# 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 <sup>®</sup> Bus controller <sup>®</sup> 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			
Power consumption Bus Additional power dissipation caused by achiators (resistive) [V0] Cetification CE						
Bus         2.W           Actional power displayion caused by actuators		Yı	es			
Additional power disapation caused by actuators (vesitive) [VI Cetifications CE UKCA ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX 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					
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>CE</td><td>Y</td><td>/es</td></t<>	CE	Y	/es			
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					
Process control equipment for hazardous locations Class I, Division 2, Group ABCD, T5           DNV         Tremperatures B (0 to 55°C) Wibratons B (4 q)           IR         ENV1           KR         ENV1           KR         ENV1           KR         ENV1           KR         Yes           ABS         Yes           SV         EC33B           Functional R (4 q)         Yes           KR         Yes           ABS         Yes           SV         EC33B           Temperature S - 55°C Vibration: 4 g         Yes           KC         Yes           Yes         Yes           Kotass         Yes           Yes         Yes           Kotass         Yes           Kotass         Yes           Kotass         Yes           Kotass         Yes           Filedbus         Yes           Yes         Yes           Yes         Yes	Hazling					
for hazardous locations           Class I, Division 2, Groups ABCD, T5           DNV         Temperature 8() (n 55°C)           Hunidity 8() (n 5 100%)         Vibration: 8(4 (n)           Ubration: 8(4 (n))         Vibration: 8(4 (n))           LR         ENV1           KR         ENV1           KR         ENV1           KR         ENV1           KR         EC33B           BV         EC33B           EV         EC33B           EAC         Yes           EV         EC42B           File(Bpd)         Comperature: 5 - 55°C           Vibration: 4()         Q           EAC         Yes           File(Bpd)         Station (PMP)           Interface         Vibration: 4()           File(Bpd)         Quert (VI/2) controlled node           Type 2         Vibration: 4()           Variant         Quert (VI/2) controlled node           Tansfer         Type 2.1           Variant         Yes           File(Dus         Type 2.1           Variant         Yes           Physical layer         100 Mbit/s           Tansfer         100 Mbit/s           Physical layer <td></td> <td></td> <td></td>						
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					
LR     EN/1       KR     Yes       ABS     Yes       BV     EC33B       Temperature: 5 - 55°C     Vibratour: 4 g       EMC: Bridge and open deck     EMC: Bridge and open deck       EAC     Yes       KC     Yes       Interfaces     Yes       Fieldbus     POWERLINK (V1/V2) controlled node       Type     POWERLINK (V1/V2) controlled node       Type     Yes       Variant     2x shielded RJ45 (hub)       Line length     Max. 100 m between 2 statoms (segment length)       Transfer rate     100 MbUS       Physical layer     100BASE-TX       Half-duplex     Yes       Fuil-duplex     Yes       Hub propagation delay     0.96 to 1 µs       Min. cycle time ?     100       Fieldbus     200 µs       Synchronization between bus systems possible     Yes       Cyclic data     Max. 1488 bytes       Output data     Max. 1488 bytes       Output data     Yes       Mounting orientation     Yes       Vertical     Yes       Instation elevation above sea level     Yes       Output of above sea level     Yes       Output of above sea level     Yes       Output of above sea level     Yes						
