X20(c)BC1083

1 General information

1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

1.2 Coated modules

Coated modules are X20 modules with a protective coating for the electronics component. This coating protects X20c modules from condensation and corrosive gases.

The modules' electronics are fully compatible with the corresponding X20 modules.

For simplification purposes, only images and module IDs of uncoated modules are used in this data sheet.

The coating has been certified according to the following standards:

- Condensation: BMW GS 95011-4, 2x 1 cycle
- Corrosive gas: EN 60068-2-60, method 4, exposure 21 days



1.2.1 Starting temperature

The starting temperature describes the minimum permissible ambient temperature in a voltage-free state at the time the coated module is switched on. This is permitted to be as low as -40°C. During operation, the conditions as specified in the technical data continue to apply.

Information:

It is important to absolutely ensure that there is no forced cooling by air currents in the closed control cabinet, e.g. due to the use of a fan or ventilation slots.

1.3 Order data

	Short description		
	Expandable bus controllers		
X20BC1083	X20 bus controller, 1 POWERLINK interface, integrated 2-port hub, supports expansion with X20 interface modules, 2x RJ45, order bus base, power supply module and terminal block sepa- rately!		
20cBC1083 X20 bus controller, coated, 1 POWERLINK interface, integrate 2-port hub, supports expansion with X20 interface modules, 1 RJ45, order bus base, power supply module and terminal blo separately!			
	Required accessories System modules for bus controllers		
X20PS9400	X20 power supply module, for bus controller and internal I/O		
X20PS9402	power supply X2X Link power supply X20 power supply module, for bus controller and internal I/O		
X20cPS9400	power supply, X2X Link supply, supply not galvanically isolated X20 power supply module, coated, for bus controller and internal		
	I/O power supply X2X Link power supply		
X20BB81	System modules for expandable bus controllers X20 bus base, for X20 base module (BC, HB, etc.) and X20 power supply module, with one expansion slot for X20 add- on module (IF, HB, etc.), X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included		
X20BB82	X20 bus base, for X20 base module (BC, HB, etc.) and X20 power supply module, with 2 expansion slots for 2 X20 add- on modules (IF, HB, etc.), X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included		
X20cBB81	X20 bus base, coated, for X20 base module (BC, HB, etc.) and X20 power supply module, with one expansion slot for X20 add- on module (IF, HB, etc.), X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included		
X20cBB82	X20 bus base, coated, for X20 base module (BC, HB, etc.) and X20 power supply module, with 2 expansion slots for 2 X20 add- on modules (IF, HB, etc.), X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included		
	Terminal blocks		
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed		
	Optional accessories System modules for expandable bus controllers		
X20IF1091-1	X20 interface module, for expandable bus controller, 1 X2X Link		
	master interface, electrically isolated, order 1x terminal block TB704 separately!		
	1D704 Separately!		
	X20 interface module communication		
X20IF1041-1	X20 interface module communication X20 interface module, for DTM configuration, 1 CANopen master interface, electrically isolated, order 1x terminal block		
X20IF1041-1 X20IF1043-1	X20 interface module communication X20 interface module, for DTM configuration, 1 CANopen master interface, electrically isolated, order 1x terminal block TB2105 separately! X20 interface module, for DTM configuration, 1 CANopen slave interface, electrically isolated, order 1x terminal block TB2105		
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Figure

Table 1: X20BC1083, X20cBC1083 - Order data

Order number	Short description
X20clF1061-1	X20 interface module, coated, for DTM configuration, 1 PROFIBUS DP V0/V1 master interface, electrically isolated
X20clF1063-1	X20 interface module, coated, for DTM configuration, 1 PROFIBUS DP V1 slave interface, electrically isolated
X20clF10D3-1	X20 interface module, coated, for DTM configuration, 1 Ether- Net/IP adapter (slave) interface, electrically isolated
X20clF10E3-1	X20 interface module, coated, for DTM configuration, 1 PROFINET IO device (slave) interface module, electrically iso- lated

Table 1: X20BC1083, X20cBC1083 - Order data

1.4 Module description

The bus controller makes it possible to connect X2X Link I/O nodes to POWERLINK. It is also possible to operate the X2X Link cycle synchronously 1:1 or synchronous to POWERLINK using a prescaler.

