

On ACOPOSmicro variants with an incremental encoder, setting bits 3 and/or 7 in the register Configuration of the incremental encoder (see page 298) exchanges the contents of this register with the register Latch of the incremental encoder (see page 298).

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

7.2.2.9 usSinceTrigger

This register indicates the time (in µs) that has passed since the trigger event occurred (see "Latch trigger status" on page 267).

7.2.2.10 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 298) and register Configuration of the incremental encoder (see 298)	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 298) and register Configuration of the incremental encoder (see 298)	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).

7.2.2.11 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.

7.2.2.12 Latch configuration

Bit	Description
0	0 ... Reserved
1 - 2	00 ... Reserved 01 ... Latch stepper position 1 on rising edge of trigger 1 input 10 ... Latch stepper position 1 on falling edge of trigger 1 input 11 ... Reserved
3 - 4	0 ... Reserved
5 - 6	00 ... Reserved 01 ... Latch stepper position 2 on rising edge of trigger 2 input 10 ... Latch stepper position 2 on falling edge of trigger 2 input
7	0 ... Reserved

7.2.2.13 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).

7.2.2.14 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.

7.2.2.15 Temperature

The internal module temperature (on the controller board) is output in °C.

Measurement range: -40 to +125°C

Overtemperature cutoff (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 environmental conditions and the permissible output current range. The temperature cutoff serves only to protect the module hardware and must not be misused for operating the module beyond the specified range as this can reduce its service life.

7.2.2.16 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. 174 "Notes about motor identification" on page 264).

Bit	Description[1)]
0	0 ... No effect 1 ... Rising edge triggers motor ID measurement for motor 1
1	0 ... No effect 1 ... Rising 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).

7.2.2.17 Full step threshold

This register is used to configure a rotational speed (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 optimum concentricity 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 the value "0" does not make sense in the full step threshold register and is interpreted as disabling of 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:

$$T^{-1} = \frac{500\ \text{Steps/second}}{200\ \text{Steps/revolution}} = 2.5 \cdot \frac{\text{Revolutions}}{\text{Second}} = 150\ \text{min}^{-1}$$

7.2.2.18 Heat sink temperature

This register indicates the temperature of the power board.

- Unit: °C
- Measurement range: +10 to +125°C

7.2.2.19 DC bus voltage

Contains the supply voltage in the power unit (in volts).

7.2.2.20 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

7.2.2.21 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

7.2.3 Registers for ACOPOSmicro variants with additional digital inputs/outputs

7.2.3.1 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)		

7.2.3.2 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	

7.2.3.3 Counter

This register contains the current counter state. Different counters (event counter, ABR counter, etc) are available depending on the configuration.

7.2.3.4 Counter latch

The counter is applied to this register when the next latch event occurs (see ABR mode in "Counter configuration" on page 270).

7.2.3.5 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, rising edge
	0010	Event counter, falling edge
	0011	Event counter, both edges
	0100	Period measurement between two consecutive falling edges
	0101	Period measurement between two consecutive rising edges
	0110	Gate measurement of the LOW level
	0111	Gate measurement of the HIGH level
	1000	AB counter without referencing
	1001	ABR referencing with referencing Counter set to zero on rising edge of R
	1010	ABR referencing with referencing Counter set to zero on falling edge of R
	1011	ABR counter with immediate referencing Counter set to zero on rising edge of bit 2 of the counter control register
	1100	AB counter without referencing
	1101	ABR referencing with referencing Counter state applied to the counter latch register on rising edge of R
	1110	ABR referencing with referencing Counter state applied to the counter latch register on falling edge of R

Bit	Description	
	1111	ABR counter with immediate referencing Counter state applied to the counter latch register on rising 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

7.2.4 Registers for ACOPOSmicro variants with additional analog inputs

7.2.4.1 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

7.2.4.2 Analog input 1 / Analog input 2

These registers receive 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

7.2.5 Trace functionality for ACOPOSmicro variants with analog inputs

7.2.5.1 Trace registers

7.2.5.1.1 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.

7.2.5.1.2 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

7.2.5.1.3 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.

7.2.5.1.4 Number of triggers executed

This register contains the number of successfully executed trigger events (trace recordings).

7.2.5.1.5 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.

7.2.5.1.6 Trace trigger

This register can be used 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 rising edge (bit changes from 0 → 1).
1	Trigger for trace instance 2	
2-7	0 ... Reserved	

7.2.5.2 Trace runtime configuration

This section specifies how the trace runtime configuration is made in Automation Studio:

7.2.5.2.1 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 177: Order of trace data from two analog channels

7.2.5.2.2 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.

7.2.5.2.3 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) cannot be greater than 8192.

7.2.5.2.4 Block sizes for asynchronous data transfer (AsynSize)

A higher value here will result in faster data transfer from the module to the CPU.

7.2.5.2.5 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.

7.2.5.2.6 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 273).
Infinite	Infinite trace can be started with bit 0/1 of the register Trace trigger (see page 273). 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.

7.2.5.2.7 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

7.2.5.3 Trace library

The AsIoTrc library must be used to read the recorded trace data (see the Automation Studio help documentation 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 channel

Examples:

- Trace for trace instance 1: "SS1.IF1.ST1.TRC1"
- Trace for trace instance 2: "SS1.IF1.ST1.TRC2"

7.3 Standard functional model with SDC

Function model "Standard with SDC" (smart device controller). This is also referred to as "MotionConfiguration".

7.3.1 Register overviews

7.3.1.1 80SD100XD.C011-01 - Registers in function model "Standard with SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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	Net time 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									
382	386	PosVal03	PosVal04	Encoder position	DINT	•			

Table 178: 80SD100XD.C011-01 - Registers in function model "Standard with SDC"

Register (dec.)		Name				Cyc.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
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	Station 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 178: 80SD100XD.C011-01 - Registers in function model "Standard with SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.2 80SD100XD.C033-01 - Registers in function model "Standard with SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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	Net time 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 179: 80SD100XD.C033-01 - Registers in function model "Standard with SDC"

Register (dec.)		Name		Description	DT	Cyc.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2			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 179: 80SD100XD.C033-01 - Registers in function model "Standard with SDC"

DT Data type of the register
Cyc. 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 - Registers in function model "Standard with SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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	Net time 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 encoder									
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 180: 80SD100XD.C044-01, 80SD100XD.W044-01 - Registers in function model "Standard with SDC"

Register (dec.)		Name		Description	DT	Cyc.		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 180: 80SD100XD.C044-01, 80SD100XD.W044-01 - Registers in function model "Standard with SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.4 80SD100XD.C04X-13 - Registers in function model "Standard with SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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	Net time 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 encoder									
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 181: 80SD100XD.C04X-13 - Registers in function model "Standard with SDC"

Register (dec.)		Name				Cyc.		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 181: 80SD100XD.C04X-13 - Registers in function model "Standard with SDC"

DT Data type of the register
Cyc. 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 - Registers in function model "Standard with SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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	Net time 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 182: 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Registers in function model "Standard with SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.6 80SD100XD.C0XX-21 - Registers in function model "Standard with SDC"

Register (dec.)		Name				Cyc.		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 on channel 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 on channel 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	Net time 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				
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				

Table 183: 80SD100XD.C0XX-21 - Registers in function model "Standard with SDC"

Register (dec.)		Name				Cyc.		Acyc.	
Channel 1	Channel 2	Channel 1	Channel 2	Description	DT	R	W	R	W
		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 183: 80SD100XD.C0XX-21 - Registers in function model "Standard with SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.7 80SD100XS.C04X-01 - Registers in function model "Standard with SDC"

Register (dec.)	Name	Description	DT	Cyc.		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 on channel 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	Net time 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 encoder							
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 184: 80SD100XS.C04X-01 - Registers in function model "Standard with SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.8 80SD100XS.C04X-13 - Registers in function model "Standard with SDC"

Register (dec.)	Name	Description	DT	Cyc. R	Cyc. W	Acyc. R	Acyc. 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 on channel 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	Net time 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 encoder							
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 185: 80SD100XS.C04X-13 - Registers in function model "Standard with SDC"

Register (dec.)	Name	Description	DT	Cyc.		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 185: 80SD100XS.C04X-13 - Registers in function model "Standard with SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.3.1.9 80SD100XS.C0XX-01 - Registers in function model "Standard with SDC"

Register (dec.)	Name	Description	DT	Cyc.		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 on channel 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	Net time 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 186: 80SD100XS.C0XX-01 - Registers in function model "Standard with SDC"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

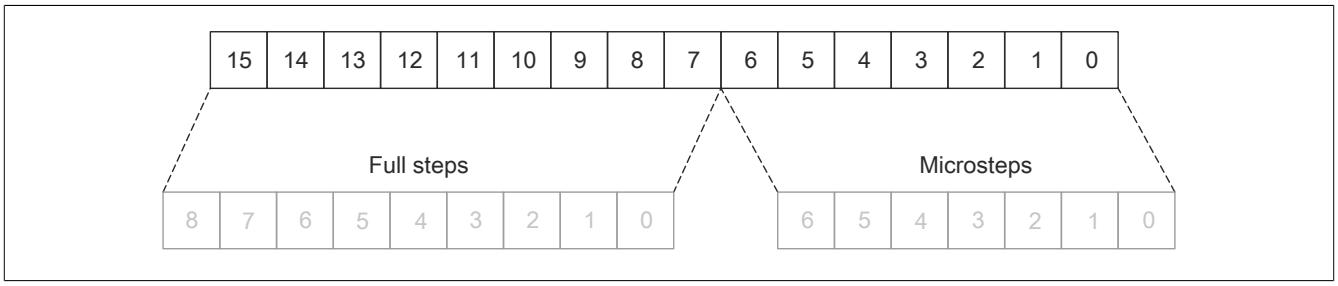
7.3.2 Registers for stepper motor control

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 266).

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 298).

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
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	

Bit	Description[1]	
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, then bit 15 is always 0, regardless of whether or not the power unit is supplied.

