



ECX-DIO8

EtherCAT Digital I/O-Module



Hardware Manual

to Product E.3010.02



NOTE

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esd electronic system design gmbh

Vahrenwalder Str. 207
30165 Hannover
Germany

Phone: +49-511-372 98-0
Fax: +49-511-372 98-68
E-mail: info@esd.eu
Internet: www.esd.eu

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Changes in the chapters

The changes in the document listed below affect changes in the hardware and firmware as well as changes in the description of facts only.

Rev.	Chapter	Changes versus previous version	Date
1.0	-	First English version	2011-02-24
1.1	-	Safety Instructions revised	2013-06-03
	2.2	Delay times inserted	
	3.3, 4.1, 4.3, 4.4	Notes inserted	
	4.5	New chapter: "Conductor Connection and Conductor Cross Sections"	
	7.	Declaration of Conformity new	
	8.	New chapter: "References"	
	9.	Chapter "Order Information" revised and moved to chapter 9	

Technical details are subject to change without further notice.



Safety Instructions

- When working with ECX-DIO8 follow the instructions below and read the manual carefully to protect yourself and the ECX-DIO8 from damage.
- The permitted operating position is specified as shown (Figure 8). Other operating positions are not allowed.
- Do not open the housing of the ECX-DIO8
- In order to prevent overvoltage damage due to thunder storm, unplug the ECX-DIO8 from CAN and the analog I/Os beforehand.
- Never let liquids get inside the ECX-DIO8. Otherwise, electric shocks or short circuits may result.
- Protect the ECX-DIO8 from dust, moisture and steam.
- Protect the ECX-DIO8 from shocks and vibrations.
- The ECX-DIO8 may become warm during normal use. Always allow adequate ventilation around the ECX-DIO8 and use care when handling.
- Do not operate the ECX-DIO8 adjacent to heat sources and do not expose it to unnecessary thermal radiation. Ensure an ambient temperature as specified in the technical data.
- Do not use damaged or defective cables to connect the ECX-DIO8.
- In case of damages to the device, which might affect safety, appropriate and immediate measures must be taken, that exclude an endangerment of persons and objects.
- Current circuits which are connected to the device have to be sufficiently protected against hazardous voltage (SELV according to EN 60950-1).
- The ECX-DIO8 may only be driven by power supply current circuits, that are contact protected. A power supply, that provides a safety extra-low voltage (SELV or PELV) according to EN 60950-1, complies with this conditions.

Conformity

The ECX-DIO8 is an industrial product and meets the demands of the EU regulations and EMC standards for industrial environments printed in the conformity declaration at the end of this manual.

Warning: In a residential, commercial or light industrial environment the ECX-DIO8 may cause radio interferences in which case the user may be required to take adequate measures.

Qualified Personal

This documentation is directed exclusively towards qualified personal in control and automation engineering. The installation and commissioning of the product may only be carried out by qualified personal, which is authorized to put devices, systems and electric circuits into operation according to the applicable national standards of safety engineering.

Intended Use

The intended use of the ECX-DIO8 is the operation as EtherCAT digital I/O module.

The esd guarantee does not cover damages which result from improper use, usage not in accordance with regulations or disregard of safety instructions and warnings.

- The ECX-DIO8 is intended for indoor installation only.
- The operation of the ECX-DIO8 in hazardous areas, or areas exposed to potentially explosive materials is not permitted.
- The operation of the ECX-DIO8 for medical purposes is prohibited.

Service Note

The ECX-DIO8 does not contain any parts that require maintenance by the user. The ECX-DIO8 does not require any manual configuration of the hardware. Unauthorized intervention in the device voids warranty claims. Remove all cables before cleaning. Clean the device with a slightly moist, lint-free cloth. Cleaning agents or solvents are not suitable.

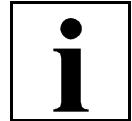
Disposal

Devices which have become defective in the long run have to be disposed in an appropriate way or have to be returned to the manufacturer for proper disposal. Please, make a contribution to environmental protection.

