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	Installations / EMV guide

1.2 Order data

Order number	Short description	Figure
	Digital outputs	
X20DO4529	X20 digital output module, 4 relays, changeover contacts, 115 VAC / 0.5 A, 24 VDC / 1 A	
	Required accessories	
	Bus modules	
X20BM11	X20 bus module, 24 VDC keyed, internal I/O power supply connected through	
X20BM15	X20 bus module, with node number switch, 24 VDC keyed, internal I/O power supply connected through	
	Terminal blocks	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	

Table 1: X20DO4529 - Order data

1.3 Module description

This module is equipped with 4 relay outputs with changeover contacts for 115 VAC. The outputs are single-channel isolated.

Functions:

- Digital 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!



Danger!

The voltage classes on the terminal block are not permitted to be mixed! Only operation with the mains voltage (e.g. 115 VAC) OR with safety extra-low voltage (e.g. 24 VDC SELV) is permitted.

2 Technical description

2.1 Technical data

Order number	X20DO4529
Short description	
I/O module	4 digital outputs 30 VDC / 115 VAC, outputs single-channel isolated
General information	
B&R ID code	0x20D9
Status indicators	I/O function per channel, operating state, module status
Diagnostics	
Module run/error	Yes, using LED status indicator and software
Outputs	Yes, using LED status indicator
Power consumption	
Bus	0.8 W
Internal I/O	-
Additional power dissipation caused by actuators (resistive) [W] [1)]	+0.3
Certifications	
CE	Yes
UKCA	Yes
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta (see X20 user's manual) FTZÚ 09 ATEX 0083X
UL	cULus E115267 Industrial control equipment
HazLoc	cCSAus 244665 Process control equipment for hazardous locations Class I, Division 2, Groups ABCD, T5
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)
CCS	Yes
LR	ENV1
KR	Yes
ABS	Yes
BV	**EC33B** Temperature: 5 - 55°C Vibration: 4 g EMC: Bridge and open deck
KC	Yes
Digital outputs	
Variant	Relay / Changeover contact Channels are single-channel isolated.
Nominal voltage	30 VDC / 115 VAC
Max. voltage	125 VAC
Switching voltage	Max. 110 VDC / 125 VAC
Rated frequency	DC / 45 to 63 Hz
Nominal output current	1 A at 30 VDC / 0.5 A at 115 VAC
Total nominal current	4 A at 30 VDC / 2 A at 115 VAC
Actuator power supply	External
Inrush current	Max. 2 A (per channel)
Contact resistance	75 mΩ at 6 VDC / 1 A
Switching delay	
0 → 1	≤4 ms
1 → 0	≤4 ms
Insulation voltages	
Channel - Bus	Tested at 1500 VAC
Channel - Channel	Tested at 1000 VAC
Service life	
Electrical [2)]	Min. 100 x 10^3 ops.
Mechanical	Min. 50 x 10^6 ops. (3 Hz)
Switching capacity	
Minimum	0.01 mA / 10 mV DC
Maximum	30 W / 62.5 VA

Table 2: X20DO4529 - Technical data

Order number	X20DO4529
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, bus and I/O power supply
Operating conditions	
Mounting orientation	
Horizontal	Yes
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
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	-
Storage	-40 to 85°C
Transport	-40 to 85°C
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order 1x terminal block X20TB12 separately. Order 1x bus module X20BM11 separately.
Pitch	12.5$^{+0.2}$ mm