1) On ACOPOSmicro 1-channel models, 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 7.2.2.7 "Error acknowledgment / Digital output of motor brake" on page 266). 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 within the valid range.
- 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 7.2.2.1 "Position" on page 263) 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 7.2.2.5 "Holding current, nominal current, maximum current" on page 265) 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	**Function**
	0	No motor identifier available (after turning on for as long as the measurement conditions are not met)

Table 187: Notes about motor identification

Notes about motor identification	
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

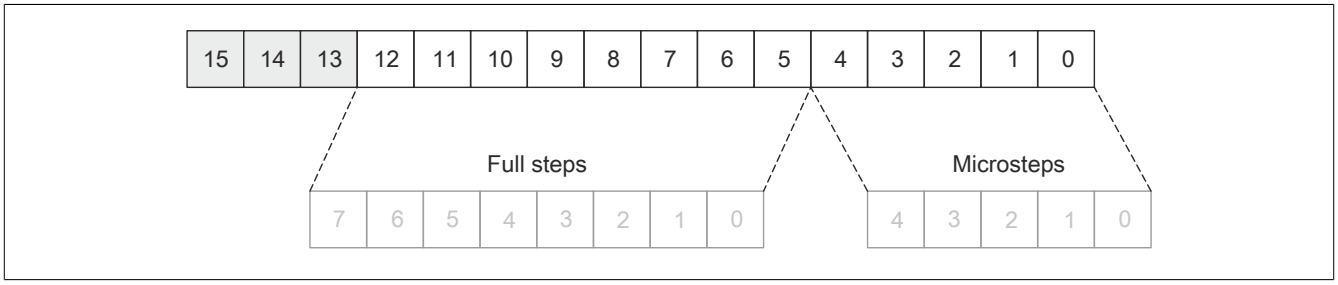
Table 187: Notes about motor identification

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 7.2.2.5 "Holding current, nominal current, maximum current" on page 265). 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 266 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 ... Maximum current 01 ... Nominal current 10 ... Holding current 11 ... Motor not powered

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 and 4 (see "Module configuration" on page 266). If only one transfer value (bits 3 and 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 266)		
	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 265).

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).

Supplying the motor with current:

In order to operate the motor, the DriveEnable bit must be set (evaluation is edge-sensitive).

The module provides the motor with current and sets the DrvOk bit after the motor settling time expires if no errors occur. If the DriveEnable bit is reset or an error occurs during operation, then the motor is shut down and DrvOk is set to FALSE.

Current can be reapplied to the motor on 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 265): 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 265 and "Position" on page 263.
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 267).

On ACOPOSmicro variants with an incremental encoder, setting bits 3 and/or 7 in the register Configuration of the incremental encoder (see page 298) exchanges the contents of this register with the register Latch of the incremental encoder (see page 298).

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 267).

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 298) and register Configuration of the incremental encoder (see 298)	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 298) and register Configuration of the incremental encoder (see 298)	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[1)]	
0	Switch the latch function on/off for the position register 0 … Falling edge: Switch off the latch function off for the position register 1 … Rising 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 rising edge of trigger input 1 10 ... Latch position on falling edge of trigger input 1 11 ... Reserved	
3	0 … Reserved	
4	Switch the latch function on/off for the position register 0 ... Falling edge: Switch off the latch function off for the position register 1 ... Rising 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 rising edge of trigger input 2 10 ... Latch position on falling 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).

7.3.2.13 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 (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 environmental conditions and the permissible output current range. The temperature cutoff serves only to protect the module hardware and must not be misused for operating the module beyond the specified range as this can reduce 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. 174 "Notes about motor identification" on page 264).

Bit	Description[1)]
0	0 ... No effect 1 ... Rising edge triggers motor ID measurement for motor 1
1	0 ... No effect 1 ... Rising 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 is used to configure a rotational speed (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 optimum concentricity 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 the value "0" does not make sense in the full step threshold register and is interpreted as disabling of 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 with an encoder

7.3.3.1 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 298).

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

7.3.3.2 Latch of the incremental encoder

The ABR counter is applied to this register when a latch event occurs (see "Latch trigger status" on page 267).

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 298).

	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

7.3.3.3 Control register for incremental encoder

Bit	Description[1)]
0	0 … Disables referencing of ABR counter 1 1 … Enables referencing of ABR counter 1 (rising edge enables referencing)
1 - 3	0 … Reserved
4	0 … Disables referencing of ABR counter 2 1 … Enables referencing of ABR counter 2 (rising 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)

7.3.3.4 Configuration of the incremental encoder

Bit		Description	
0 - 1	Configures referencing of ABR counter 1:		Encoder 1
	00	No referencing	
	01	Referencing on rising edge of the R signal	
	10	Referencing on falling edge of the R signal	
	11	Referencing immediately on rising edge of bit 0 of Control register for incremental encoder (see 298)	
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 rising edge of the R signal	
	10	Referencing on falling edge of the R signal	
	11	Referencing immediately on rising edge of bit 0 of Control register for incremental encoder (see 298)	
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):

Referencing of the ABR counter will always be configured using bits 0 - 2 or 4 - 6 of the ABR configuration register and enabled by a rising edge on 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.

7.3.3.5 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

7.3.4 Registers for ACOPOSmicro variants with additional digital inputs/outputs

7.3.4.1 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)			

7.3.4.2 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	

7.3.4.3 Counter

This register contains the current counter state. Different counters (event counter, ABR counter, etc) are available depending on the configuration.

7.3.4.4 Counter latch

The counter is applied to this register when the next latch event occurs (see ABR mode in "Counter configuration" on page 270).

7.3.4.5 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 3125 kHz
	10	External counter frequency (digital input 3)
	11	Reserved
2	0	Reserved
3 - 6	Counter mode:	
	0000	No counter
	0001	Event counter, rising edge
	0010	Event counter, falling edge
	0011	Event counter, both edges
	0100	Period measurement between two consecutive falling edges
	0101	Period measurement between two consecutive rising edges
	0110	Gate measurement of the LOW level
	0111	Gate measurement of the HIGH level
	1000	AB counter without referencing
	1001	ABR referencing with referencing Counter set to zero on rising edge of R
	1010	ABR referencing with referencing Counter set to zero on falling edge of R
	1011	ABR counter with immediate referencing Counter set to zero on rising edge of bit 2 of the counter control register
	1100	AB counter without referencing
	1101	ABR referencing with referencing Counter state applied to the counter latch register on rising edge of R
	1110	ABR referencing with referencing Counter state applied to the counter latch register on falling edge of R

Bit	Description	
	1111	ABR counter with immediate referencing Counter state applied to the counter latch register on rising 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

7.3.5 Registers for ACOPOSmicro variants with additional analog inputs

7.3.5.1 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

7.3.5.2 Analog input 1 / Analog input 2

These registers receive 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

7.3.6 Trace functionality for ACOPOSmicro variants with analog inputs

7.3.6.1 Trace registers

7.3.6.1.1 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.

7.3.6.1.2 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

7.3.6.1.3 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.

7.3.6.1.4 Number of triggers executed

This register contains the number of successfully executed trigger events (trace recordings).

7.3.6.1.5 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.

7.3.6.1.6 Trace trigger

This register can be used 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 rising edge (bit changes from 0 → 1).
1	Trigger for trace instance 2	
2-7	0 ... Reserved	

7.3.6.2 Trace runtime configuration

This section specifies how the trace runtime configuration is made in Automation Studio:

7.3.6.2.1 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 188: Order of trace data from two analog channels

7.3.6.2.2 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.

7.3.6.2.3 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) cannot be greater than 8192.

7.3.6.2.4 Block sizes for asynchronous data transfer (AsynSize)

A higher value here will result in faster data transfer from the module to the CPU.

7.3.6.2.5 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.

7.3.6.2.6 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 273).
Infinite	Infinite trace can be started with bit 0/1 of the register Trace trigger (see page 273). 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.

7.3.6.2.7 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

7.3.6.3 Trace library

The AsIoTrc library must be used to read the recorded trace data (see the Automation Studio help documentation 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 channel

Examples:

- Trace for trace instance 1: "SS1.IF1.ST1.TRC1"
- Trace for trace instance 2: "SS1.IF1.ST1.TRC2"

7.4 Ramp and CANIOBusController function models

The ramp function model is based on the CANopen communication profile DS402.

If an ACOPOSmicro module is operated on a bus controller, then the CANIOBusController function model is used. Aside from some minor differences (see footnotes in the register overview), the CANIOBusController and ramp function models are identical.

7.4.1 Register overviews

7.4.1.1 80SD100XD.C011-01 - Registers in function model "Ramp"

Register (dec.)		Name				Cyc.		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		Status of the digital inputs	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	Station 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 189: 80SD100XD.C011-01 - Registers in function model "Ramp"

Register (dec.)		Name				Cyc.		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 189: 80SD100XD.C011-01 - Registers in function model "Ramp"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.2 80SD100XD.C033-01 - Registers in function model "Ramp"

Register (dec.)		Name				Cyc.		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		Status of the digital inputs	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 190: 80SD100XD.C033-01 - Registers in function model "Ramp"

DT Data type of the register
Cyc. 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 - Registers in function model "Ramp"

Register (dec.)		Name				Cyc.		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		Status of the digital inputs	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 encoder									
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 191: 80SD100XD.C044-01, 80SD100XD.W044-01 - Registers in function model "Ramp"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.4 80SD100XD.C04X-13 - Registers in function model "Ramp"

Register (dec.)		Name				Cyc.		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		Status of the digital inputs	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 encoder									
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 192: 80SD100XD.C04X-13 - Registers in function model "Ramp"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register
(x) Some registers in the CANIOBusController function model fall within a different range (see values in parentheses).

7.4.1.5 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Registers in function model "Ramp"

Register (dec.)		Name				Cyc.		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		Status of the digital inputs	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 193: 80SD100XD.C0XX-01, 80SD100XD.W0XX-01 - Registers in function model "Ramp"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.6 80SD100XD.C0XX-21 - Registers in function model "Ramp"

Register (dec.)		Name				Cyc.		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		Status of the digital inputs	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 194: 80SD100XD.C0XX-21 - Registers in function model "Ramp"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register
(x) Some registers in the CANIOBusController function model fall within a different range (see values in parentheses).
(-) Some registers in the CANIOBusController function model are not available and marked as such.