The bus modules expanded to the left allow connection of up to 2 interface modules in addition to the bus controller. Functions:

• POWERLINK

POWERLINK

POWERLINK is a standard protocol for Fast Ethernet equipped with hard real-time characteristics.

2 Technical description

2.1 Technical data

Mounting orientation Mounting orientation Horizontal Yes Vertical Yes Installation elevation above sea level Yes 0 to 2000 m No limitation >2000 m Reduction of ambient temperature by 0.5°C per 100 m	Order number	X20BC1083	X20cBC1083			
Bus controller [®] Bus controller [®] Base and Moreau Moreau Automation and a with up to 2 stols for interfere modules BAR Dio Code Disposed Situs indicators BAR Dio Code Disposed Situs indicators Bas Incolon Disposed Situs Indicators Disposed Situs Indicators Disposed Situs Indicators Disposed Situs Indicators Disposed Disposed Situs Indicators Disposed Disposed Situs Indicators Disposed Disposed Situs Indicators Disposed Disp	Short description		1			
General Information Description BRN Dock Dx228 Dx217 BRN Dock Module status, be function Dispression Status indicators Module status, be function Dispression Module status Yes, using LED status indicator and software Support Yes Yes Dynamic incide allocation (DNA) Yes Yes Dynamic incide allocation (DNA) Yes Yes Data 2.W Yes Incident caused by actuators 2.W Yes CE Yes Yes UL Control (DNA) Yes UL Transport Yes UL Transport Yes UL Transport Yes UL Transport Yes DN Transport Yes EVE Bit function (DNA) Yes Indicators Yes Yes DN Transport Yes EVE Bit function (DNA) Yes DN <	•	POWERLINK (V1/V2) controlled node	with up to 2 slots for interface modules			
B&R. Dock Ox/200 Ox/201 Diagnoteics Module status, bus function Diagnoteics Yes, using LED status indicator and software Bus function Yes, using LED status indicator and software Dynamic node allocation (DNA) Yes Dear consumption - Ber 2.W Additional power distapation caused by actuation - Construction Yes LUCA Yes Construction - Construction Yes LUC Outure E115287 LUC Collume E115287 Luca Collume E115287 DNV Temperature B to 857(5) Humdary B (up to 100%) Yes SV EC38 EV EC38 EV EC38 Ves Set yes Yes Yes <						
Sindual indicators Module status, bus function Module status Ves, using LED status indicator and software Support Ves, using LED status indicator and software Support Ves, using LED status indicator and software Support Ves Dynamic indicator (DNA) Ves Dynamic indicator (DNA) Ves But 2W Additional power dissipation caused by actuators		0x2268 0xE217				
Diagnostiss			l.			
Module status Yes, using LED status indicator and software Support Yes, using LED status indicator and software Support Yes Dynamic node allocation (DNA) Yes Dware consumption 2 W Sub function 2 W Additional power dissipation caused by actuators - Ceff Yes Ceff. Yes UKCA Yes UKCA Yes UKCA Conce 2.1 (Sites ACO net if in Face ACO Net ACO ACO ACO ACO ACO ACO A						
But function Yes, using LED status incloator and software Dynamic node allocator (DNA) Yes Dynamic node allocator (DNA) Yes Bus 2 W Additional power dissipation caused by actuators (resistive) (M) - Cefficiations - Cefficiations - UKCA Yes ATEX 2 Dia Cause An Clu ATS Ge UL - UL - HacLor Yes UL - HacLor - OPA - Process control outpriment - HacLor - DN - HacLor - DN - Farst - Box - DN - Farst Soft Soft Soft Soft Soft Soft Soft Sof		Vac. using LED status	indiantar and asthuara			
Support						
Dynamic node allocation (DNA) Yes Bus 2 W Additional power dissipation caused by actuators 2 W Additional power dissipation caused by actuators		Yes, using LED status	Indicator and software			
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Bus 2.W Actional power displayion caused by actuators		Yı	es			
Additional power disapation caused by actuators (vesitive) [VI Cetifications CE UKCA ATEX						
(resistive) [M] CE VICA Vies Vies Vies Vies Vies Vies Vies Vies		2	W			
CE Yes UKCA Yes ATEX Zone 2, II 3G Ex nA ncl IIA T5 Gc II IP20 Ta (see X20 user's manual) FT21 09 ATEX 0053X IIII Staff UL OULs ET115267 Industrial control equipment Industrial control equipment Hackoo CSAsa 244665 Process control equipment For hazardoos locations ONV Temperatures 18 (or 55°C) Hundly: B (up to 100%) Whatdon B (d g) LR ENV1 KR ENV1 KR EX38 BV Easa 10 Notation 2, Groups ABCD, T6 EX4 EAS3 BV Easa 10 Notation 4 (d g) IR EX38 BV Easa 10 Notation 4 (d g) IR EX485 INPA Yes Interaces Yes Interaces Yes Transfer tab 100 Mbk/s Physical layer 100BASE-TX Half colupex No Automogoliation Yes			-			