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1. Overview

1.1 Description of the Module

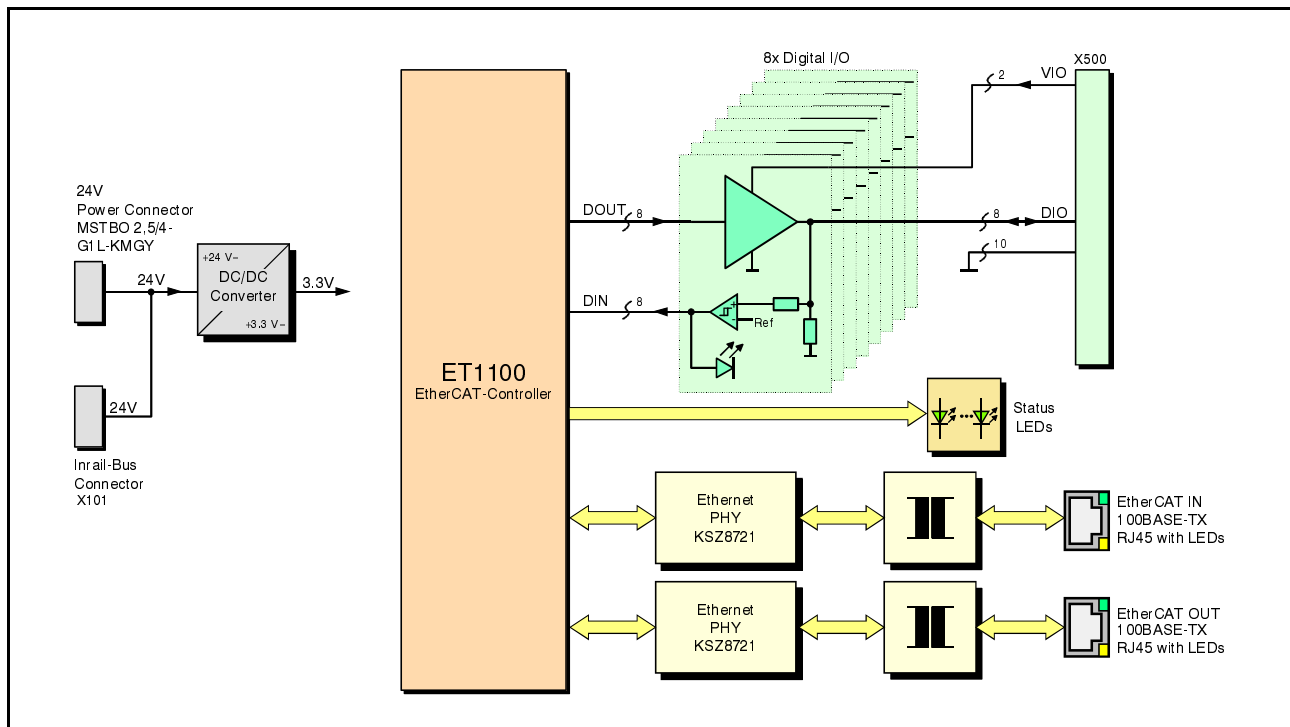


Fig. 1: Block circuit diagram of the ECX-DIO8 module

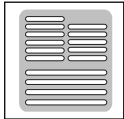
The ECX-DIO8 is an EtherCAT digital I/O-module. It is equipped with 8 digital I/Os, each available as input and output. The nominal I/O-voltage value is 24 V. Nominal output current is 0.5 A at 24 V. The ECX-DIO8 module provides industrial digital in-/outputs with two-wire connection in combination with service-friendly wiring of supply voltage.

The power supply can be applied via the InRailBus connector (TBUS-connector) integrated in the mounting rail or separately via the clamp-connection.

The 100BASE-TX EtherCAT® interface is compatible to IEEE 802.3.

Configuration is done by EtherCAT® master (XML file).

The module is designed for hat-rail mounting in a control enclosure. The digital I/O connectors and status LEDs are mounted in the front panel.

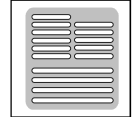


2. Technical Data

2.1 General Technical Data

Supply voltage	nominal: 24 VDC / 50 mA min./max.: 12 VDC/30 VDC
Connectors	EtherNet IN (8-pin RJ45 jack, X320A) - EtherCAT data IN (from master) OUT (8-pin RJ45 jack, X320B) - EtherCAT data OUT (to next slave) Digital I/O (20-pin Mini COMBICON double-level header, X500) - digital input/output 24V (4-pin COMBICON connector with spring-cage connection, X101) - 24V-power supply voltage InRailBus (5-pin ME-MAX-TBUS-connector, Phoenix Contact, X100) - power supply voltage for InRailBus
Temperature range	-20 ... + 70 °C ambient temperature
Humidity	max. 90%, non-condensing
Protection class	IP20
Pollution degree	maximum permissible according to DIN EN 61131-2: Pollution Degree 2
Housing	Plastic housing for carrier rail mounting NS35/7,5 DIN EN 60715
Dimensions	width: 22.5 mm, length: 99 mm, constructional height: 114.5 mm (dimensions without mating connectors)
Weight	135 g