KR     Yes       ABS     Yes       BV     EC33B       Temperature: 5 - 55°C     Vibration: 4 g       EAC     Yes       KC     Yes       KC     Yes       Fieldbus     POWERLINK (V1/V2) controlled node       Type 2     Yes       Variant     2x shielded RJ45 (hub)       Line length     Max.100 m between 2 stations (segment length)       Transfer 7     100 Mbit/s       Transfer 7     Yes       Physical layer     100 Mbit/s       Transfer 7     Yes       Half-duplex     No       Auto-MD/IMDIX     Yes       Hul-duplex     200 µs       X2X Link     200 µs       X2X Link     200 µs       Synchronization between bus systems possible     Yes       Output data     Max.1488 bytes       Output data     POWERLINK isolated from bus and I/O       Poreating conditions     Yes       Vertical     Yes       Instation elevation above sea level     Yes       Instation elevation above sea level     Yes       Oto 200 m     Reduction of ambient temperature by 0.5°C per 100 m		EMC: B (bridge and open deck)				
ABS       Yes         BV       EC33B         BV       Temperature: 5-55°C         Wittinge and open deck         EAC       Yes         EAC       Yes         EAC       Yes         Fieldbus       -         Interfaces       -         Fieldbus       POWERLINK (V1/V2) controlled node         Type 1       -         Variant       2x shielde RJ45 (hub)         Line length       Max. 100 m between 2 stations (segment length)         Transfer rate       100 Mbit/s         Transfer rate       100 Mbit/s         Physical layer       100BASE-TX         Half-duplex       Yes         Autonegolitation       Yes         Autonegolitation       Yes         Min. cycle time ?1       -         Fieldbus       200 µs         Synchronization between bus systems possible       Yes         Cyclic data       -         Input data       Max. 1488 bytes         Output data       Max. 1488 bytes         Output data       Yes         Stornitation elevation above sea level       Yes         Output data       Yes         Output data       Yes </td <td>LR</td> <td colspan="4">ENV1</td>	LR	ENV1				
BV     EC38 Temperature: 5 - 55°C Ultration: 4 g EMC: Bridge and open deck       EAC     Yes       KC     Yes       Interaces       Fieldbus     POWERLINK (V1/V2) controlled node       Type     POWERLINK (V1/V2) controlled node       Yes     -       Interaces     POWERLINK (V1/V2) controlled node       Type 2     Type 2.1       Variant     2x shielded RJ45 (hub)       Line length     Max. 100 m between 2 stations (segment length)       Transfer rate     100 Mbti/s       Physical layer     100 BASE-TX       Half-duplex     Yes       Hul-duplex     No       Auto-MDI/MDIX     Yes       Hub propagaton delay     0.96 to 1 µs       Min. cycle time 7)     200 µs       Fieldbus     200 µs       Synchronization between bus systems possible     Yes       Cycle data     Max. 1488 bytes       Input data     Max. 1488 bytes       Output data     POWERLINK isolated from bus and I/O <b>Deparing conditions</b> Yes       Hortortal     Yes       Instalion elevation above sea level     Yes       Notation above sea level     No limitation       Output data     Yes	KR	Yes				
Temperature : 5 - 55°C           Vbration: 4 g           EAC         Yes           KC         Yes           Interfaces         -           Fieldbus         POWERLINK (V1/V2) controlled node           Type         2 <sup>1</sup> Variant         Acx shielded R.M5 (hub)           Line length         Max. 100 m between 2 stations (segment length)           Transfer rate         100 MbU/s           Physical layer         100BASE-TX           Half-duplex         Yes           Automegotiation         Yes           Automegotiation         Yes           Hub propagation delay         0.96 to 1 µs           Min. cycle time <sup>2</sup> Yes           Fieldbus         200 µs           X2X Link         200 µs           Synchronization between bus systems possible         Yes           Cyclic data         Max. 1438 bytes           Output data         Max. 1438 bytes           Output data         POWERLINK isolated from bus and I/O <b>Deresting conditions</b> Yes           Instation elevation above sea level         Yes           Morting orientation         Yes           Instation elevation above sea level         Yes	ABS	Yi	es .			