UKCA Yes ATEX Zone 2, II GE xn An Di NT6 Gc (IP20, To (see XD user's maruul)) ET2U 04 TKX 003X UL 0LU.s E115267 Iduatitial control equipment 0LU.s E115267 Hazloc 0CSAus 244665 Process control equipment 0Frazious Incentions Iduatitial control equipment 0Frazious Incentions OCASAUS 244665 Process control equipment Iduatitial control equipment 0Frazious Incentions ORA Class ID Vision 2, Groups A8CD, TS DIV Temperature: B (0 to 50%) Withations B (4 g) ECS3B SV ECS3B BV ECS3B Temperature: 5 - 55° C VBration: 4 g EAC Yes KG Yes Interfaces - Fleidbus POWERLINK (V1/12) controlled node Type Type 2 ° Variant Zx shalidad RJA5 (hub) Line length Max 100 m between 2 stations (segment length) Timesfer - Phylical layer 1008ASE-TX Half-duplex <t< td=""><td>Certifications</td><td></td><td></td></t<>	Certifications					
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ATEX Zone 2, II 3G Ex rA nCI IA 15 G c III IIII Sector UL Colluse ETISSET III. Industria Control equipment HatLoc CSAus 244655 Process control equipment For hazardous locations Tor hazardous locations CSAus 244655 Process control equipment For hazardous locations Class I, Division 2, Groups ABCO, T5 Ministon 2, Groups ABCO, T5 DNV Temperature: B (16 b) 5°C() Hundity: B (up to 100%) Witeration: B (4 g) LR ENV1 KR Yes BS Yes BV EC33B EC40: Yes BV EC33B EC40: Yes KC Yes Fieldous POWERLINK (V1/V2) controlled node Type 7: Yes Yes Yes Fieldous POWERLINK (V1/V2) controlled node Type 7: Yes Yes Yes Fieldous POWERLINK (V1/V2) controlled node Tran						
IP20. Tac See X20 user's manual) IVL OULus E115267 Industrial control equipment OULus E115267 Industrial control equipment OCSAus 244665 Process control equipment OTEX 100874 Industrial control equipment OTEX 100874 In		-				
Hazloc Industrial control equipment Hazloc CGAus 244665 Process control equipment Fromession 244665 DNV Class I, Division 2, Groups ADC, T5 DNV Temperature: 8 (0 to 55°C) Humidity: B (up to 100%) Vibration: 8 (4 g) LR EMCI B(NV1 KR Station 200% KR Station 200% BV EC338 BV EC338 BV EC338 BV EC338 EV Temperature: 5-5°C Vibration: 4 g EC338 BV		IP20, Ta (see X2	20 user's manual)			
HazLoc CSAus 244865 Process control equipment for hazardous locations Class I, Division 2, Groups ABCD, T5 DNV Temperature 8 (0 to 55°C) Humidity 8 (up to 100%) Vibration: 8 (4 a) EXER (4	UL					
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Class I, Divisino 2, Groups ABCD, T5 DNV Temperature: B (0 to 50°.C) Humidity: B (up to 100%) Winstaton: B (4 g) LR EMC: B (hridge and open deck) LR EMV1 KR Yes ABS Yes BV EC33B EC42 Yes KC Yes Kotaus 20.0000 Type Type 2.10 Variant 2.x shielded RJ45 (hub) Line length Mat. 1000 metween 2 statons (segment length) Transfer Teate 1000 Mbit/s Transfer Iso Yes Autompolitalion Yes						
DNV Temperature: 8 (up to 100%) Wibration: 8 (d) 0 LR ENV1 KR ENV1 KR Yes BV Ecsas BV Ecsas EXC Yes BV Ecsas EXC Yes BV Ecsas EXC Yes EXC Yes Filedbus Yes Filedbus POWERLINK (V1/V2) controlled node Type						
Humidity: B (up 100%) Vibration: B (4.0) LR EMC: B (bridge and open deck) KR ENV1 KR Yes ABS Yes BV EC33B Temporature: 5 - 50°C Vibration: 4 g EAC Yes KC Yes KIFaces POWERLINK (V1/V2) controlled node Type Yes Yariant 20x shield RJAS (hub) Line length Max. 100 m between 2 stations (segment length) Transfer rate 100 BASE Fuld-duplex Yes Fuid-duplex Yes <td< td=""><td>DNV</td><td></td><td>· ·</td></td<>	DNV		· ·			
EMC. B (bridge and open deck) IR EMV1 KR ENV1 KR Yes ABS Yes BV EC338 Temperature: 5- 55°C Vibration: 4 g Vibration: 4 g State EAC Yes KC Yes KC Yes Feldbus POWERLINK (V1/N2) controlled node Type POWERLINK (V1/N2) controlled node Type POWERLINK (V1/N2) controlled node Type POWERLINK (V1/N2) controlled node Type in transfer Interfaces For interfaces POWERLINK (V1/N2) controlled node Type in transfer rate 100 Mbi/s Transfer rate 100 Mbi/s Transfer rate 100 MASE-TX Half-duplex Yes Full-duplex Yes Auto-mobilizion Yes Auto-MD/MDIX Yes Full-duplex Yes Synchronization between bus systems possible Yes Outorupagation delay Max. 1488 bytes	2					
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>2000 m Reduction of ambient temperature by 0.5°C per 100 m	0 to 2000 m	No lim	nitation			
	Degree of protection per EN 60529	-				