7.4.1.7 80SD100XS.C04X-01 - Registers in function model "Ramp"

Register (dec.)	Name	Description	DT	Cyc.		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	Status of the digital inputs	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 encoder							
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 195: 80SD100XS.C04X-01 - Registers in function model "Ramp"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.1.8 80SD100XS.C04X-13 - Registers in function model "Ramp"

Register (dec.)	Name	Description	DT	Cyc.		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	Status of the digital inputs	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 encoder							
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 196: 80SD100XS.C04X-13 - Registers in function model "Ramp"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register
(x) Some registers in the CANIOBusController function model fall within a different range (see values in parentheses).

7.4.1.9 80SD100XS.C0XX-01 - Registers in function model "Ramp"

Register (dec.)	Name	Description	DT	Cyc.		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	Status of the digital inputs	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 197: 80SD100XS.C0XX-01 - Registers in function model "Ramp"

DT Data type of the register
Cyc. Cyclic reading (R) or writing (W) of register
Acyc. Acyclic reading (R) or writing (W) of register

7.4.2 Register for all ACOPOSmicro

7.4.2.1 Target position / Speed

This synchronous register is used to set position or speed, depending on the operating mode (see section "Mode" on page 317).

- **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

7.4.2.2 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 316 register).

7.4.2.3 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 motion profile generator: 00 ... 25 ms 01 ... 10 ms 10 ... 5 ms 11 ... Reserved The cycle time for the motion 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 higher. Older firmware versions have the cycle time for the motion profile generator set fixed to 25 ms.

7.4.2.4 Control word

This register can be used to send commands based on the module's state (see section "Ramp function model operation" on page 349).

Bit	Description[1)]	
0		Switch on
1		Enable voltage
2		Quick stop
3		Enable operation
4 - 6		Mode-specific[2)]
7		Fault reset
8		Stop[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.

<table>
<tr><th>Bit</th><th colspan="2">Description[1)]</th></tr>
<tr><td>12</td><td></td><td>Warning reset

0 ... No effect.
1 ... Rising edge: Resets any warnings.</td></tr>
<tr><td>13</td><td></td><td>Undercurrent detection

0 ... Disables current error detection (default).
1 ... Enables current error detection.</td></tr>
<tr><td>14</td><td>G</td><td>Contents of the Current position (cyclic/acyclic) registers:
<table>
<tr><th>Value</th><th>Register Current position (cyclic)</th><th>Current position (acyclic) register</th></tr>
<tr><td>0</td><td>Internal position counter</td><td>Encoder position</td></tr>
<tr><td>1</td><td>Encoder position</td><td>Internal position counter</td></tr>
</table>
Default setting: 0</td></tr>
<tr><td>15</td><td></td><td>0 … Reserved</td></tr>
</table>

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 317).

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 325).
4) The description of the *Current position (acyclic)* register can be found in the corresponding section for encoders:

- "Registers for incremental encoder" on page 335
- "Registers for HIPERFACE encoders" on page 336
- "Registers for SSI absolute encoders" on page 346

7.4.2.5 Status word

The bits in the *status word* represent the status of the *State machine* (see section "Ramp function model operation" on page 349).

<table>
<tr><th>Bit</th><th colspan="2">Description</th></tr>
<tr><td>0</td><td colspan="2">Ready to switch on</td></tr>
<tr><td>1</td><td colspan="2">Switched on</td></tr>
<tr><td>2</td><td colspan="2">Operation enabled</td></tr>
<tr><td>3</td><td colspan="2">Fault (error bit)</td></tr>
<tr><td>4</td><td colspan="2">Voltage enabled</td></tr>
<tr><td>5</td><td colspan="2">Quick stop</td></tr>
<tr><td>6</td><td colspan="2">Switch on disabled</td></tr>
<tr><td>7</td><td colspan="2">Warning</td></tr>
<tr><td>8</td><td colspan="2">Reserved</td></tr>
<tr><td>9</td><td colspan="2">Remote (always 1 since there is no local mode)</td></tr>
<tr><td>10</td><td colspan="2">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 (Halt) in the control word:
<table>
<tr><th>If Halt = 0</th><th>If Halt = 1</th></tr>
<tr><td>0 ... Target position not reached
1 ... Target position reached</td><td>0 ... Axis decelerating
1 ... Axis speed = 0</td></tr>
</table></td></tr>
<tr><td>11</td><td colspan="2">Internal limit active
0 ... Current position within software limits.
1 ... Software limit overflow or underflow</td></tr>
<tr><td>12</td><td colspan="2">Setpoint acknowledge[1)]
0 ... Ramp generator did not apply the position value
1 ... Ramp generator applied the position value</td></tr>
<tr><td>13 - 15</td><td colspan="2">Reserved</td></tr>
</table>

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 317.

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	-

7.4.2.6 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 316), the position mode behaves as follows: • Position mode without extended control word: Move to target position as soon as the target position changes (see "Mode 1: Position mode without extended control word" on page 318). • "Position mode with extended control word" on page 318: Move to target position as explained in corresponding section "Position mode with extended control word" on page 318.
2	Speed mode: Constant speed
-120	Set reference 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 324)
-128	Negative homing (see also "Homing configuration" on page 324)

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 317).

A new position or speed can be specified even before the current action is finished.

7.4.2.6.1 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 316).

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)

7.4.2.6.2 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 316).

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*)

7.4.2.6.2.1 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 316
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 316

7.4.2.6.2.2 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 317
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 317

7.4.2.6.2.3 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.

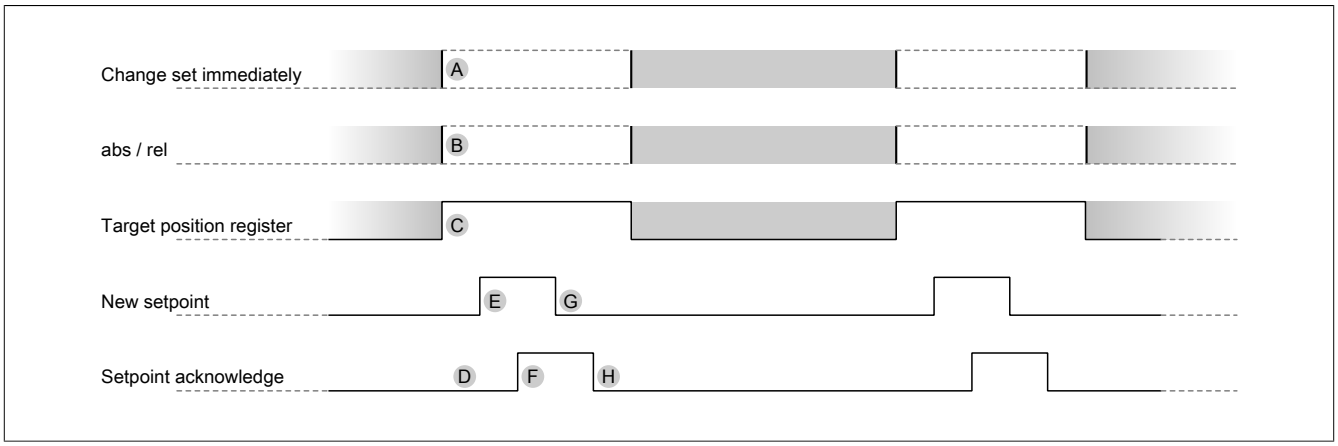
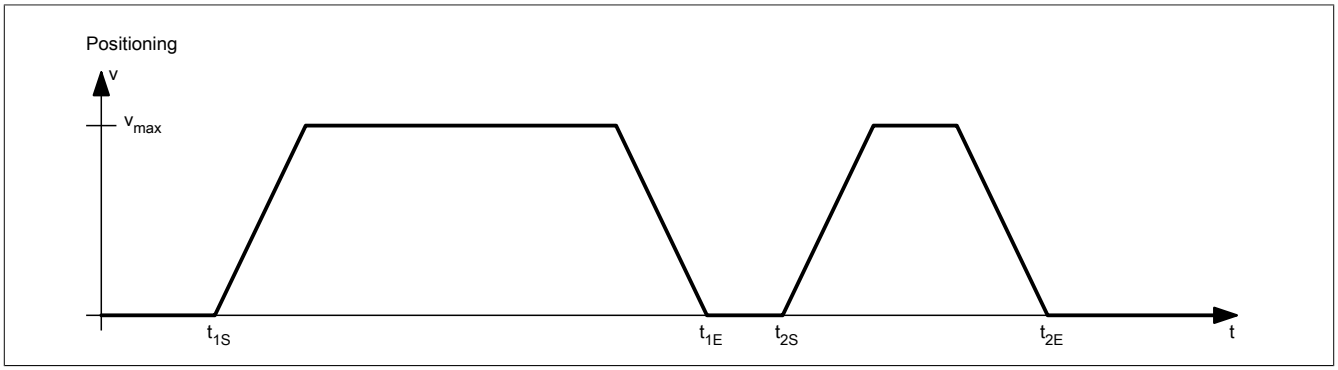


Figure 55: Specifying the target position

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 the *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.

