X20(c)DO4649

1 General information

The module is equipped with 4 relay outputs.

- 4 digital outputs
- Relay module for 240 VAC / 30 VDC
- 4 normally open contacts
- Single-channel isolated outputs

Danger!

Risk of electric shock!

The terminal block is only permitted to conduct voltage when it is connected. It is not permitted to be disconnected or connected while voltage is applied or have voltage applied to it while it is removed under any circumstances.

This module is not permitted to be the last module connected on the X2X Link network. At least one subsequent X20ZF dummy module must provide protection against contact.

Danger!

The voltage classes on the terminal block must not be mixed! Only operation at mains voltage (e.g. 230 VAC) OR safety extra-low voltage (e.g. 24 VDC SELV) is permitted.

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

3 Order data

Model number	Short description	Figure
	Digital outputs	
X20DO4649	X20 digital output module, 4 relays, N.O. contacts, 240 VAC / 5 A	
X20cDO4649	X20 digital output module, coated, 4 relays, N.O. contacts, 240 VAC / 5 A	
	Required accessories	
	Bus modules	
X20BM11	X20 bus module, 24 VDC keyed, internal I/O supply continuous	
X20BM15	X20 bus module, with node number switch, 24 VDC keyed, internal I/O supply continuous	
X20cBM11	X20 bus module, coated, 24 VDC keyed, internal I/O supply continuous	
	Terminal blocks	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	

Table 1: X20DO4649, X20cDO4649 - Order data

4 Technical data

Model number	X20DO4649	X20cDO4649
Short description		
I/O module	4 digital outputs 30 VDC / 240 VAC, outputs are single-channel isolated	
General information		
B&R ID code	0xA704	0xE67E
Status indicators	I/O function per channel, operating state, module status	
Diagnostics		
Module run/error	Yes, using status LED and software	
Outputs	Yes, using status LED	
Power consumption		
Bus	0.8 W	
Internal I/O	-	
Additional power dissipation caused by actuators (resistive) [W] [1)]	+1.5	
Certifications		
CE	Yes	
KC	Yes	-
EAC	Yes	
UL	cULus E115267 Industrial control equipment	
HazLoc	cCSAus 244665 Process control equipment for hazardous locations Class I, Division 2, Groups ABCD, T5	
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta (see X20 user's manual) FTZÚ 09 ATEX 0083X	
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)	
KR	Yes	
Digital outputs		
Variant	Relay / Normally open contact Channels are single-channel isolated	
Nominal voltage	30 VDC / 240 VAC	
Max. voltage	264 VAC	
Switching voltage	Max. 110 VDC / 264 VAC	
Rated frequency	DC / 45 to 63 Hz	
Nominal output current	5 A at 30 VDC / 5 A at 240 VAC	
Total nominal current	10 A at 30 VDC / 10 A at 240 VAC	
Actuator power supply	External	
Inrush current	Max. 5 A (per channel)	
Contact resistance	Max. 100 mΩ	
Switching delay		
0 → 1	≤10 ms	
1 → 0	≤10 ms	
Isolation voltages		
Channel - Bus	Tested at 2300 VAC	
Channel - Channel	Tested at 750 VAC	

Table 2: X20DO4649, X20cDO4649 - Technical data

Model number	X20DO4649	X20cDO4649
Service life		
Electrical [2]	Min. 5 x 10^4 ops. (NO) at 5 A	
Mechanical	Min. 2 x 10^7 ops.	
Switching capacity		
Minimum	0.05 W / 2.4 VA	
Maximum	150 W / 1250 VA	
Protective circuit		
Internal	None	
External		
AC	RC combination or VDR	
DC	Inverse diode, RC combination or VDR	
Electrical properties		
Electrical isolation	Channel isolated from channel and bus	
Operating conditions		
Mounting orientation		
Horizontal	Yes	
Vertical	Yes	
Installation elevation above sea level		
0 to 2000 m	No limitations	
>2000 m	Not permitted	
Degree of protection per EN 60529	IP20	
Ambient conditions		
Temperature		
Operation		
Horizontal mounting orientation	-25 to 60°C	
Vertical mounting orientation	-25 to 50°C	
Derating	See section "Derating"	
Storage	-40 to 85°C	
Transport	-40 to 85°C	
Relative humidity		
Operation	5 to 95%, non-condensing	Up to 100%, condensing
Storage	5 to 95%, non-condensing	
Transport	5 to 95%, non-condensing	
Mechanical properties		
Note	Order 1x X20TB12 terminal block separately Order 1x X20BM11 bus module separately	Order 1x X20TB12 terminal block separately Order 1x X20cBM11 bus module separately
Spacing	$12.5^{+0.2}$ mm	