Table 2: X20DO4529 - Technical data

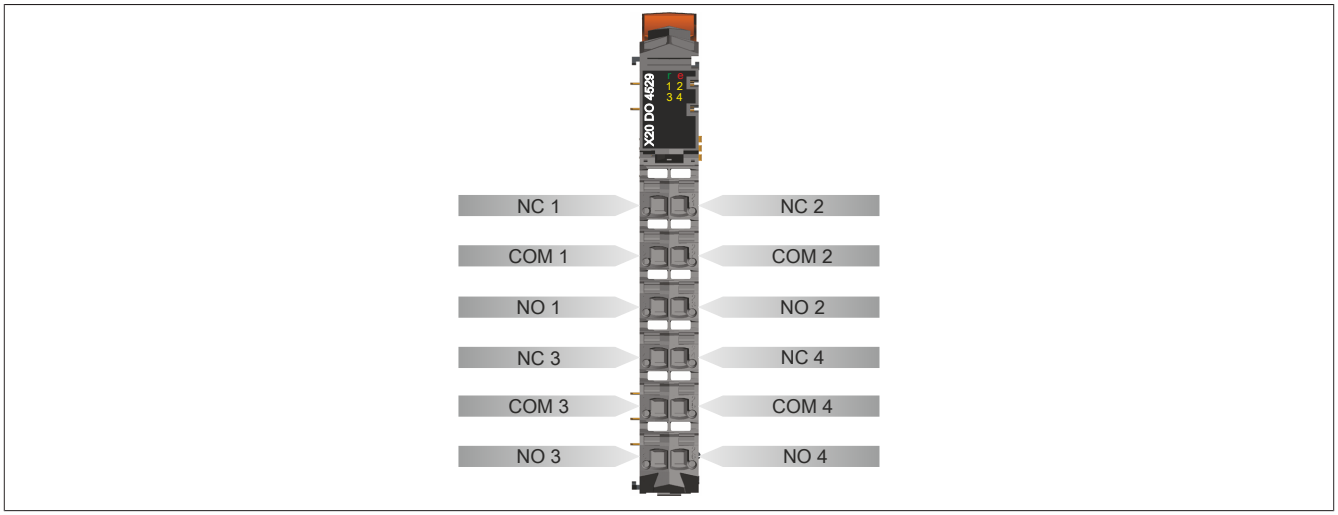
1) Number of outputs x Contact resistance x Nominal output current^2. For a calculation example, see section "Mechanical and electrical configuration" in the X20 system user's manual.
2) With resistive load. See also section "Electrical service life".

2.2 Status LEDs

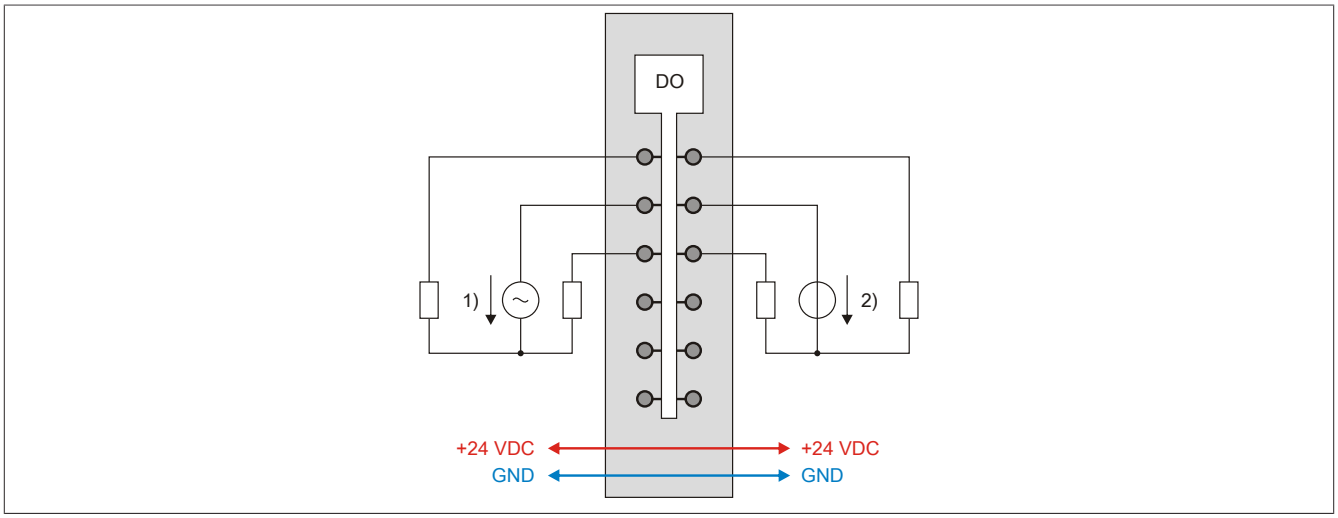
For a description of the various operating modes, see section "Additional information - Diagnostic LEDs" in the X20 System user's manual.