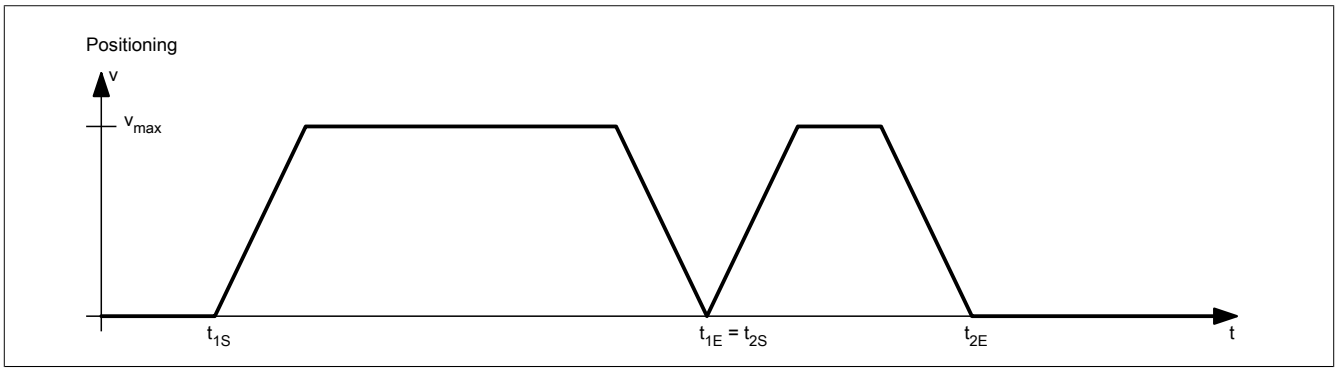
7.4.2.6.2.4 Examples of position specifications

"Single setpoint" and *Change set immediately* = 0



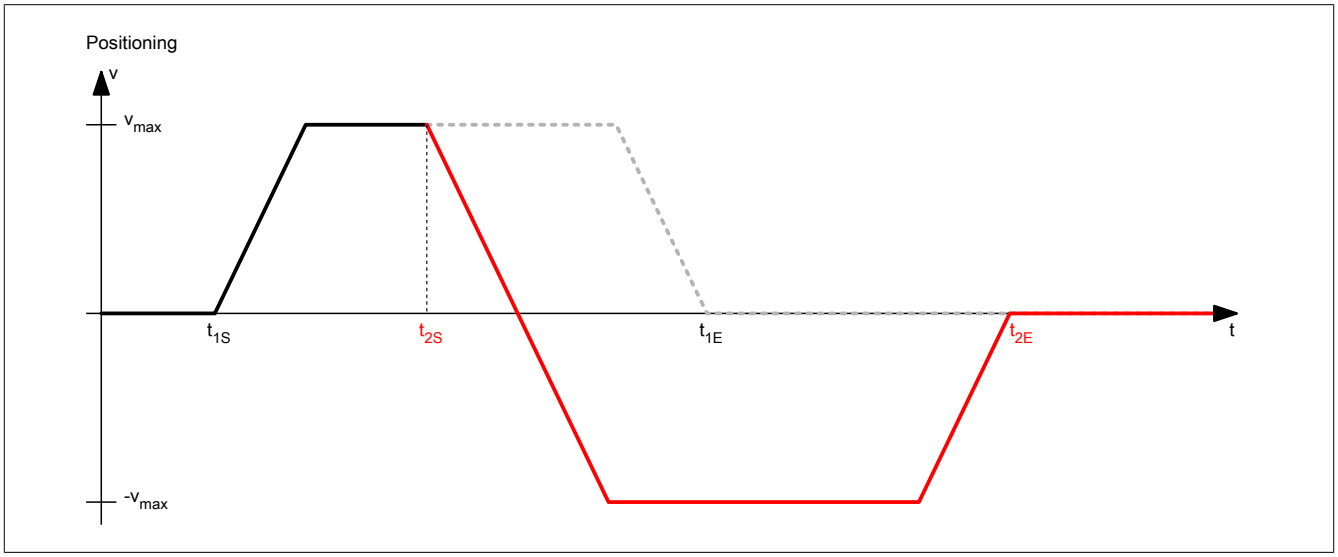
Two target positions are specified in this example. The application only specifies the second position after the first positioning sequence is completed (*Target reached* = 1).

"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.

7.4.2.6.3 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.

7.4.2.6.4 Mode -120: Sets the home position[4)]

The current value for the actual position is modified so that the position specified in the *Target position* register is the home position. If you subsequently move to this position, the motor is at the home position.

The home position of the internal position counter in the *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.

4) Firmware version 100 and higher.

7.4.2.6.5 Mode -121: Remaining distance mode (like mode 1)

On a rising/falling edge of the corresponding digital input, the number of steps defined in the "Fixed position A" register 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 324) determines whether a rising or falling edge of the digital input is used as the trigger.

7.4.2.6.6 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.

7.4.2.6.7 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.

7.4.2.6.8 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.

7.4.2.6.9 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:

- Mode -125: *Fixed position A*
- Mode -126: *Fixed position B*

7.4.2.6.10 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.

7.4.2.7 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 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.

7.4.2.8 Status of the digital inputs

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.

7.4.2.9 U_{DC} DC bus voltage

This register contains the current supply voltage of the power unit (DC bus voltage).

Unit: V

7.4.2.10 Temperature of the power output stage

This register contains the current temperature of the power output stage.

Unit: °C

7.4.2.11 Temperature

This register contains the current module temperature.

Unit: °C

7.4.2.12 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. This is done according to the following priority regardless of the actual defined values: maximum current before rated current before holding current.

7.4.2.13 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

7.4.2.14 Maximum acceleration

Maximum acceleration (also applies to referencing modes).

Unit: Microsteps/cycle²

7.4.2.15 Maximum deceleration

Maximum deceleration (also applies to referencing modes).

Unit: Microsteps/cycle²

7.4.2.16 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.

7.4.2.17 Fixed position A

Position to move to in modes -124 (when the digital input is set to 1) and -125.

7.4.2.18 Fixed position B

Position to move to in modes -124 (when 0 is set at the digital input) and -126.

7.4.2.19 Homing speed

Speed for referencing modes (-127 and -128).

Unit: Microsteps/cycle

7.4.2.20 Homing configuration

Value (dec.)	Description
-121	Referencing on rising edge of the digital input[1)]
-122	Referencing on falling edge of the digital input[1)]
-123	Referencing on rising edge of the R input[2)]
-124	Referencing on falling edge of the R input[2)]
-125	Referencing on rising edge of the digital input[3)]
-126	Referencing on falling 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)

7.4.2.21 Full step threshold

This register configures a rotational speed (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 optimum concentricity 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:

$$T^{-1} = \frac{500\ \text{Steps/second}}{200\ \text{Steps/revolution}} = 2.5 \cdot \frac{\text{Revolutions}}{\text{Second}} = 150\ \text{min}^{-1}$$

7.4.2.22 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).

7.4.2.23 Control word (read back)

Reads back the register Control word register (see page 316).

7.4.2.24 Mode (read back)

Reads back the register Mode register (see page 317).

7.4.2.25 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

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 316) 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 323) 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

[5)] Firmware version 100 and higher. Older firmware versions can only use max. 16 FIFO elements.

Measured values (motor identification register)	Description
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).

7.4.2.26 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 316).

7.4.2.27 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.

7.4.2.28 Limit switch configuration 1/2

These two registers configure the two digital inputs 1 and 2 as negative or positive limit switches:

Bit	Name
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. The "Device Control State Machine" state is not changed. 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.

7.4.2.29 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.

7.4.2.30 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**

7.4.3 Register for additional digital inputs/outputs

7.4.3.1 Counter

This register contains the current counter state. Different counters (event counter, ABR counter, etc) are available depending on the configuration.

7.4.3.2 Counter latch

The counter is applied to this register when a latch event occurs (see counter mode in "Counter configuration" on page 330).

7.4.3.3 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)		

7.4.3.4 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

7.4.3.5 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, rising edge 0010 ... Event counter, falling edge 0011 ... Event counter, both edges 0100 ... Period measurement between two consecutive falling edges 0101 ... Period measurement between two consecutive rising edges 0110 ... Gate measurement of the LOW level 0111 ... Gate measurement of the HIGH level 1000 ... AB counter without referencing 1001 ... ABR referencing with referencing Counter set to zero on rising edge of R 1010 ... ABR referencing with referencing Counter set to zero on falling edge of R 1011 ... ABR counter with immediate referencing Counter set to zero on rising edge of bit 2 of the counter control register 1100 ... AB counter without referencing 1101 ... ABR referencing with referencing Counter state applied to the counter latch register on rising edge of R 1110 ... ABR referencing with referencing Counter state applied to the counter latch register on falling edge of R 1111 ... ABR counter with immediate referencing Counter state applied to the counter latch register on rising 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

7.4.4 Registers for additional analog inputs

7.4.4.1 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 < -10V	-32,767	0x8001
Invalid value	-32,768	0x8000

7.4.4.2 Analog input 1 / Analog input 2

These registers receive the analog value of the corresponding input.

Measurement range:

Input voltage	Value of the register
+10 V	+32,767
:	:
-10 V	-32,768

7.4.5 Trace functions for additional analog inputs

The trace function is not available in the CANIOBusController function model.

7.4.5.1 Trace register

7.4.5.1.1 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.

7.4.5.1.2 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

7.4.5.1.3 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.

7.4.5.1.4 Number of triggers executed

This register contains the number of successfully executed trigger events (trace recordings).

7.4.5.1.5 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.

7.4.5.1.6 Trace trigger

This register can be used 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 rising edge (bit changes from 0 → 1).
1	Trigger for analog input 2	
2-7	0 ... Reserved	

7.4.5.2 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 198: 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 332).
Infinite	Infinite trace can be started with bit 0/1 of the register Trace trigger(see 332). 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

7.4.5.3 Trace library

The AsIoTrc library must be used to read the recorded trace data (see the Automation Studio help documentation 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 instance 1: "SS1.IF1.ST1.TRC1"
- Trace instance 2: "SS1.IF1.ST1.TRC2"

7.4.6 Registers for incremental encoder

7.4.6.1 Encoder temperature limit

Temperature limit value of the encoder in °C. Monitoring is switched off at 0.

Adjustment 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.

7.4.6.2 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 316).

7.4.6.3 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 316).

7.4.6.4 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.

7.4.7 Registers for HIPERFACE encoders

7.4.7.1 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 316).

7.4.7.2 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.

7.4.7.2.1 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	Value	Information
UINT	0 to 1500	Values in mV, bus controller default setting: 800

7.4.7.2.2 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	Value	Information
UINT	0 to 1500	Values in mV, bus controller default setting: 1200

7.4.7.2.3 SinCosQuitTime

Names (pChannelName):
SinCosQuitTime

If an error is detected on the analog interface, the last correctly read values remain valid. An interval can be defined 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	Value	Information
UDINT	0 to 20000000	Values in µs, bus controller default setting: 100000

7.4.7.3 HIPERFACE - Digital interface configuration

HIPERFACE builds upon the RS-485 (EIA-485) specification and permits communication with multiple HIPERFACE slaves.

7.4.7.3.1 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	Value	Information
UDINT	1200, 2400, 4800, 9600, 19200, 38400	Baud, bus controller default: 9600

7.4.7.3.2 HfParity

Name:
HfParity

This register configures the parity bit for the interface.

Data type	Value	Information
USINT	69	E → even parity bit; bus controller default
	78	N → no parity bit
	79	O → odd parity bit

7.4.7.3.3 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	Value	Information
USINT	1 to 255	Char, bus controller default: 55

7.4.7.3.4 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	Value	Information
USINT	0	Operation without sine/cosine track
	64 to 95	Open address range for max. 32 HIPERFACE slaves
	255	Broadcast address; bus controller default

7.4.7.3.5 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	Value	Information
USINT	8 to 32	Bus controller default: 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).