Table 2: X20DO4649, X20cDO4649 - Technical data

1) Number of outputs x Contact resistance x Nominal output current^2. For a calculation example, see section "Mechanical and electrical configuration" of the X20 system user's manual.
2) With a resistive load. See also section "Electrical service life"

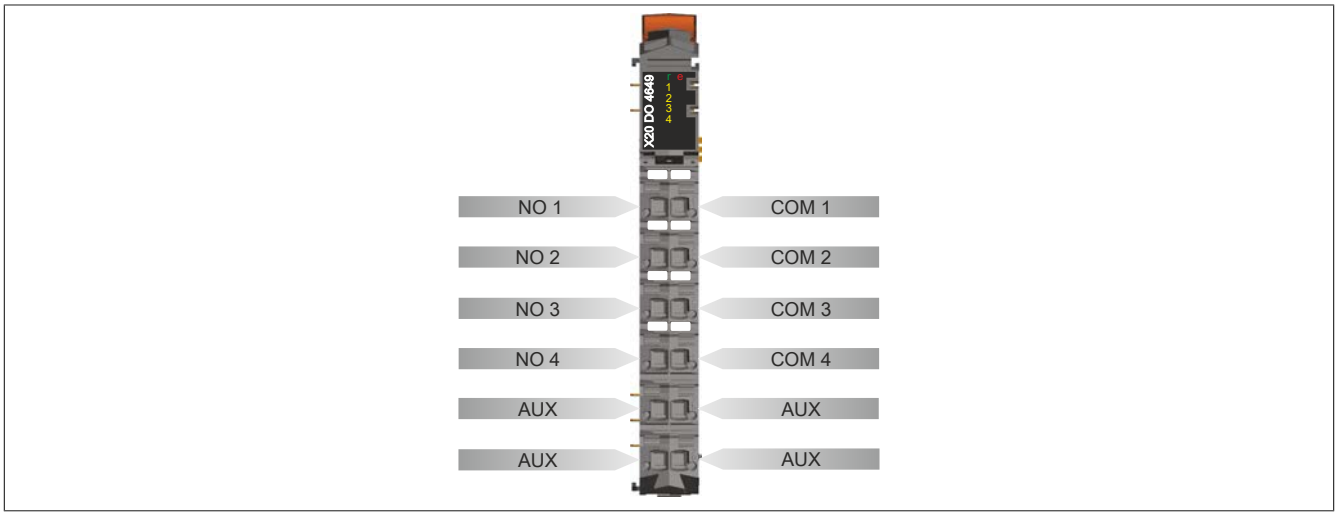
5 Status LEDs

For a description of the various operating modes, see section "Additional information - Diagnostic LEDs" of the X20 system user's manual.