Understand         Understand           EAC         Yes           KC         Yes           KC         Yes           Interfaces         -           Fieldbus         POWERLINK (V1/V2) controlled node           Type         ?           Yes         -           Fieldbus         POWERLINK (V1/V2) controlled node           Type         ?           Variant         2x shielded RJ45 (nub)           Line length         Max. 100 m between 2 stations (segment length)           Transfer         100 Mbit/s           Transfer         100 Mbit/s           Field-uplex         No           Autonegotiation         Yes           Autonegotiation         Yes           Autonegotiation         Yes           Hub propagation delay         0.96 to 1 µs           Min. cycle time ?         1           Filelbus         200 µs           X2X Link         200 µs           Synchronization between bus systems possible         Yes           Cyclic data         Max. 1488 bytes           Input data         Max. 1488 bytes           Output data         POWERLINK isolated from bus and I/O <b>Operating conditions</b> <t< td=""><td>BV</td><td>EC</td><td>33B</td></t<>	BV	EC	33B			
EAC         Yes           KC         Yes         -           Interfaces         -           Fieldbus         POWERLINK (V1/V2) controlled node         -           Type         POWERLINK (V1/V2) controlled node         -           Type         Type 2 ''         -           Variant         2x shielded RJ45 (hub)         -           Line length         Max. 100 m betwen 2 stations (segment length)         -           Transfer rate         1000 Mbit/s         -           Physical layer         100BASE-TX         -           Half-duplex         Yes         -           Fuil-duplex         Yes         -           Autonegotiation         Yes         -           Auto-MDI/MDIX         Yes         -           Hub propagation delay         0.96 to 1 µs         -           Min. cycle time <sup>a</sup> -         -           Fieldbus         200 µs         200 µs         -           Synchronization between bus systems possible         Yes         -           Output data         Max. 1488 bytes         -           Cyclic data         POWERLINK isolated from bus and I/O         -           Operating conditions         Yes         - <td colspan="2"></td> <td>ıre: 5 - 55°C</td>			ıre: 5 - 55°C			
EAC         Yes           KC         Yes         -           Interfaces         POWERLINK (V1/V2) controlled node         Type 2 ''           Yrainat         2x shielded RJ45 (hub)           Line length         Max. 100 m between 2 stations (segment length)           Transfer rate         100 Mbit/s           Physical layer         100 Mbit/s           Flid-duplex         Yes           Full-duplex         Yes           Haif-duplex         No           Autonegotiation         Yes           Hub propagation delay         0.96 to 1 µs           Min. cycle time <sup>2n</sup> 200 µs           Yzz Link         200 µs           Synchronization between bus systems possible         Yes           Output data         Max. 1488 bytes           Output data         Max. 1488 bytes           Electrical isolation         POWERLINK isolated from bus and I/O           Operating conditions         Yes           Horizontal         Yes           Vertical         Yes           Installation elevation above sea level         Yes           Output data         Yes           Diraction         Yes           Link         280 µs           Outpu						
KC         Yes         -           Interaces         POWERLINK (V1/V2) controlled node         Type         FOWERLINK (V1/V2) controlled node         Type 2 ''           Type         Type 2 ''         Controlled RUAS (hub)         Controled RUAS (hub)         Controled RUAS (hub) </td <td></td> <td colspan="4"></td>						