7.4.7.4 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. Detailed information regarding the errors that can be detected in this way can be found in the encoder's manual.

7.4.7.4.1 HfErrorCounter

Name:
HfErrorCounter

Error counter: This register is increased by 1 for each error on the HIPERFACE interface.

7.4.7.4.2 HfErrorStationAdress

Name: HfErrorStationAdress

The station address of the HIPERFACE slave where the last error occurred is output in this register.

7.4.7.4.3 HfErrorCommand

Name:
HfErrorCommand

The command that caused the error on the slave is output in this register.

7.4.7.4.4 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.

7.4.7.5 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.

7.4.7.5.1 HfAdrIdent

Name:
HfAdrIdent

This register is used to specify the address of the HIPERFACE slave whose parameter should be read by the module.

Data type	Value	Information
USINT	0	Identification disabled, bus controller default: 0
	64 to 95	Open address range for max. 32 HIPERFACE slaves
	255	Broadcast address (when operating with one slave)

7.4.7.5.2 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 341 register.

Data type	Value	Value
USINT	0	Serial number; bus controller default
	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.

7.4.7.5.3 HfIdentOk

Name:
HfIdentOk

This register's bits provide information about the validity of the latest ID values in temporary storage.

Data type	Value
USINT	See bit structure.

Bit structure:

Bit	Name	Value	Information
0	HfIdentOk01	0	Parameter 01 invalid
		1	Parameter 01 valid
1 - 7	Reserved	-	

7.4.7.5.4 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	Value
USINT	See bit structure.

Bit structure:

Bit	Name	Value	Information
0 - 2	Speed code	001	1200 baud
		010	2400 baud
		011	4800 baud
		100	9600 baud; bus controller default
		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)

7.4.7.5.5 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	Value
USINT	0 to 255

7.4.7.5.6 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	Value	Value
USINT	0 to 255	16-byte blocks

7.4.7.5.7 HfOptionFlags

Name:
HfOptionFlags

This register is used to store slave-specific hardware and software settings.

Data type	Value
USINT	0 to 255

7.4.7.5.8 HfFreeMemory

Name:
HfFreeMemory

This register is used to indicate the number of free 16-byte blocks remaining on the HIPERFACE slave.

Data type	Value	Information
USINT	0 to 255	16-byte blocks

7.4.7.5.9 HfDataFields

Name:
HfDataFields

This register is used to indicate the number of data fields that have been written thus far.

Data type	Value
USINT	0 to 255

7.4.7.5.10 HfExtByte

Name:
HfExtByte01 to HfExtByte10

These registers provide the respective parameters according to how the "HfSelectionIdent" on page 339 register is configured.

Data type	Value
USINT	0 to 255

7.4.7.6 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.

7.4.7.6.1 AddPosAdr

Name:
AddPosAdr01 to AddPosAdr02

These registers specify the addresses of the HIPERFACE slaves whose position values should be processed in the module.

Data type	Value	Information
USINT	0	Additional encoder position disabled; bus controller default
	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.

7.4.7.6.2 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	Value
USINT	See bit structure.

Bit structure:

Bit	Name	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	-	

7.4.7.6.3 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	Value
DINT	-2147483648 to 2147483647
INT	-32768 to 32767

7.4.7.6.4 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	Value	Information
DINT	-2147483648 to 2147483647	NetTime in µs
INT	-32768 to 32767	

7.4.7.7 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.

7.4.7.7.1 AnalogAdrCh

Name:
AnalogAdrCh01 to AnalogAdrCh04

These registers specify the addresses of the HIPERFACE slaves whose analog values 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	Value	Information
USINT	0	Additional analog values disabled; bus controller default
	64 to 95	Open address range for max. 32 HIPERFACE slaves
	255	Broadcast address (when operating with one slave)

7.4.7.7.2 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	Value
USINT	See encoder data sheet Bus controller default: 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.

7.4.7.7.3 AnalogChOk (byte)

Name:
AnalogChOk01 to AnalogChOk04

This register's bits provide information about the validity of the values in temporary storage.

Data type	Value
USINT	See bit structure.

Bit structure:

Bit	Name	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	-	

7.4.7.7.4 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	Value
UINT	0 to 65535
INT	-32768 to 32767

7.4.7.7.5 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	Value	Information
DINT	-2147483648 to 2147483647	Time in µs
INT	-32768 to 32767	

7.4.8 Registers for SSI absolute encoders

7.4.8.1 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 316).

7.4.8.2 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

7.4.8.3 EncoderConfiguration

Name:
EncoderConfiguration

Asynchronous configuration register for the SSI encoder input.

Bit	Name	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.

7.4.8.4 TotalSSIBitLength

Name:
TotalSSIBitLength

Total number of bits to be sent in a frame, including leading zeros for SSI. Without parity bit.

Maximum value: 32

7.4.8.5 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.

7.4.8.6 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 need to 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

7.4.8.7 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.

7.4.8.8 SSIHwVer

Name:
SSIHwVer

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can be used to read the hardware version of the encoder.

7.4.8.9 SSIFwVer

Name:
SSIFwVer

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can be used to read the firmware version of the encoder.

7.4.8.10 SSISerNr

Name:
SSISerNr

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can be used to read the serial number of the stepper motor with an encoder.

7.4.8.11 SSINominalCurrent

Name:
SSINominalCurrent

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can be used to read the rated current of the stepper motor.

Information:

The nominal current is specified in 1/10 A.

7.4.8.12 SSIMotorID

Name:
SSIMotorID

If a B&R stepper motor with SSI encoder (80MPXX.XXXX113-01) is used, this register can be used to read the module ID of the stepper motor with an encoder.

7.4.9 Ramp function model operation

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 317). The function mode (absolute position, constant speed, referencing, etc.) is set in the Mode register (see section "Mode" on page 317).

7.4.9.1 Control word

Control word bits and their state for the commands of the state machine:

Com-mand	Reserved	Encoder position sync/async	Undercurrent detection	Warning reset	Motor ID trigger	Reserved	Reserved	Stop	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**
Shut-down	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 opera-tion	x	x	x	x	x	x	x	x	0	x	x	x	0	1	1	1
Enable opera-tion	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
ACOPOS cro vari-ant[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 351) 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 351)
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.

7.4.9.2 Status word

The individual bits of the Status word register (see section "Status word" on page 317) 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 351).
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 326). 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

7.4.9.3 State machine

The motor is controlled according to the state machine illustrated below. After the module is started, the state machine automatically changes to the 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 349).

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 317) until the "*Operation enable*" state.

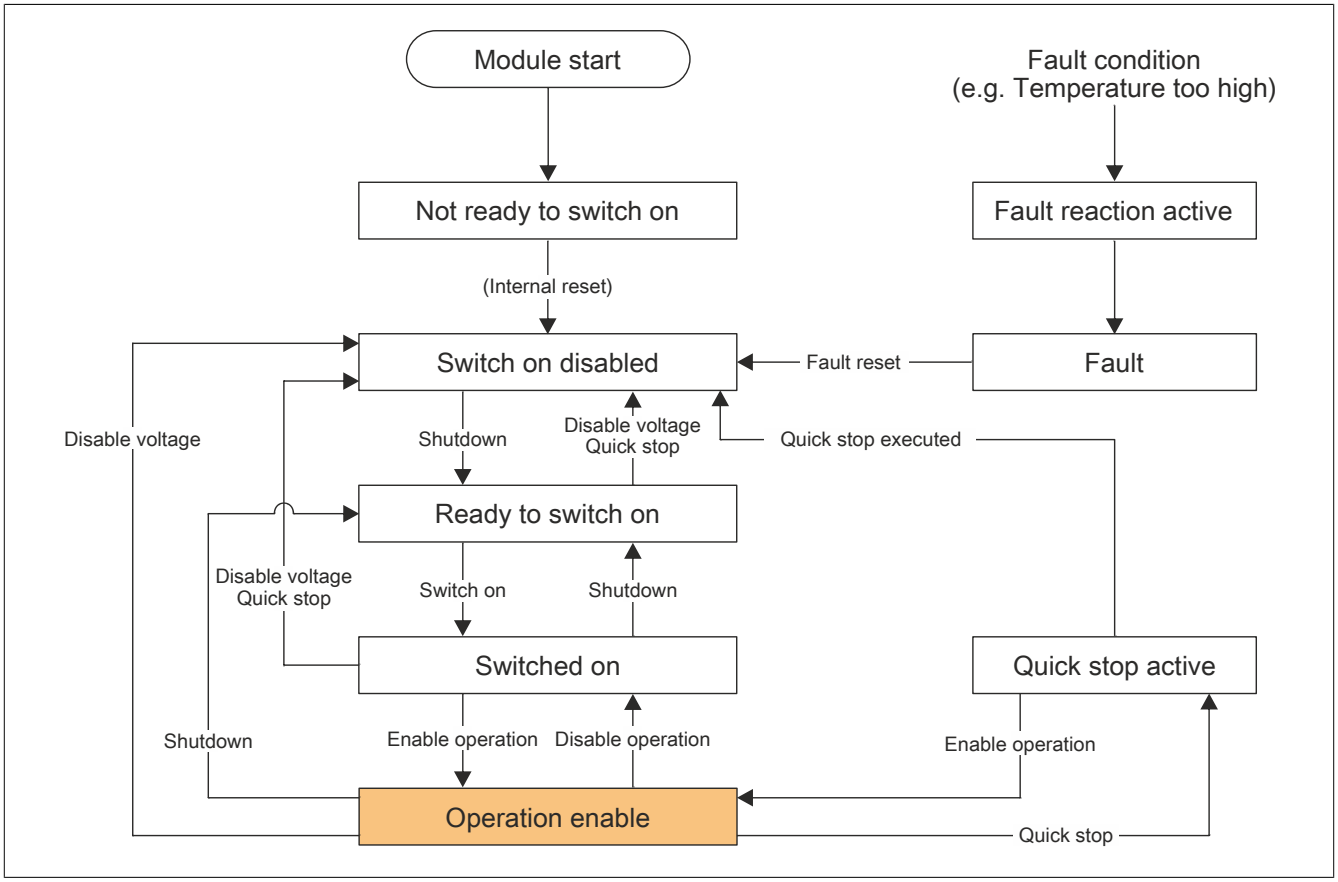


Figure 56: State machine - Flow chart

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 brought on by the *Shutdown* command. 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 brought on by the *Shutdown* command. 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 brought on by the *Shutdown* command. The motor voltage is switched off immediately.