Table 1: General technical data



2.2 Digital In/Outputs

Number of digital in/outputs	8 channels, each selectable as input and output
Specification of the digital inputs	input voltage (nominal value): 24 VDC over voltage protection up to U_{VIO}
Specification of the digital outputs	high side power switches, power supply U_{VIO} : nominal 24 VDC, min./max.: 12 VDC / 30 VDC, output current (nom.): 0.5 A (70 °C, 24 V), protection circuit: short circuit and over temperature protection with output shutdown and undervoltage shutdown with auto-restart and hysteresis
Input switching threshold '0'>'1'	input voltage ≥ 8.2 V
Input switching threshold '1'>'0'	input voltage ≤ 6.0 V
Input resistance	ca. 10 k Ω
Input time delay (caused by input filters)	typical: 90 μ s \pm 1%
Delay of the Output (switch to on)	typical: 50 μ s; maximum: 100 μ s
Delay of the Output (switch to off)	typical: 75 μ s; maximum: 150 μ s
Electrical isolation	none
LEDs	8 LEDs reflecting the DIO pin status

Table 2: Digital in/outputs

2.3 EtherCAT® Slave Controller (ESC)

Controller	Beckhoff ET1100
Typ	EtherCAT Slave
ESC interface	2x RJ45, 100BASE-TX according to IEEE 802.3

Table 3: EtherCAT Slave Controller

2.4 Software Support

Configuration is done by EtherCAT® master (XML file).