Interfaces         POWERLINK (V1/V2) controlled node           Fieldbus         POWERLINK (V1/V2) controlled node           Type         Type 2 ''           Variant         2x shielded RJ45 (hub)           Line length         Max. 100 m between 2 stations (segment length)           Transfer rate         100 Mbit/s           Physical layer         100 BASE-TX           Half-duplex         Yes           Full-duplex         No           Auto-MDI/MDIX         Yes           Hub propagation delay         0.0 95 to 1 µs           Min. cycle time <sup>20</sup> 200 µs           Yink         200 µs           X2X Link         200 µs           Synchronization between bus systems possible         Yes           Cyclic data         Max. 1488 bytes           Input data         Max. 1488 bytes           Output data         POWERLINK isolated from bus and I/O           Operating conditions         Yes           Horizontal         Yes           Installation elevation above sea level         Yes           0 to 200 m         No limitation	EAC	Y	es			
Fieldbus         POWERLINK (V1/V2) controlled node           Type         Type 2 <sup>13</sup> Variant         2x shielded R.J45 (hub)           Line length         Max. 100 m between 2 stations (segment length)           Transfer rate         100 Mbit/s           Transfer         100 Mbit/s           Physical layer         100BASE-TX           Half-duplex         Yes           Full-duplex         No           Autonegotiation         Yes           Auto-MDI/MDIX         Yes           Hub propagation delay         0.96 to 1 µs           Min. cycle time <sup>2)</sup> 100 µs           X2X Link         200 µs           Synchronization between bus systems possible         Yes           Cyclic data         Max. 1488 bytes           Input data         Max. 1488 bytes           Output data         Max. 1488 bytes           Output data         POWERLINK isolated from bus and I/O           Operating conditions         Yes           Vertical         Yes           Vertical         Yes           Output data         Max. 1488 bytes           Output data         Max. 1488 bytes           Output data         Max. 1488 bytes           Istallation e	KC	Yes	-			
Type         Type 2 '0           Variant         2x shielded RJ45 (hub)           Line length         Max. 100 m between 2 stations (segment length)           Transfer rate         100 Mbit/s           Physical layer         100BASE-TX           Half-duplex         Yes           Full-duplex         Yes           Autonegotiation         Yes           Autonegotiation         Yes           Hub propagation delay         0.96 to 1 µs           Min. cycle time 2')         100           Fieldbus         200 µs           X2X Link         200 µs           Synchronization between bus systems possible         Yes           Cyclic data         Max. 1488 bytes           Input data         Max. 1488 bytes           Output data         Max. 1488 bytes           Electrical properties         100           Electrical properties         100           Installation elevation above sea level         Yes           Vertical         Yes           Installation elevation above sea level         Yes           0 to 2000 m         No limitation	Interfaces					
Variant         2x shielded RJ45 (hub)           Line length         Max. 100 m between 2 stations (segment length)           Transfer rate         100 Mbit/s           Transfer         000 Mbit/s           Physical layer         100BASE-TX           Half-duplex         Yes           Full-duplex         No           Autonegotiation         Yes           Autonegotiation         Yes           Min. cycle time ?         0.96 to 1 µs           Min. cycle time ?            Fieldbus         200 µs           X2X Link         200 µs           Synchronization between bus systems possible         Yes           Cyclic data         Max. 1488 bytes           Input data         Max. 1488 bytes           Output data         POWERLINK isolated from bus and I/O           Oreating conditions         Yes           Fieldbus         Yes           Output data         POWERLINK isolated from bus and I/O           Output data         Yes           Cyclic data         Yes           Installation elevation above sea level         Yes           Output data         Yes           Electrical isolation         Yes           Vertical         Yes </td <td>Fieldbus</td> <td>POWERLINK (V1/</td> <td>V2) controlled node</td>	Fieldbus	POWERLINK (V1/	V2) controlled node			