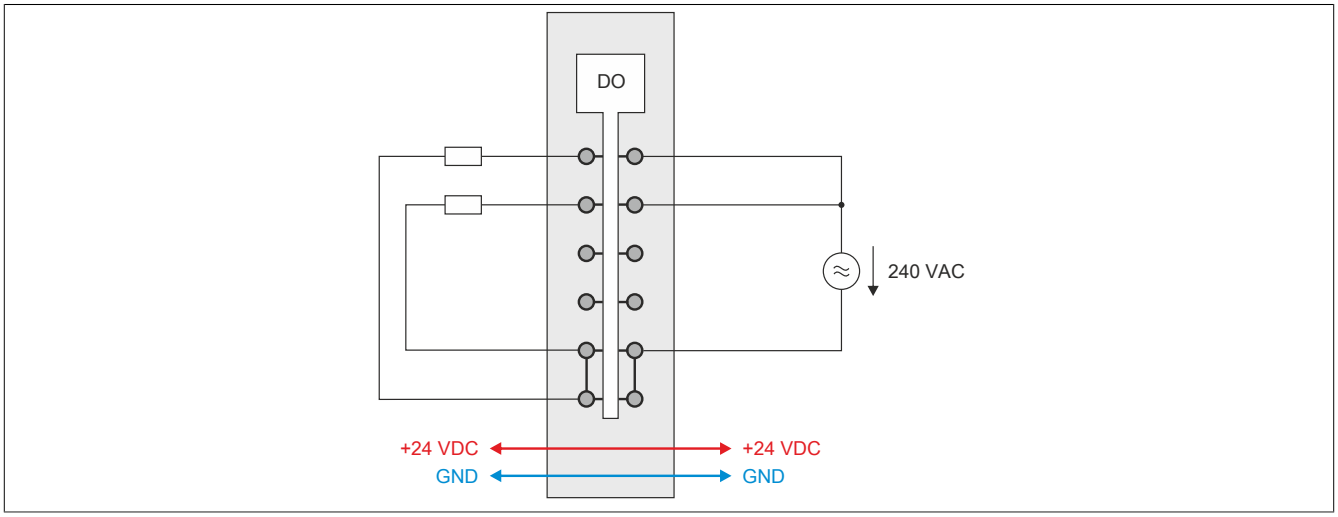
Figure	LED	Color	Status	Description
	r	Green	Off	Module supply not connected
			Single flash	RESET mode
			Blinking	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	Module supply not connected or everything OK
			On	Error or reset status
	e + r	Red on / Green single flash		Invalid firmware
	1 - 4	Orange		Output status of the corresponding digital output

6 Pinout

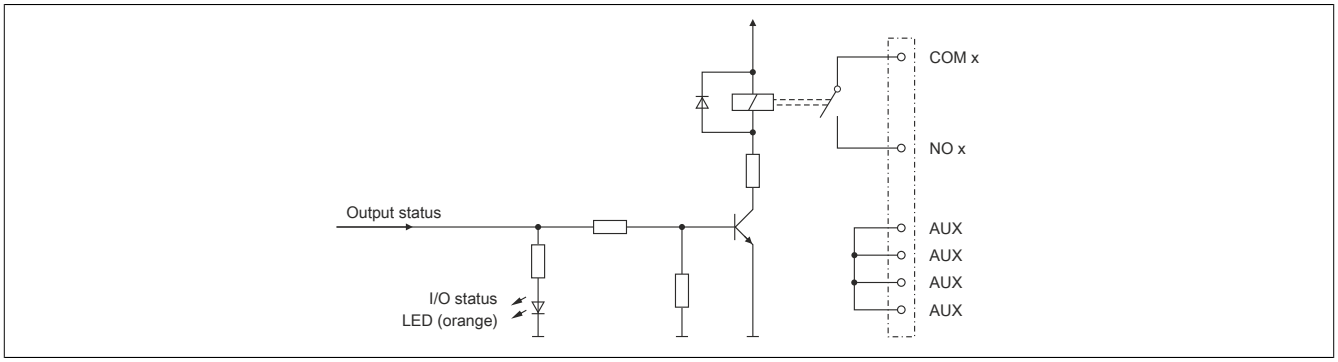
For easy wiring, 4 auxiliary contacts are available on the module starting with revision E0. They are connected together internally and can be loaded with a total of 10 A (see also section "Connection example" on page 4).



