ctrlX I/O

Digital Input and Output Module XI112108
8/8-channel, DC 24 V, 3 ms Input Filter, 0.5 A, 1-wire

DOK-XIO***-XI112108***-DA02-EN-P

R911424702
Edition 02

1 Functional description

The digital input and output module XI112108 is used to detect and output binary 24 V control signals in a ctrlX I/O station. The module is designed with 8 input channels and 8 output channels, each in 1-wire technique. The signal state is shown at the channel LED on the removable peripheral connector. The peripheral supply voltage U_P supplies the digital outputs.

The logic and peripheral supply as well as the EtherCAT-based module communication are routed through the module.

ℹ For an application manual of the ctrlX I/O modules, refer to the media directory ➦ www.boschrexroth.com/mediadirectory and enter the search term ➦ "R911423458".

ℹ Ensure that the current documentation is consulted. For the current documentations, go to ➦ www.boschrexroth.com/mediadirectory and enter the module type as search term.

ℹ For the integration into the parent system, the respective ESI files are available. For the ESI files, go to ➦ http://www.boschrexroth.com/electrics, search term "➦ESI-Files".

2 Ordering data

Type	Part number	Description
XI112108	R912009441	Digital input and output module, 8/8-channel, DC 24 V, 3 ms input filter, 0.5 A, 1-wire

ℹ For more ordering data (accessories), go to the product catalog under ➦ www.boschrexroth.com/electrics.

3 Technical data

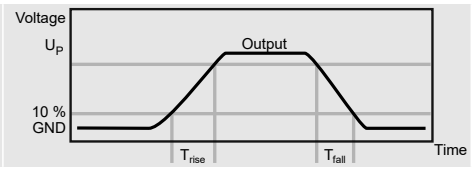
3.1 General technical data

Number of inputs	8
Number of outputs	8
Connection method	Push-in terminal
Connection technique	1-wire technique
Nominal voltage (U_L/U_P)	DC 24 V (19.2 V to 30 V, including tolerance and residual ripple) PELV/SELV (safety extra-low voltage)
Current consumption U_L	30 mA
Current consumption U_P	48 mA + load
Max. power consumption of the module	1.8 W
Bit width in the process image	1 byte input, 1 byte output
Configuration	No address or configuration setting required
Dimensions	12 mm × 105 mm × 99 mm (width × height × depth)
Weight	100 g (module including connector)
Electrical isolation	1211 V DC U_P to U_L, 707 V DC U_P/U_L to FE (not evaluated by UL)
EMC resistance	Acc. to EN 61000-6-2 and EN 61000-6-4
Mounting position	Vertical, on a horizontal mounting rail
Labeling, approvals	CE, UKCA, UL

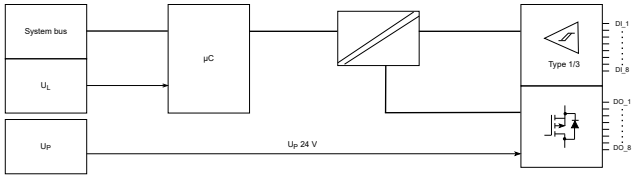
3.1.1 Digital inputs

Specification	EN 61131-2, type 1/3
Input filter	3 ms
Signal voltage "0"	-3 V... 5 V
Signal voltage "1"	11 V... 30 V
Input current	Typically 2.4 mA

3.1.2 Digital outputs

Output current max.	0.5 A per channel
Total current of channels	4 A max.
Nominal load	Ohmic, 12 W max. (48 Ω; at nominal voltage)
Minimum load	10 kΩ
	
Rising time (T_{Rise})	Without load: 8.3 µs on the digital input 8.5 µs at 240 Ω, 100 mA Ohmic nominal load: 10 µs at 48 Ω, 500 mA
Fall time (T_{FALL})	Without load: 1.4 ms on the digital input 50 µs at 240 Ω, 100 mA Ohmic nominal load: 11 µs at 48 Ω, 500 mA
Inductive switch-off energy	150 mJ max. per channel
Overload response	Granular switch-off with automatic restart
Feedback voltage resistance	Not resistant to feedback, external measures required

3.2 Internal schematic diagram



3.3 Ambient conditions

Ambient temperature	
≤ 2,000 m	-25 to +55 °C
2,000 m to 3,000 m	-25 to +50 °C
3,000 m to 4,000 m	-25 to +45 °C
4,000 m to 5,000 m	-25 to +40 °C
Maximum operating altitude Acc. to DIN 60204	5,000 m
Ambient temperature (storage and transport)	-40 to +70 °C
Permitted air humidity according to DIN EN 61131-2 (Operation, storage, transport)	10 to 95 %
Degree of protection Acc. to DIN EN 60 529	IP20 (not evaluated by UL)
Protection class Acc. to DIN EN 61010-2-201	III
Overvoltage category Acc. to IEC 60664-1	2
Contamination level Acc. to EN 61010-1	2, no condensation

NOTICE

Defective device due to contaminated air!