Table 2: X20BC1083, X20cBC1083 - Technical data

X20(c)BC1083

Order number	X20BC1083	X20cBC1083			
Ambient conditions		,			
Temperature					
Operation					
Horizontal mounting orientation	-25 to	o 60°C			
Vertical mounting orientation	-25 to	o 50°C			
Derating		-			
Starting temperature	-	Yes, -40°C			
Storage	-40 to	o 85°C			
Transport	-40 to	o 85°C			
Relative humidity					
Operation	5 to 95%, non-condensing	Up to 100%, condensing			
Storage	5 to 95%, no	5 to 95%, non-condensing			
Transport	5 to 95%, no	on-condensing			
Mechanical properties					
Note	Order 1x terminal block X20TB12 separately. Order 1x power supply module X20PS9400 or X20PS9402 separately.	Order 1x terminal block X20TB12 separately. Order 1x power supply mod- ule X20cPS9400 separately.			
	Order 1x bus base X20B- B81 or X20BB82 separately.	Order 1x bus base X20cB- B81 or X20cBB82 separately			
Pitch 3)					
X20BB81	62.5*	^{-0.2} mm			
X20BB82	87.5*	87.5 ^{+0.2} mm			

Table 2: X20BC1083, X20cBC1083 - Technical data

For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help. 1)

2) 3) The minimum cycle time specifies how far the bus cycle can be reduced without communication errors occurring. Pitch is based on the width of bus base X20BB81 or X20BB82. Up to 2 interface modules and 1 power supply module X20PS9400 or X20PS9402 are always required for the bus controller.