Table 199: 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 the *Quick stop active* state. Once the motor is at standstill, the state automatically changes to the *Switch on disabled* state. 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 326). (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 326). 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 199: 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:

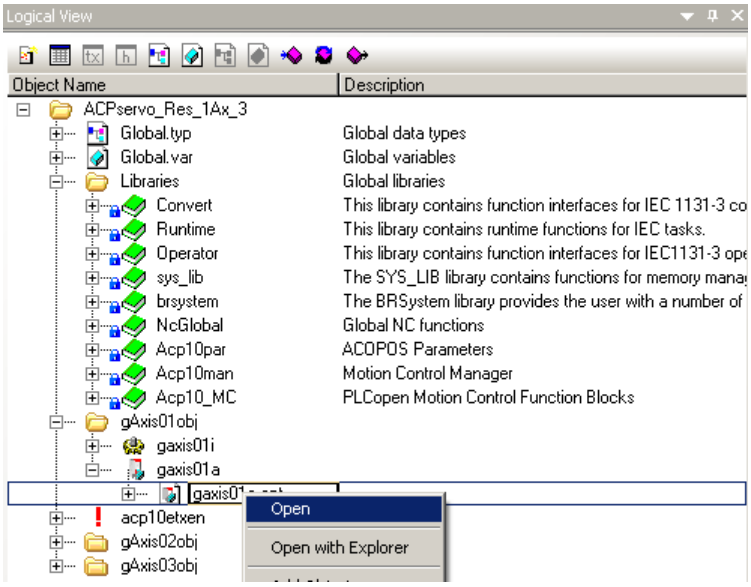
ACOPOSmicro	Automation Studio	ACP10 software	40 kHz switching frequency possible
80VD100PD.C000-01	3.0.81.SP3 or later	2.250 or later	Beginning with hardware revision F3 and ACP10 3.150
80VD100PD.C000-14	3.0.81 SP3 or later	2.380 or later	Beginning with hardware revision C3 and ACP10 3.150
80VD100PD.C022-01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

1 If the parameter group is added manually, see "Adding parameter groups manually" on page 353.

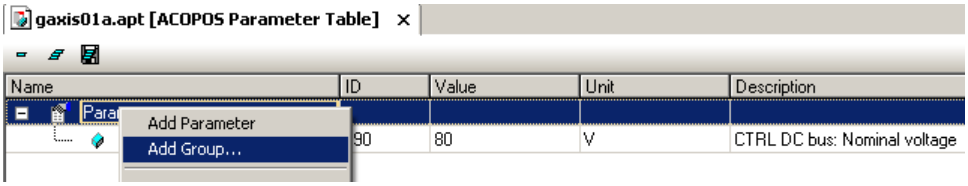
8.1.1 Adding parameter groups manually

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:

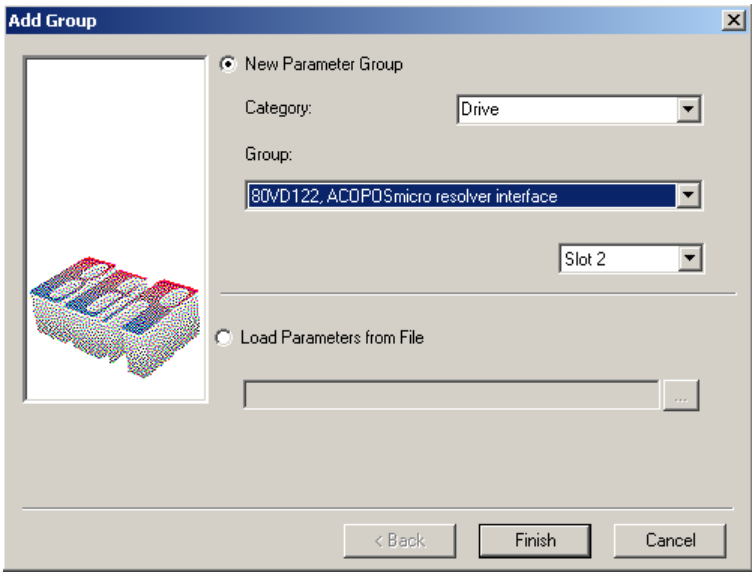
1. In the Logical View:
   Right-click on the respective axis parameter to open its shortcut menu, then select "Open":



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 the "Add group" window:
   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 permitted range has been exceeded on an encoder where multi-turn overflow monitoring is enabled.
Disturbances will trigger error 39025.

8.2.2.3.4 Voltage supply failure

An error occurred in the voltage 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

The battery needs to be changed.

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

Incomplete initialization will trigger error 7022.

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	Function	= 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
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
Voltage supply 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 defines how far the cycle time of the X2X Link bus can be reduced without causing a communication error or impaired functionality. 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 200: Power supply module - Minimum cycle time

9.2 Standard function model

9.2.1 Overview of registers

Register (dec.)	Channel name	Description	DT	Cyc.		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				●
1282	TempBleeder01	Calculated braking resistor temperature (T_B)	INT			●	

Table 201: Register overview - Standard function model

*) Key: DT ... Data type, cycl. ... Cyclic, Acyc. ... 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 117 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 higher.

9.2.9 VoltageSet01

Voltage reference for the power output:

Value of VoltageSet01	Voltage
24 to 80	24 VDC to 80 VDC

Important!

If multiple power supplies are connected to each other, they must first be configured for parallel operation. Only then can the output 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 115).

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 1000000	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

9.3 Function model: CANIOBusController

9.3.1 Overview of registers

Register (dec.)	Channel name	Description	DT	Cyc.		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				●
1282	TempBleeder01	Calculated braking resistor temperature (T_B)	INT			●	

Table 202: Register overview - CANIOBusController function model

*) Key: DT ... Data type, cycl. ... Cyclic, Acyc. ... Acyclic, R ... Read; W ... Write

10 Safety technology [V1.21]

10.1 History of chapter "ACOPOSmicro safety technology"

Version	Date	Comment
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 "Enable input circuits in accordance with Safety Category 3 / SIL 2 / PL d and functionality (STO, SS1, SS2, SLS, SOS)", including subsections. • Added section "B&R modules with safe outputs". • Editorial changes.

Table 203: History of chapter "Safety technology"

10.2 Standard safety technology ("hardwired safety technology")

Danger!

Particularly in the area of safety technology, the specifications listed in the latest version of this user's manual on the B&R website (www.br-automation.com) are always valid! 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 consideration 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.

Safety-related products are only permitted to be operated by qualified personnel who, because of their training, experience and instruction combined with their knowledge of relevant standards, regulations, accident prevention guidelines and operating conditions, are qualified to carry out essential tasks and recognize and avoid potentially dangerous situations. Consideration of and adherence to industry standards, safety regulations, operating conditions, etc. that apply to the end product are the sole responsibility of the customer, as is the functionality of the supplied contractual product as part of the end 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 in accordance with EN ISO 13849-1:2008	CAT 3
Maximum performance level in accordance with EN ISO 13849-1:2008	PL d
Maximum safety integrity level in accordance with IEC 62061:2010	SIL 2
Maximum safety integrity level in accordance with 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 204: 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 205: 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 in accordance with 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 in accordance with 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 voltage 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

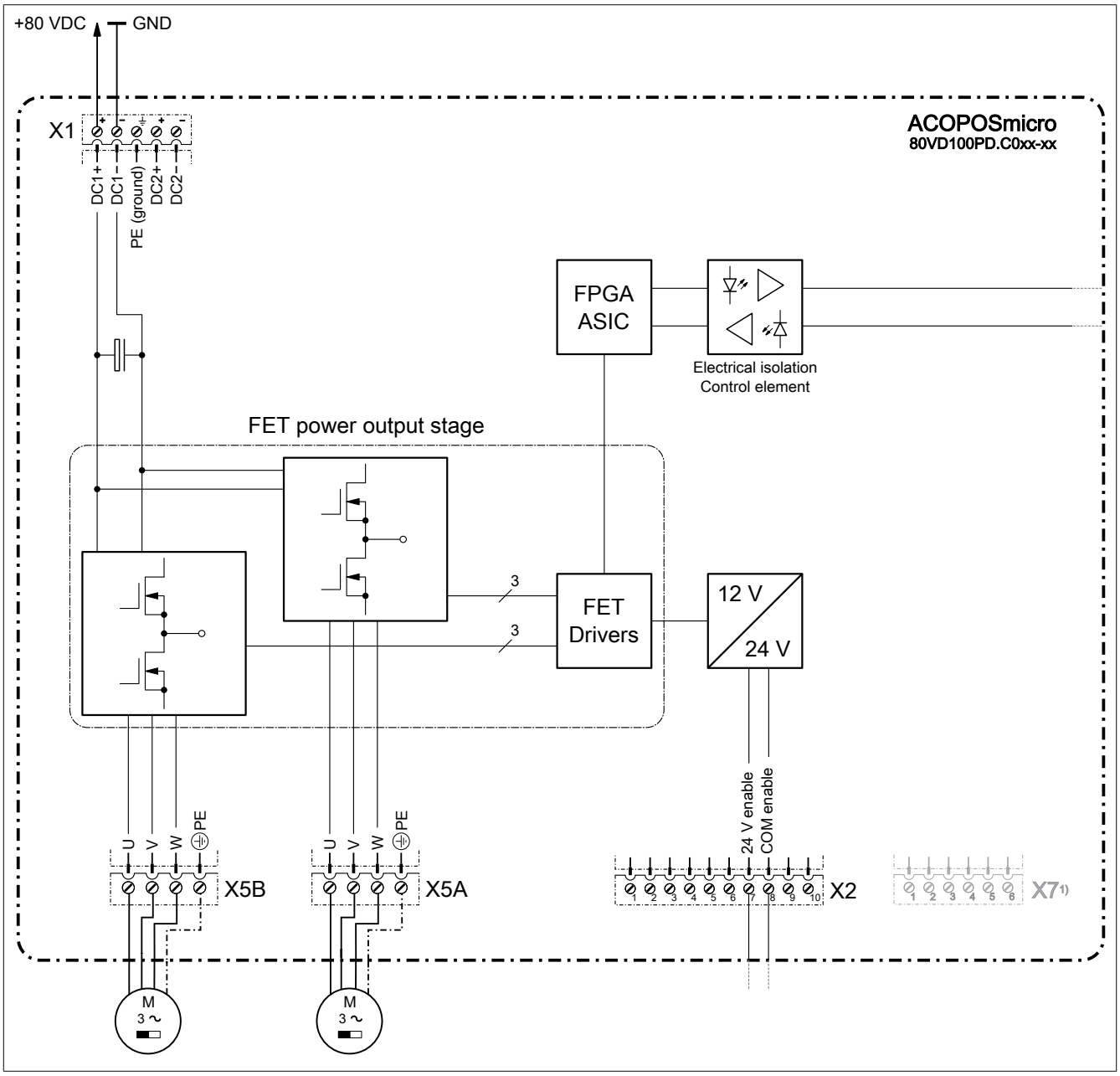


Figure 57: 2-axis inverter module - Block diagram for safe pulse disabling

1) The X7 connection is only relevant for 80VD100PD.C000-14 and 80VD100PD.C022-14 modules.