- The ambient air must not contain acids, alkaline solutions, corrosive agents, salts, metal vapors and other electrically conductive contaminants in high concentrations.
- The devices to be installed into the housings and installation compartments must at least comply with the degree of protection IP 54 according to DIN EN 60529.
- The device shall be provided in a suitable fire enclosure in the end-use application.

NOTICE

Defective device due to gases jeopardizing functions

Due to the risk of corrosion, avoid sulphureous gases (e.g. sulphur dioxide (SO_2) and hydrogen sulphide (H_2S)). The device is not resistant against these gases.

NOTICE

Defective device due to overheating

To avoid overheating and to ensure a trouble-free operation of the device, the ambient air has to circulate. Also refer to the section “Installation notes”.

3.4 Mechanical tests

Vibration resistance Acc. to DIN EN 60068-2-6	Oscillations, sinusoidal in all three axes, 5 Hz - 8,4 Hz with 3.5 mm amplitude 8.4 Hz -150 Hz with 1 g peak acceleration
Shock test Acc. to DIN EN 60068-2-27	Shock stress: Shock resistance in all three axes 11 ms semi-sinusoidal 15 g
Broadband noise Acc. to DIN EN 60068-2-64	20-500 Hz with 1.22 g RMS (Root Mean Square), 30 min in all three axes

For the current approvals, go to
www.boschrexroth.com/electrics.

4 For your safety

4.1 Intended use

Use the module only as specified in the data sheet.

4.2 User qualification

The product use described in this data sheet is only intended for qualified electricians and staff trained by these qualified electricians. The user has to be familiar with the known safety concepts on automation technology, applicable standards and other guidelines.

4.3 Electrical safety

NOTICE

Loss of electric safety

Unintended handling can affect the device safety! Observe the notes in the present data sheet during installation, commissioning and operation.

5 Signal processing

5.1 Synchronizing the application

The application is synchronized in the "SM synchronous" mode.

6 Process data

6.1 Process data of the module

The module is a simple module with a device emulation. Apart from the registers of the EtherCAT slave, no further objects are available for configuration or status.

The following process data is transferred:

6.1.1 Input process data

Index (hex)	Object name	Type	Access	Description	Default (hex)
6000:01	In Channel 1.Value	BOOL	RO	Channel 1, input value	0
6010:01	In Channel 2.Value	BOOL	RO	Channel 2, input value	0
6020:01	In Channel 3.Value	BOOL	RO	Channel 3, input value	0
6030:01	In Channel 4.Value	BOOL	RO	Channel 4, input value	0
6040:01	In Channel 5.Value	BOOL	RO	Channel 5, input value	0
6050:01	In Channel 6.Value	BOOL	RO	Channel 6, input value	0
6060:01	In Channel 7.Value	BOOL	RO	Channel 7, input value	0
6070:01	In Channel 8.Value	BOOL	RO	Channel 8, input value	0

6.1.2 Output process data

Index (hex)	Object name	Type	Access	Description	Default (hex)
7000:01	Out Channel 1.Value	BOOL	RW	Channel 1, output value	0
7010:01	Out Channel 2.Value	BOOL	RW	Channel 2, output value	0
7020:01	Out Channel 3.Value	BOOL	RW	Channel 3, output value	0
7030:01	Out Channel 4.Value	BOOL	RW	Channel 4, output value	0
7040:01	Out Channel 5.Value	BOOL	RW	Channel 5, output value	0
7050:01	Out Channel 6.Value	BOOL	RW	Channel 6, output value	0

Index (hex)	Object name	Type	Access	Description	Default (hex)
7060:01	Out Channel 7.Value	BOOL	RW	Channel 7, output value	0
7070:01	Out Channel 8.Value	BOOL	RW	Channel 8, output value	0

7 Diagnostic strategy

7.1 Mechanisms

Different mechanisms are used for the diagnostics of the module.