Line length       Max. 100 m between 2 stations (segment length)         Transfer rate       100 Mbit/s         Transfer       100BASE-TX         Half-duplex       Yes         Full-duplex       No         Auto-mD/MDIX       Yes         Hub propagation delay       0.96 to 1 µs         Min. cycle time 2)       200 µs         Fieldbus       200 µs         X2X Link       200 µs         Synchronization between bus systems possible       Yes         Cyclic data       Max. 1488 bytes         Input data       Max. 1488 bytes         Output data       POWERLINK isolated from bus and I/O         Operating condition       Yes         Horizontal       Yes         Vertical       Yes         Solution       POWERLINK isolated from bus and I/O         Operating conditions       Yes         Vertical isolation       Yes         Vertical       Yes         Vertical       Yes         Vertical       Yes         Vortical       Yes         Vortical       Yes         Vortical       Yes         Vortical       Yes         Vortical       Yes         <	Туре	Туре	e 2 <sup>1)</sup>			
Transfer rate       100 Mbit/s         Transfer       100BASE-TX         Physical layer       100BASE-TX         Half-duplex       Yes         Full-duplex       No         Autonegotiation       Yes         Autonegotiation       Yes         Mub propagation delay       0.96 to 1 µs         Min. cycle time ?0       0         Fieldbus       200 µs         X2X Link       200 µs         Synchronization between bus systems possible       Yes         Cyclic data       Max. 1488 bytes         Output data       Max. 1488 bytes         Output data       Max. 1488 bytes         Electrical isolation       POWERLINK isolated from bus and I/O         Operating conditions       Yes         Mounting orientation       Yes         Horizontal       Yes         Vertical       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	Variant	2x shielded	RJ45 (hub)			
Transfer       Transfer         Physical layer       100BASE-TX         Half-duplex       Yes         Full-duplex       No         Autonegotiation       Yes         Auto-MDI/MDIX       Yes         Hub propagation delay       0.98 to 1 µs         Min. cycle time 2)       200 µs         Fieldbus       200 µs         X2X Link       200 µs         Synchronization between bus systems possible       Yes         Cyclic data       Max. 1488 bytes         Output data       Max. 1488 bytes         Output data       POWERLINK isolated from bus and I/O         Operating conditions       Yes         Mounting orientation       Yes         Horizontal       Yes         Vertical       Yes         Installation elevation above sea level       Yes         Vertical       Yes         Installation elevation above sea level       Yes         Vortical       Yes         Noting orientation       Yes         Noting orientation       Yes         Notall to plevation above sea level       Yes         Output on a move sea level       Yes         Noting orientation       Yes         Not	Line length	Max. 100 m between 2 s	stations (segment length)			
Physical layer         100BASE-TX           Half-duplex         Yes           Full-duplex         No           Autonegotiation         Yes           Auto-MDI/MDIX         Yes           Hub propagation delay         0.96 to 1 µs           Min. cycle time 2)         1           Fieldbus         200 µs           X2X Link         200 µs           Synchronization between bus systems possible         Yes           Cyclic data         1           Input data         Max. 1488 bytes           Output data         Max. 1488 bytes           Electrical isolation         POWERLINK isolated from bus and I/O           Operating conditions         Yes           Mounting orientation         Yes           Horizontal         Yes           Vertical         Yes	Transfer rate	100	Mbit/s			
Half-duplexYesFull-duplexNoAutonegotiationNoAutonegotiationYesAuto-MDI/MDIXYesHub propagation delay0.96 to 1 µsMin. cycle time ²)0.96 to 1 µsFieldbus200 µsX2X Link200 µsSynchronization between bus systems possibleYesCyclic data1Input dataMax. 1488 bytesOutput dataMax. 1488 bytesElectrical properties90WERLINK isolated from bus and I/OOperating conditionsYesMounting orientationYesVerticalYesVerticalYesOutput dataYesDoubletaPOWERLINK isolated from bus and I/ODoubletaYesOperationsYesVerticalYesVerticalYesVertical nabove sea levelYes0 to 2000 mNo limitation>2000 mReduction of ambient temperature by 0.5°C per 100 m	Transfer					