2-axis stepper motor modules

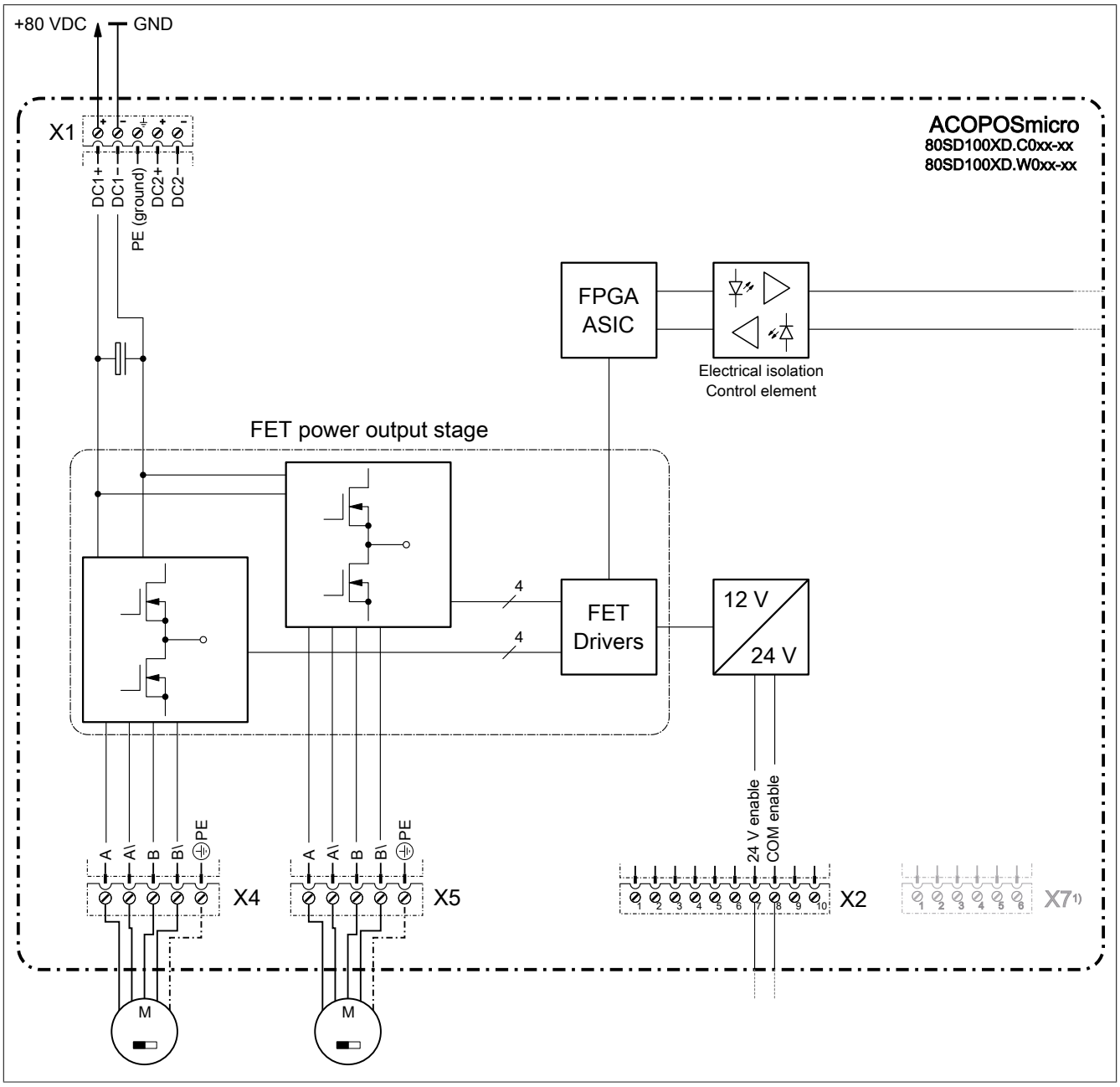


Figure 58: 2-axis stepper motor module - Block diagram for safe pulse disabling

1) The X7 connection is only relevant for 80SD100XD.C04X-13 and 80SD100XD.C0XX-21 modules.