2.2 Operating and connection elements

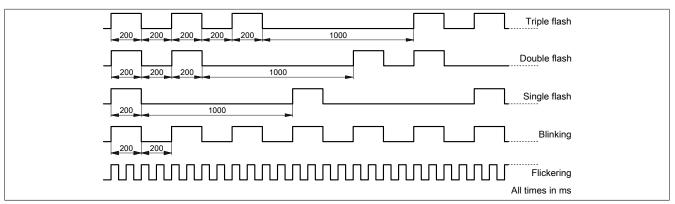
	4 3 2 1		5
1	POWERLINK connection with 2x RJ45 for simple wiring	2	Slot for interface module
3	Node number switch	4	LED status indicators
5	Terminal block for bus controller and I/O supply	6	-

2.2.1 LED status indicators

Figure	LED	Color	Status	Description
	S/E ¹⁾	Green	Off	No power supply or mode NOT_ACTIVE. The controlled node (CN) is either not supplied with power or it is in state NOT_ACTIVE. The CN waits in this state for about 5 s after a restart. Communi- cation is not possible with the CN. If no POWERLINK communication is detected during these 5 s, the CN changes to state BASIC_ETHERNET (flickering). If POWERLINK communication is detected before this time expires, however, the CN immediately changes to state PRE_OPERATIONAL_1.
S/E L/A IF1 C B C C C C C C C C C C C C C C C C C C			Flickering	Mode BASIC_ETHERNET. The CN has not detected any POWERLINK communication. In this state, it is possible to communicate directly with the CN (e.g. with UDP, IP). If POWERLINK communication is detected in this state, the CN changes to state PRE_OPERATIONAL_1.
an x16 ₽			Single flash	Mode PRE_OPERATIONAL_1. When operating on a POWERLINK V1 manager, the CN immediately changes to state PRE_OPERATIONAL_2. When operating on a POWERLINK V2 manager, the CN waits until an SoC frame is received and then changes to state PRE_OPERATIONAL_2.
			Double flash	Mode PRE_OPERATIONAL_2. The CN is normally configured by the manager in this state. It is then switched to state READY_TO_OPERATE by command (POWERLINK V2) or by setting flag "Data valid" in the output data (POWERLINK V1).
			Triple flash	Mode READY_TO_OPERATE. In a POWERLINK V1 network, the CN switches to state OPERATIONAL auto- matically as soon as input data is present. In a POWERLINK V2 network, the manager switches to state OPERATIONAL by command.
			On	Mode OPERATIONAL. PDO mapping is active and cyclic data is evaluated.
			Blinking	Mode STOPPED. Output data is not being output, and no input data is being provided. It is only possible to switch to or leave this state after the manager has given the appro- priate command.
		Red	On	The controlled node (CN) is in an error state (failed Ethernet frames, increased number of collisions on the network, etc.). If an error occurs in the following states, the red LED is superimposed by the green flashing LED: • PRE_OPERATIONAL_1 • PRE_OPERATIONAL_2 • READY_TO_OPERATE Status green LED "S/E" • Note:
				 Several red blinking signals are displayed immediately after the device is switched on. This is not an error, however. The LED lights up red for CNs with set physical node number 0 that
				have not yet been assigned a node number via dynamic node allocation (DNA).
	L/A IFx	Green	On Blinking	Link established to the remote station A link to the remote station has been established and there is activity on bus.
			Diriking	

1) The Status/Error LED "S/E" is a green/red dual LED.

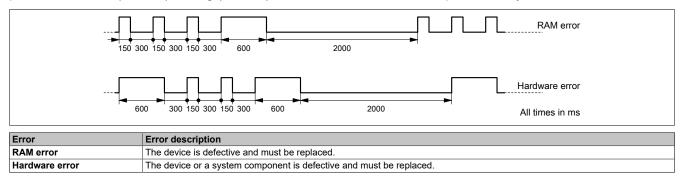
LED status indicators - Blink times



System stop error codes

A system stop error can occur due to incorrect configuration or defective hardware.

The error code is indicated by LED "S/E" blinking red. The blinking signal of the error code consists of 4 switch-on phases with short (150 ms) or long (600 ms) duration. The error code is repeated every 2 seconds.



2.2.2 POWERLINK node number

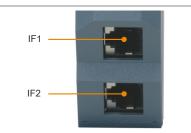


The node number for the POWERLINK node is set using the two number switches.

Switch position	Description
0x00	Only permitted when operating the POWERLINK node in DNA mode.
0x01 - 0xEF	Node number of the POWERLINK node. Operation as a controlled node (CN).
0xF0 - 0xFF	Reserved, switch position not permitted.