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

2.3 Pinout

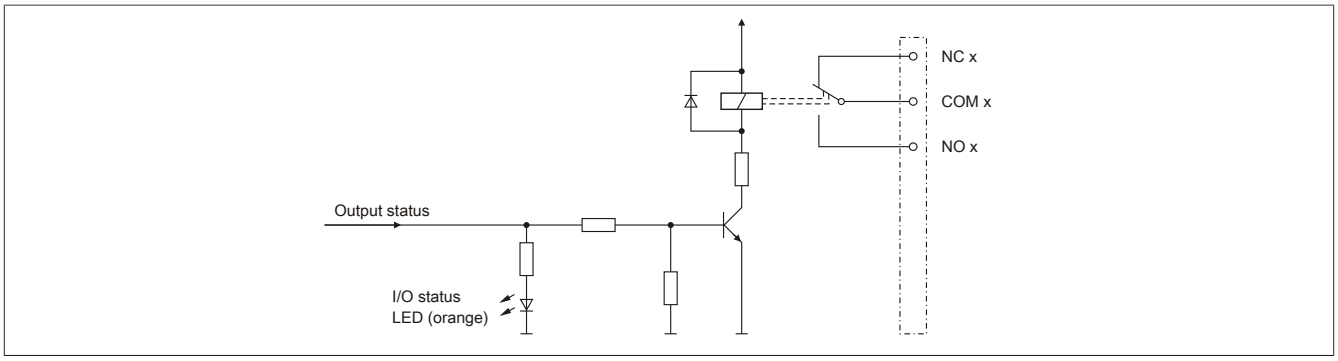


2.4 Connection example

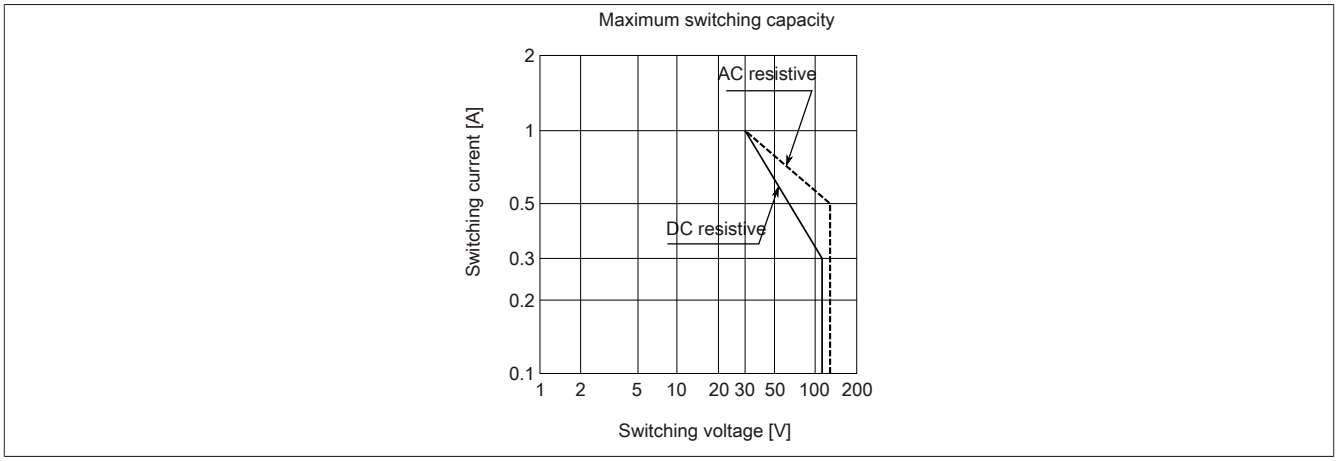


1) 115 VAC
2) 24 VDC

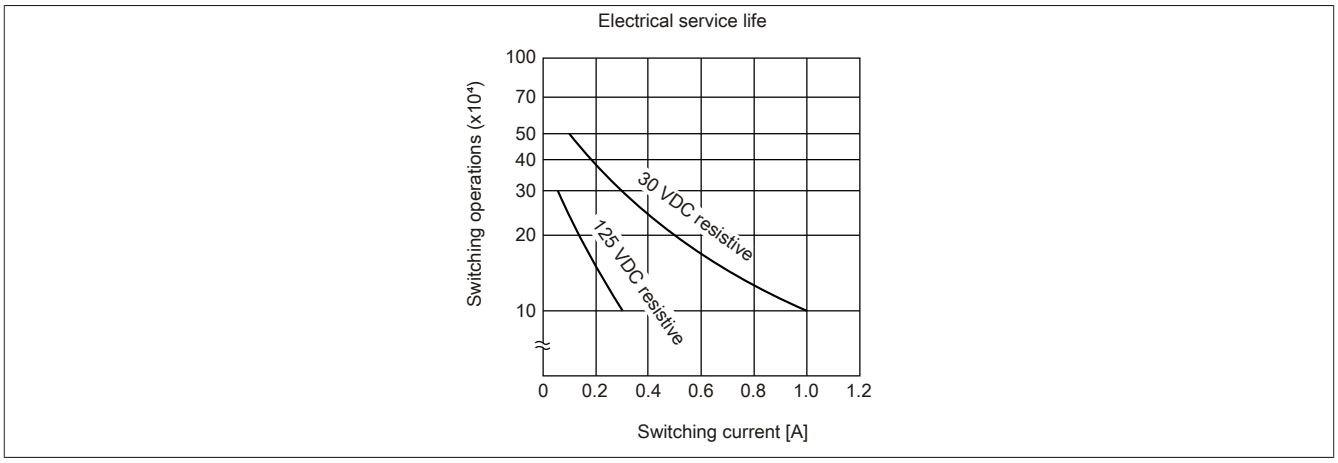
2.5 Output circuit diagram



2.6 Maximum switching capacity



2.7 Electrical service life



3 Function description

3.1 Digital outputs

The module is equipped with 4 relay outputs with changeover contacts.

The output state is transferred to the output channels with a fixed offset (<60 µs) in relation to the network cycle (SyncOut).

Packed outputs (only function model 0 - Standard)

Setting "Packed outputs" in the Automation Studio I/O configuration can be used to determine whether all bits of the register should be applied as individual data points in the Automation Studio I/O mapping ("DigitalOutput01 to DigitalOutputxx") or whether the register should be displayed as a single USINT data point ("DigitalOutput").



Information:

The register is described in "Switching state of digital outputs 1 to 4" on page 10.

4 Commissioning

4.1 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 other registers and functions depending on the fieldbus used.

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

4.1.1 CAN I/O bus controller

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

5 Register description

5.1 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" in the X20 System user's manual.

5.2 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.

5.3 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.

5.4 Digital outputs

5.4.1 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.

Data type	Values	Information[1)]
USINT	0 to 15	Packed outputs = On Data point: "DigitalOutput"
	See the bit structure.	Packed outputs = Off or function model ≠ 0 - Standard. Data points: "DigitalOutput01" to "DigitalOutput04"

1) See "Digital outputs" on page 8.

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

5.5 Minimum cycle time

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

Minimum cycle time
100 µs

5.6 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