Mechanism	Diagnostics
EtherCAT state machine	EtherCAT system diagnostics
EtherCAT hardware watchdog	
Module status LED	Shows the general module status
Channel status LED	Signals the channel status or the error states

7.2 Module status LED

Device state	LED flashing pattern
Booting	BU BU BU BU BU -- -- -- -- -- ⮌
Initialization	BU BU BU BU BU BU BU BU BU BU ⮌
It is currently configured. Module not yet ready.	GN GN GN GN GN -- -- -- -- -- ⮌
Process data transmission, outputs inactive.	GN GN GN GN GN GN GN GN GN -- ⮌
Module in "Run" state	GN GN GN GN GN GN GN GN GN GN ⮌
Error and warning states	
Logic or peripheral voltage error	RD RD RD RD RD RD RD RD RD RD ⮌
Communication or configuration error	RD RD RD RD RD -- -- -- -- -- ⮌

ℹ One square corresponds to a period of 200 ms.
The arrow represents the end of a cycle.

-- LED is not on.

BU LED is blue.

GN LED is green.

RD LED is red.

ℹ A new status is only displayed after the previous flashing cycle has elapsed. A change in status can thus be delayed up to two seconds.

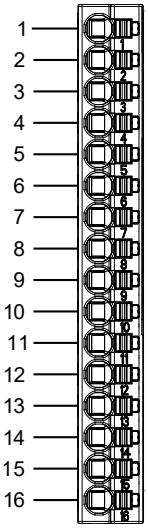
7.3 Channel status LED

Each channel of the module is provided with a channel status LED at the respective signal pin of the plug.

LED	Logic signal state
Off	0
Green	1

8 Installation

8.1 Clamping point assignment

Clamping point	Assignment	Color
	1 - DI channel 1	Grey
	2 - DI channel 2	Grey
	3 - DI channel 3	Grey
	4 - DI channel 4	Grey
	5 - DI channel 5	Grey
	6 - DI channel 6	Grey
	7 - DI channel 7	Grey
	8 - DI channel 8	Grey
	9 - DO channel 1	Grey
	10 - DO channel 2	Grey
	11 - DO channel 3	Grey
	12 - DO channel 4	Grey
	13 - DO channel 5	Grey
	14 - DO channel 6	Grey
	15 - DO channel 7	Grey
	16 - DO channel 8	Grey

ℹ The following applies to the digital inputs: Provide the potential reference of the channels via U_P 24 V or use the potential distribution terminal XI822116 (16 × DC 24 V) with the part number R911406125 or XI824116 (8 × DC 24 V, 8 × GND) with the part number R911406122.
The following applies to the digital outputs: Provide the potential reference of the channels via U_{GND} or use the potential distribution terminal XI821116 (16 × GND) with the part number R911406125 or XI824116 (8 × DC 24 V, 8 × GND) with the part number R911406122.

8.2 Switching off inductive loads

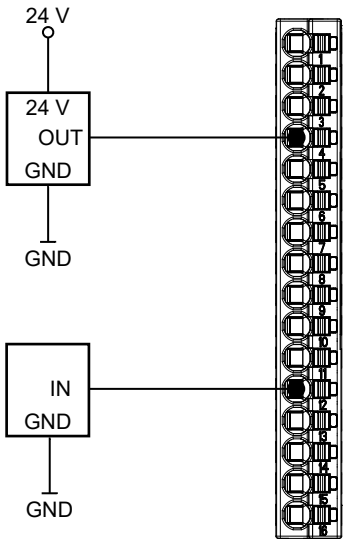
Negative voltages are generated when inductive loads are switched off. If the switch-off energies are greater than specified in the technical data, these switch-off energies can cause damage to the electronics of the module.

NOTICE

Electronic damage due to overload

Use a suitable external freewheeling circuit to protect the module from high voltages when switching off inductive loads.

8.3 Wiring example



8.4 Mounting and installation

The application manual for the ctrlX I/O modules contains notes on installation, mounting and dismounting. For the application description, go to:

- ➦www.boschrexroth.com/MediaDirectory,
  Search term: ➦"R911423458"

or

- ➦https://docs.automation.boschrexroth.com/doc/4126711705/ctrx-i-o-anwendungsbeschreibung/latest/en/.

NOTICE

Destruction of the device due to non-compliance with the application manual

Follow the mounting instructions in the application manual to ensure a correct mounting and to prevent damage to the device.

9 License information

9.1 EtherCAT®

The ctrlX I/O modules use EtherCAT® technology. "EtherCAT®" is a registered trademark and patented technology licensed by the Beckhoff Automation GmbH, Germany. EtherCAT is an open, internationally standardized standard and developed further by the "EtherCAT Technology Group" (ETG).

Bosch Rexroth AG
Bgm.-Dr.-Nebel-Str. 2
97816 Lohr a.Main
Germany
Tel. +49 9352 18 0
Fax +49 9352 18 8400
www.boschrexroth.com/electrics