2.2.3 Ethernet interface

For information about wiring X20 modules with an Ethernet interface, see section "Mechanical and electrical configuration - Wiring guidelines for X20 modules with Ethernet cables" in the X20 user's manual.



Interface	-	Pinout	
	Pin	Ethernet	
	1	RXD	Receive data
	2	RXD\	Receive data\
	3	TXD	Transmit data
	4	Termination	
	5	Termination	
	6	TXD\	Transmit data\
Shielded RJ45	7	Termination	
	8	Termination	

2.2.4 Slot for interface modules

Depending on the bus base, up to two interface modules can be installed on the left side of the expandable bus controller:

Bus base	Slots for interface modules
X20BB81	1
X20BB82	2

Table 3: Slots for interface modules for various bus bases

2.3 Dynamic node allocation (DNA)

Most POWERLINK bus controllers have the ability to dynamically assign node numbers. This has the following advantages:

- No setting of the node number switch
- · Easier installation
- Reduced error sources

For information regarding configuration as well as an example, see Automation Help \rightarrow Communication \rightarrow POW-ERLINK \rightarrow General information \rightarrow Dynamic node allocation (DNA)

2.4 Operating the bus controller with netX modules and the X20IF1091-1

2.4.1 Operating netX controller modules

It is important to note the following in order to operate the module with the bus controller without problems:

- A minimum revision \geq E0 is required for the bus controller.
- The module can only be operated with the POWERLINK V2 setting. V1 is not permitted.
- With SDO access to POWERLINK object 0x1011/1 on the bus controller, the firmware and configuration stored on the bus controller are not reset. They can only be overwritten by accessing them again. This affects objects 0x20C0 and 0x20C8, subindexes 92 to 95.

2.4.2 Cycle synchronization with X20IF1091-1

The local X2X Link cycle of the bus controller is automatically synchronized with the X2X Link cycle of module X20IF1091-1. The local X2X Link cycle time of the bus controller is used as the main cycle time, however, not the POWERLINK cycle time.

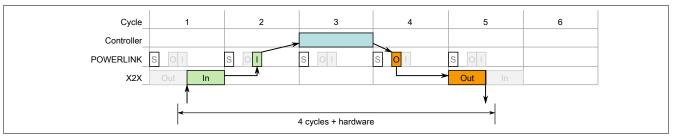
To optimize the transfer time, a cycle time should be used on the X20IF1091-1 that is synchronous to the POWERLINK cycle time.

2.4.3 Runtime shift

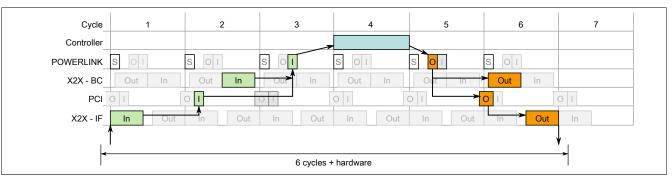
The internal data transfer results in an additional runtime shift of one cycle per direction when using an X20IF10xx-1.

Example

Necessary transfer cycles between module and controller.



Required transfer cycles when using an X20IF10xx-1



Information:

For detailed information about runtime and response time, see "Communication \rightarrow POWERLINK \rightarrow Response time" in Automation Help.

3 Function description

3.1 POWERLINK

POWERLINK is an Ethernet-based, real-time capable fieldbus. POWERLINK extends the IEEE 802.3 Ethernet standard by a deterministic access method and also defines a CANopen-compatible fieldbus interface. POWER-LINK distinguishes between process and service data in the same way as CANopen. Process data (PDO) is exchanged cyclically in the cyclic phase, while service data (SDO) is transferred acyclically. Service data objects are transmitted in the acyclic phases of POWERLINK using a connection-oriented protocol. The cyclic transfer of data in PDOs is enabled by "mapping".

For additional information, see <u>POWERLINK</u> bus controller user's manual and <u>www.br-automation.com/en/tech-nologies/powerlink</u>.

4 Commissioning

4.1 SGx target systems

SG3

This module is not supported on SG3 target systems.

SG4

The module comes with preinstalled firmware. The firmware is also part of the Automation Runtime operating system for the PLC. With different versions, the Automation Runtime firmware is loaded onto the module.

Current firmware is made available automatically by updating Automation Runtime.