Half-duplexYesFull-duplexNoAutonegotiationNoAutonegotiationYesAuto-MDI/MDIXYesHub propagation delay0.96 to 1 µsMin. cycle time ²)0.96 to 1 µsFieldbus200 µsX2X Link200 µsSynchronization between bus systems possibleYesCyclic data1Input dataMax. 1488 bytesOutput dataMax. 1488 bytesElectrical properties90WERLINK isolated from bus and I/OOperating conditionsYesMounting orientationYesVerticalYesVerticalYesOutput dataYesDoubletaPOWERLINK isolated from bus and I/ODoubletaYesOperationsYesVerticalYesVerticalYesVertical nabove sea levelYes0 to 2000 mNo limitation>2000 mReduction of ambient temperature by 0.5°C per 100 m	Physical laver	100BA	ASE-TX			
Full-duplex       No         Autonegotiation       Yes         Auto-MDI/MDIX       Yes         Hub propagation delay       0.96 to 1 µs         Min. cycle time 2)       200 µs         Y2X Link       200 µs         X2X Link       200 µs         Synchronization between bus systems possible       Yes         Cyclic data       Yes         Input data       Max. 1488 bytes         Output data       Max. 1488 bytes         Electrical properties       Electrical isolation         Electrical isolation       POWERLINK isolated from bus and I/O         Operating conditions       Yes         Mounting orientation       Yes         Horizontal       Yes         Vertical       Yes         Vertical       Yes         Output dation above sea level       Yes         0 to 2000 m       No limitation         >2000 m       Reduction of ambient temperature by 0.5°C per 100 m						
AutonegotiationYesAuto-MDI/MDIXYesHub propagation delay0.96 to 1 µsMin. cycle time 2)1Fieldbus200 µsX2X Link200 µsSynchronization between bus systems possibleYesCyclic data1Input dataMax. 1488 bytesOutput dataMax. 1488 bytesElectrical properties1Electrical solationPOWERLINK isolated from bus and I/OOperating conditionsYesMounting orientationYesVerticalYesInsultation elevation above sea levelYes0 to 2000 mNo limitation>2000 mReduction of ambient temperature by 0.5°C per 100 m	•					
Auto-MDI/MDIXYesHub propagation delay0.96 to 1 µsMin. cycle time 2)Fieldbus200 µsX2X Link200 µsSynchronization between bus systems possibleYesCyclic dataInput dataMax. 1488 bytesOutput dataMax. 1488 bytesOutput dataMax. 1488 bytesElectrical propertiesElectrical isolationPOWERLINK isolated from bus and I/OOperating conditionsMounting orientationYesVerticalYesInstallation elevation above sea levelYes0 to 2000 mReduction of ambient temperature by 0.5°C per 100 m						
Hub propagation delay0.96 to 1 µsMin. cycle time ²)Fieldbus200 µsX2X Link200 µsSynchronization between bus systems possibleYesCyclic dataYesInput dataMax. 1488 bytesOutput dataMax. 1488 bytesDutput dataPOWERLINK isolated from bus and I/OOperating conditionsMounting orientationYesHorizontalYesVerticalYesVerticalYesInstallation elevation above sea levelNo limitation0 to 2000 mNo limitation>2000 mReduction of ambient temperature by 0.5°C per 100 m	-					
Min. cycle time 2)       200 µs         Fieldbus       200 µs         X2X Link       200 µs         Synchronization between bus systems possible       Yes         Cyclic data       Yes         Input data       Max. 1488 bytes         Output data       Max. 1488 bytes         Output data       Max. 1488 bytes         Electrical properties       POWERLINK isolated from bus and I/O         Operating conditions       POWERLINK isolated from bus and I/O         Mounting orientation       Yes         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			-			
Fieldbus200 µsX2X Link200 µsSynchronization between bus systems possibleYesCyclic dataYesInput dataMax. 1488 bytesOutput dataMax. 1488 bytesElectrical propertiesElectrical isolationElectrical isolationPOWERLINK isolated from bus and I/OOperating conditionsYesMounting orientationYesHorizontalYesVerticalYesInstallation elevation above sea levelYes0 to 2000 mNo limitation>2000 mReduction of ambient temperature by 0.5°C per 100 m		0.96 t				
X2X Link200 µsSynchronization between bus systems possibleYesCyclic dataYesInput dataMax. 1488 bytesOutput dataMax. 1488 bytesElectrical propertiesElectrical isolationElectrical isolationPOWERLINK isolated from bus and I/OOperating conditionsYesMounting orientationYesHorizontalYesVerticalYesInstallation elevation above sea levelYes0 to 2000 mNo limitation>2000 mReduction of ambient temperature by 0.5°C per 100 m		000	0.00			