1-axis inverter module

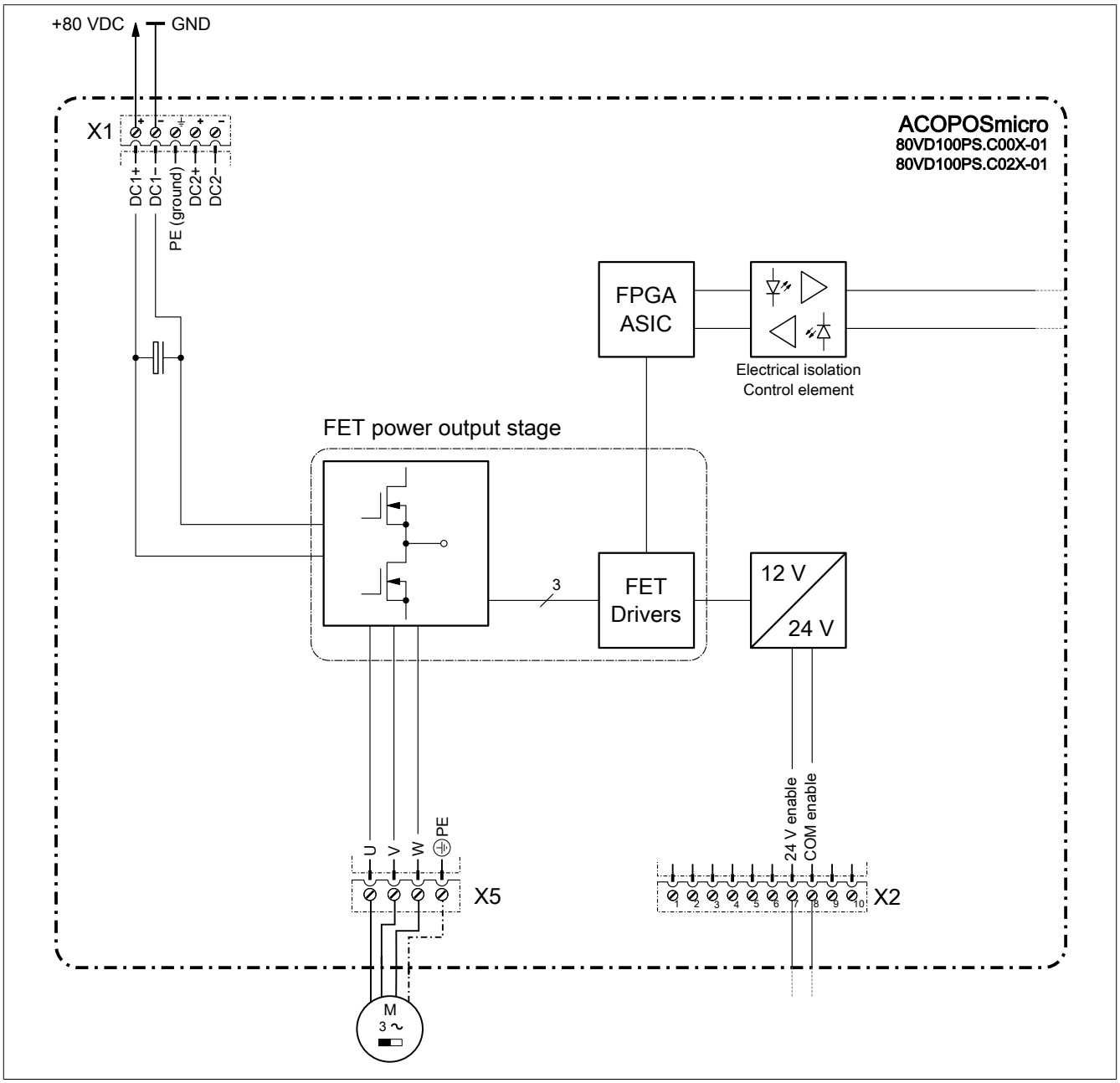


Figure 59: 1-axis inverter module - Block diagram for safe pulse disabling

1-axis stepper motor modules

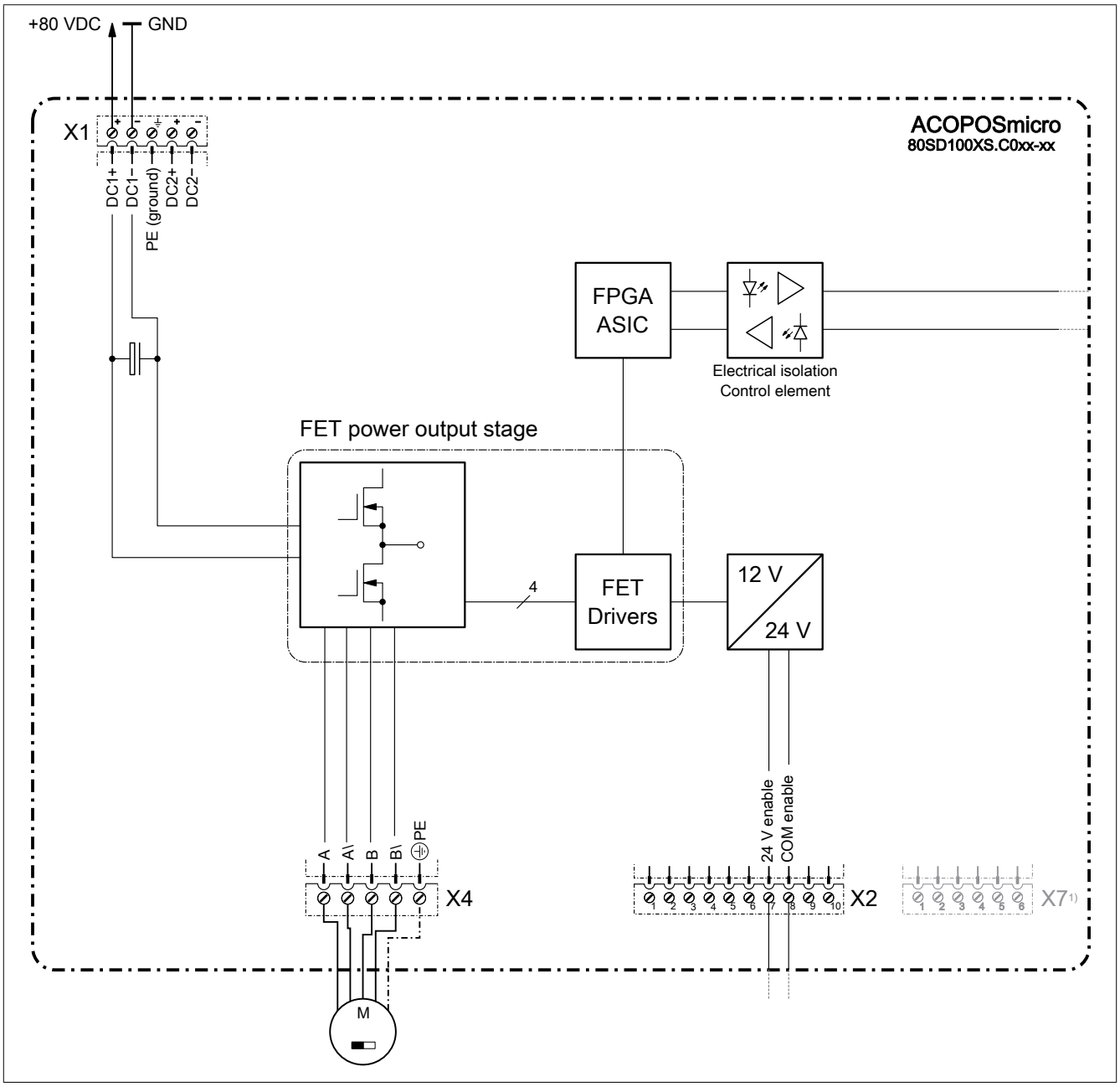


Figure 60: 1-axis stepper motor module - Block diagram for safe pulse disabling

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 hanging 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!

Operating outside of technical data specifications is not permitted and can result in dangerous situations.

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 input can be found in the technical data for the respective ACOPOSmicro system.

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 in accordance with 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 in accordance with 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).

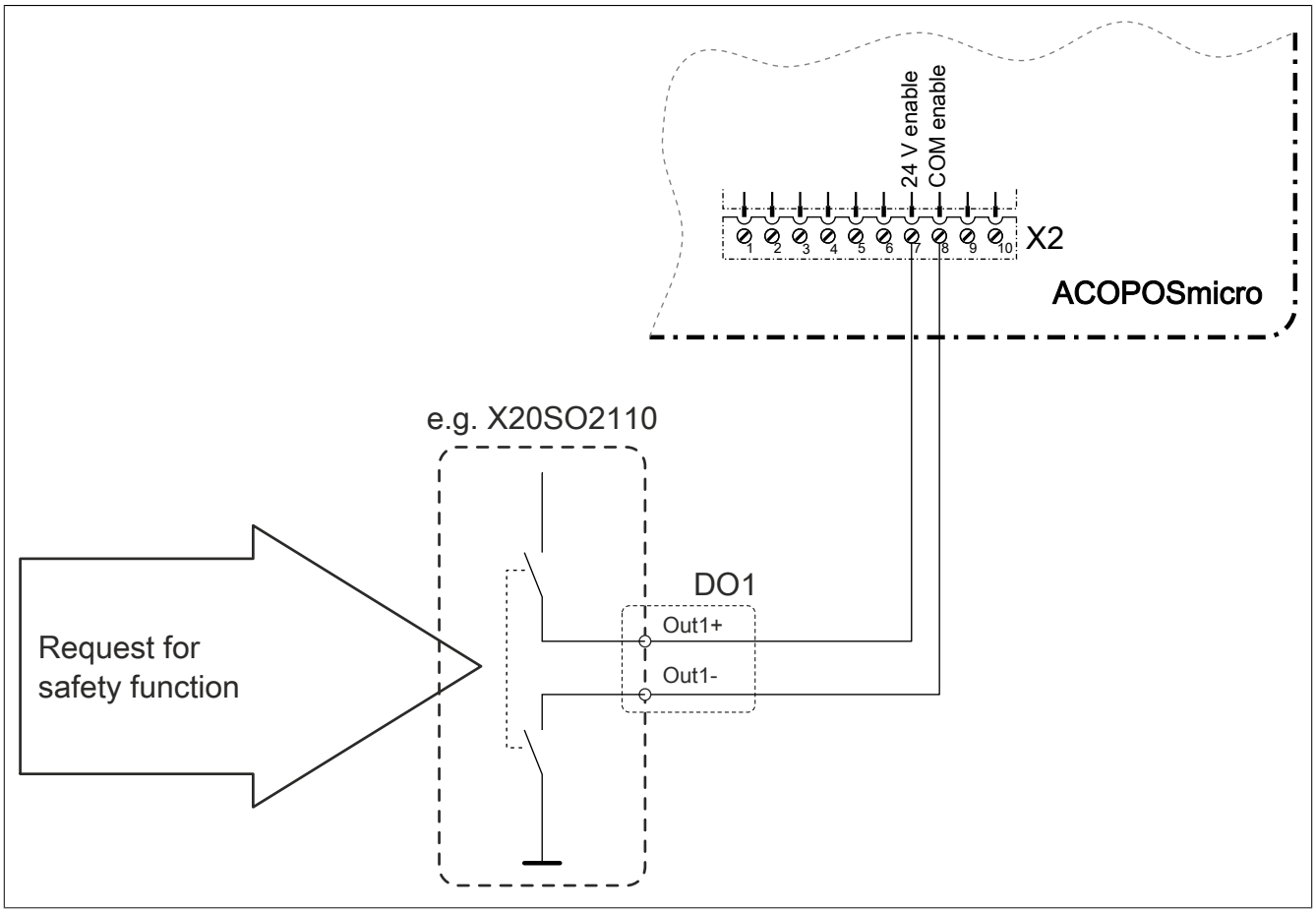


Figure 61: STO, category 3 / SIL 2 / PL d (variant A)

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).

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 206: Applicable standards for the ACOPOSmicro

The limit values specified from section 11.3 "Environmental limits" to section 11.6 "Additional environmental limit values in accordance with EN 61800-2" are taken from product standard EN/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 in accordance with 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 207: 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 208: Mechanical conditions during transport

11.3.2 Climate conditions in accordance with 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 209: 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 210: Climate conditions during storage - Temperature

IEC 60721-3-1, class 1K3	
	EN 61800-2
Relative humidity during storage	5% - 95%, non-condensing

Table 211: 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 212: 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 in accordance with EN 61800-3

These immunity tests are applicable for industrial environments (2nd environment).

11.4.2.1 Electrostatic discharge

Tests in accordance with 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 213: Limit values for electrical discharge

11.4.2.2 Electromagnetic fields

Tests in accordance with 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 214: Limit values for electromagnetic fields

11.4.2.3 Burst

Tests in accordance with 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 215: Limit values for burst

11.4.2.4 Surge

Tests in accordance with 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 216: 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

Tests in accordance with 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 217: Limit values for high-frequency conducted disturbances

11.5 Requirements for emissions (EMC)

11.5.1 High-frequency emissions in accordance with 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

Tests in accordance with EN 55011			
Continuous current on motor	**Frequency range [MHz]**	**Quasi-peak value**	**Average**
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 218: 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

Tests in accordance with 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 219: 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 in accordance with EN 61800-2

	EN 61800-2
Pollution degree in accordance with EN 61800-2, 4.1.2.1.	2 (non-conductive pollution)
Overvoltage category in accordance with IEC 60364-4-443:1999	III
EN 60529 protection	IP20
Reduction of the continuous current at installation elevations over 500 m above sea level	10% per 1000 m
Maximum installation elevation	2000 m[1)]

Table 220: Additional environmental limit values

1) Requirements that go beyond this must be arranged with B&R.

11.7 International certifications

B&R products and services comply with applicable standards. This includes 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 are committed to ensuring the reliability of our products in an industrial environment.

	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 systems in these regions.
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 221: International certifications

12 EC declaration of conformity

This document was originally written in the German language. The German edition therefore represents the original instruction manual in accordance with the 2006/42/EC machinery directive. Documents in other languages are to be interpreted as translations of the original instruction manual.

Product manufacturer:

Bernecker + Rainer

Industrie-Elektronik Ges.m.b.H.

B&R Strasse 1

5142 Eggelsberg

AUSTRIA

The EC declarations of conformity for B&R products can be downloaded from the B&R website at www.br-automation.com.

Appendix A Abbreviations

A.1 General information

Abbreviations appear throughout the user's manual, for example in data tables or descriptions of pinouts.

A.2 Overview

Abbreviation	Stands for	Description
NC	Normally closed	Normally closed relay contact.
	Not connected	Used in pinout descriptions if a terminal or pin is not connected to a module.
ND	Not defined	In data tables, this stands for a value that has not been defined. This may be because a cable manufacturer does not provide certain technical data, for example.
NO	Normally open	Normally open relay contact.
TBD	To be defined	Used in technical data tables when certain information is not yet available. The value will be provided later.

Table 222: Abbreviations in this user's manual