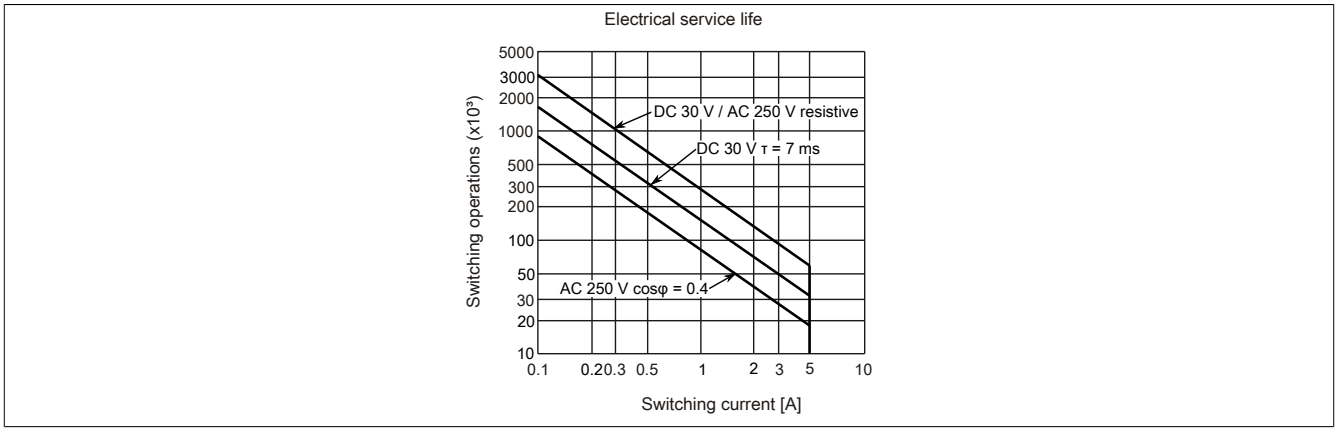
7 Connection example



8 Output circuit diagram



9 Electrical service life



10 Derating

There is no derating when operated below 55°C.

When operating above 55°C, the maximum current per channel is reduced to 4 A and the maximum summation current to 8 A!

11 Register description

11.1 General data points

In addition to the registers described in the register description, the module has additional general data points. These are not module-specific but contain general information such as serial number and hardware variant.

General data points are described in section "Additional information - General data points" of the X20 system user's manual.

11.2 Function model 0 - Standard

Register	Fixed offset	Name	Data type	Read		Write	
				Cyclic	Acyclic	Cyclic	Acyclic
2	0	DigitalOutput	USINT			•	
		DigitalOutput01	Bit 0				
		...	...				
		DigitalOutput04	Bit 3				

Fixed modules require their data points to be in a specific order in the X2X frame. Cyclic access occurs according to a predefined offset, not based on the register address.

Acyclic access continues to be based on the register numbers.

11.3 Function model 254 - Bus controller

Register	Offset[1)]	Name	Data type	Read		Write	
				Cyclic	Acyclic	Cyclic	Acyclic
2	0	Switching state of digital outputs 1 to 4	USINT			•	
		DigitalOutput01	Bit 0				
		...	...				
		DigitalOutput04	Bit 3				

1) The offset specifies the position of the register within the CAN object.

11.3.1 Using the module on the bus controller

Function model 254 "Bus controller" is used by default only by non-configurable bus controllers. All other bus controllers can use additional registers and functions depending on the fieldbus used.

For detailed information, see section "Additional information - Using I/O modules on the bus controller" of the X20 user's manual (version 3.50 or later).

11.3.2 CAN I/O bus controller

The module occupies 1 digital logical slot on CAN I/O.

11.4 Digital outputs

The output status is transferred to the output channels with a fixed offset (<60 µs) based on the network cycle (SyncOut).

11.4.1 Switching state of digital outputs 1 to 4

Name:
DigitalOutput
DigitalOutput01 to DigitalOutput04

This register is used to store the switching state of digital outputs 1 to 4.

Only function model 0 - Standard:

Setting "Packed outputs" in the Automation Studio I/O configuration determines whether all bits of this register should be applied individually as data points in the Automation Studio I/O assignment ("DigitalOutput01" to "DigitalOutput0x") or whether this register should be displayed as a single USINT data point ("DigitalOutput").

Data type	Values	Information
USINT	0 to 15	Packed outputs = On
	See the bit structure.	Packed outputs = Off or function model ≠ 0 - Standard.

Bit structure:

Bit	Description	Value	Information
0	DigitalOutput01	0	Digital output 01 reset
		1	Digital output 01 set
...		...	
3	DigitalOutput04	0	Digital output 04 reset
		1	Digital output 04 set

11.5 Minimum cycle time

The minimum cycle time specifies the time up to which the bus cycle can be reduced without communication errors occurring. It is important to note that very fast cycles reduce the idle time available for handling monitoring, diagnostics and acyclic commands.

Minimum cycle time
100 µs

11.6 Minimum I/O update time

The minimum I/O update time specifies how far the bus cycle can be reduced so that an I/O update is performed in each cycle.

Minimum I/O update time
Equal to the minimum cycle time