Synchronization between bus systems possible       Yes         Cyclic data       Input data         Input data       Max. 1488 bytes         Output data       Max. 1488 bytes         Electrical properties       Electrical isolation         Electrical isolation       POWERLINK isolated from bus and I/O         Operating conditions       POWERLINK isolated from bus and I/O         Mounting orientation       Yes         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						
Cyclic data       Input data         Input data       Max. 1488 bytes         Output data       Max. 1488 bytes         Electrical properties       Electrical isolation         Electrical isolation       POWERLINK isolated from bus and I/O         Operating conditions       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			· ·			
Input dataMax. 1488 bytesOutput dataMax. 1488 bytesOutput dataMax. 1488 bytesElectrical propertiesElectrical isolationPOWERLINK isolated from bus and I/OOperating conditionsMounting orientationHorizontalYesVerticalYesVerticalYesInstallation elevation above sea level0 to 2000 mNo limitation>2000 mReduction of ambient temperature by 0.5°C per 100 m		Yi	es			
Output data       Max. 1488 bytes         Electrical properties         Electrical isolation       POWERLINK isolated from bus and I/O         Operating conditions       Powerschlutter         Mounting orientation       Installation         Vertical       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						
Electrical properties         Electrical isolation       POWERLINK isolated from bus and I/O         Operating conditions       Mounting orientation         Mounting orientation       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						
Electrical isolation     POWERLINK isolated from bus and I/O       Operating conditions       Mounting orientation       Horizontal       Vertical       Yetrical       Installation elevation above sea level       0 to 2000 m       >2000 m       Reduction of ambient temperature by 0.5°C per 100 m		Max. 14	88 bytes			
Operating conditions           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						
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		POWERLINK isolat	ted from bus and I/O			
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	Operating conditions					
Vertical     Yes       Installation elevation above sea level        0 to 2000 m     No limitation       >2000 m     Reduction of ambient temperature by 0.5°C per 100 m	Mounting orientation					
Installation elevation above sea level       No         0 to 2000 m       No limitation         >2000 m       Reduction of ambient temperature by 0.5°C per 100 m	Horizontal	Y	és			
0 to 2000 m     No limitation       >2000 m     Reduction of ambient temperature by 0.5°C per 100 m	Vertical	Y	/es			
0 to 2000 m     No limitation       >2000 m     Reduction of ambient temperature by 0.5°C per 100 m	Installation elevation above sea level					
>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*	<sup>-0.2</sup> mm			
X20BB82	87.5*	87.5 <sup>+0.2</sup> 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

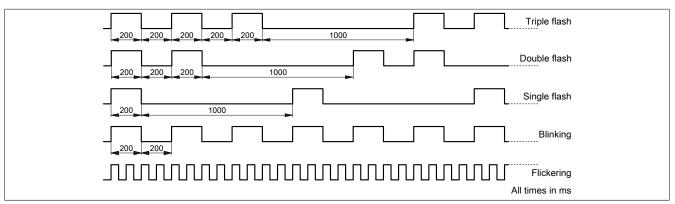
	4 3 2 1		5
1	POWERLINK connection with 2x RJ45 for simple wiring	2	Slot for interface module
3	Node number switch	4	LED status indicators
5	Terminal block for bus controller and I/O supply	6	-

# 2.2.1 LED status indicators

Figure	LED	Color	Status	Description
	S/E <sup>1)</sup>	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:
				<ul> <li>Several red blinking signals are displayed immediately after the device is switched on. This is not an error, however.</li> <li>The LED lights up red for CNs with set physical node number 0 that</li> </ul>
				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.

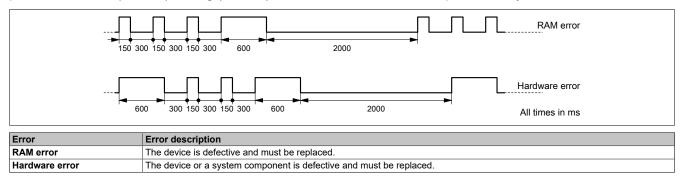
## LED status indicators - Blink times



## 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

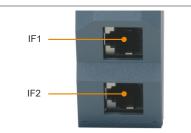


The node number for the POWERLINK node is set using the two number switches.

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.

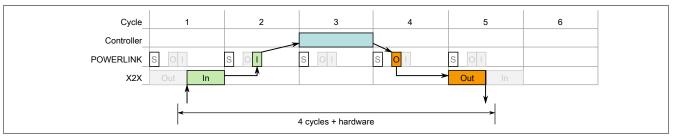
To optimize the transfer time, a cycle time should be used on the X20IF1091-1 that is synchronous to the POWERLINK cycle time.

# 2.4.3 Runtime shift

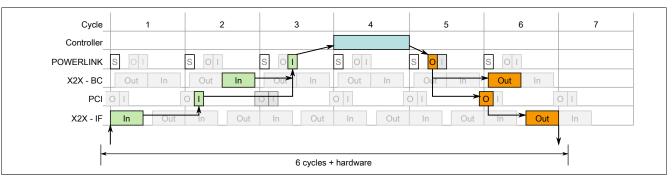
The internal data transfer results in an additional runtime shift of one cycle per direction when using an X20IF10xx-1.

# 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.