3. Hardware Installation

3.1 Connecting Diagram

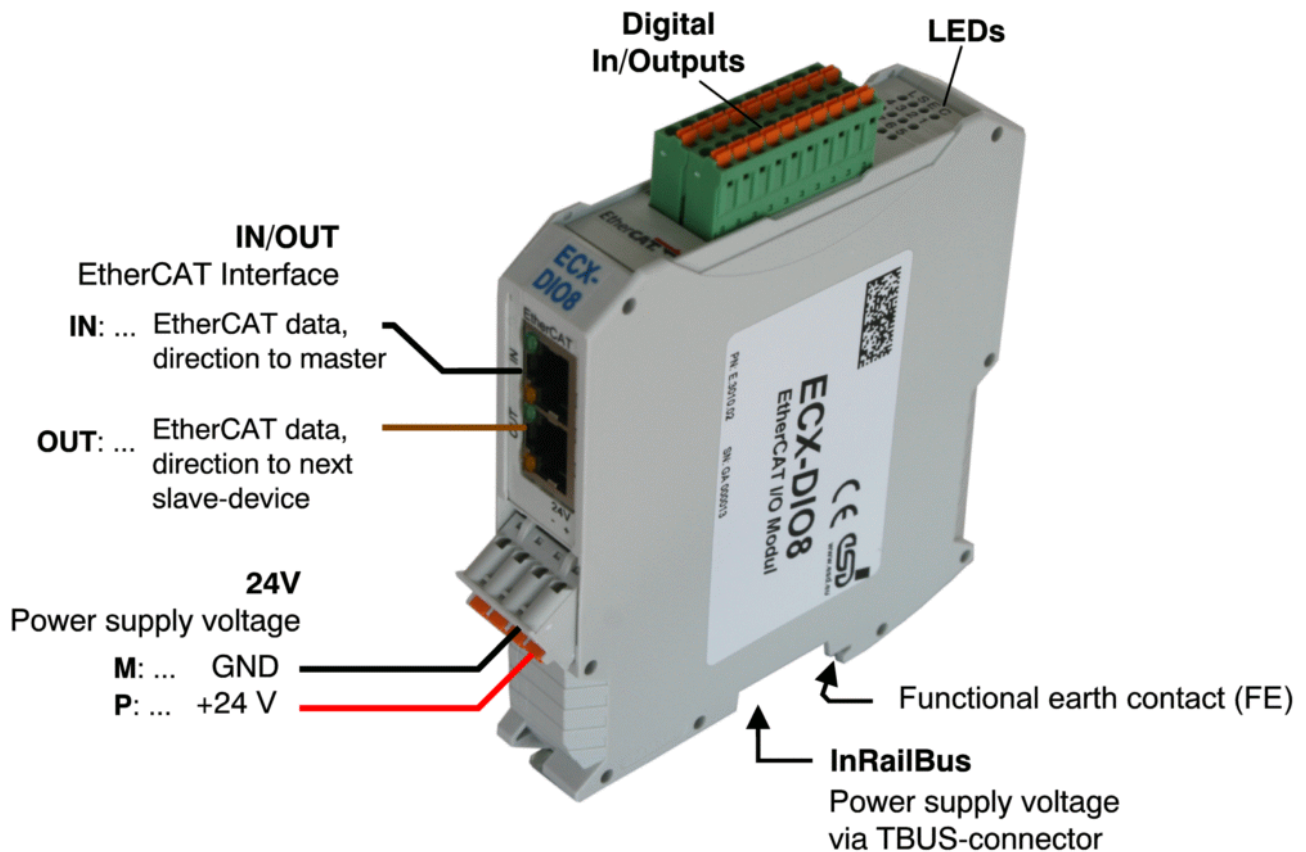


Fig. 2: Connections of the ECX-DIO8 module



Attention:

The pins 1,2 and 3 of the mounting rail bus connector are reserved and must not be connected!

The connector pin assignment can be found on page 19 and following.



3.2 LEDs

3.2.1 LEDs in the Front Panel

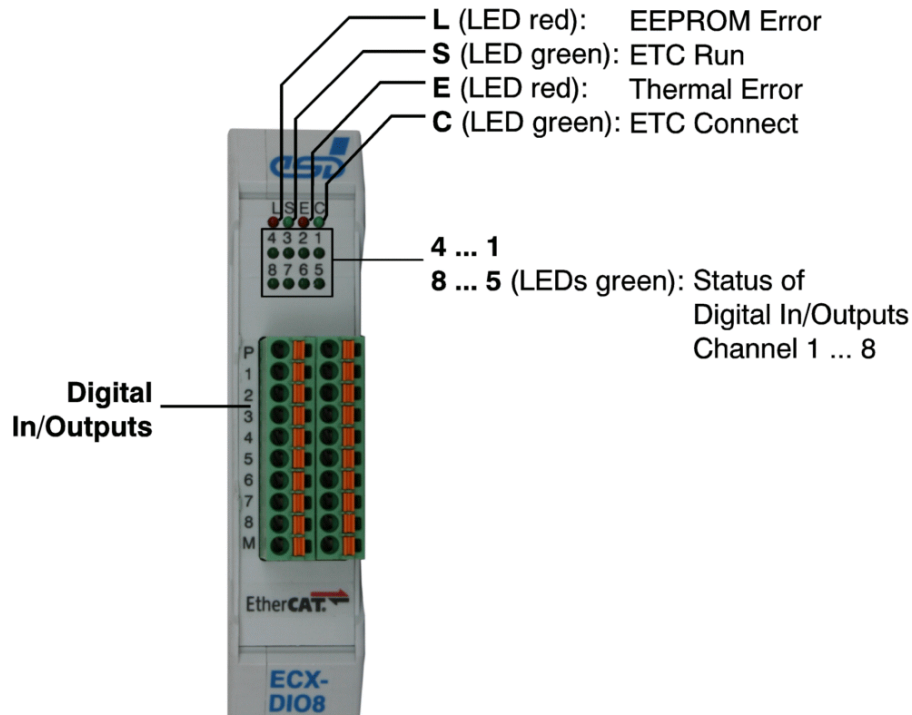


Fig. 3: Position of the LEDs in the front panel

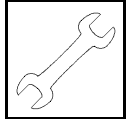
In the front panel the ECX-DIO8 module is equipped with 4 status LEDs (L, S, E, C) and 8 green LEDs (1-8) for the digital I/O channels. The indicator states of the front panel LEDs are described in the following chapters.



3.2.1.1 Operation of the Status LEDs L, S, E, C

LED indication			Display function		LED-Name in Schematics Diagram
Label	Name	Colour	Indicator state	Description	
L	EEPROM Error	red	on	EEPROM error, EEPROM not loaded	LED200A
			off	EEPROM completely loaded	
S	ETC Run	green	off	ECX-DIO8 in INIT state, ETC is not initialised	LED200B
			blinking (fast)	ECX-DIO8 in PRE-OPERATIONAL state	
			single flash	ECX-DIO8 is in SAFE-OPERATIONAL state	
			on	ECX-DIO8 is in OPERATIONAL state, ETC is initialised, registers are set, (Run mode)	
			flickering	ECX-DIO8 is in BOOTSTRAP state	
E	Thermal Error	red	on	Error of digital outputs, excess temperature	LED200C
			off	digital outputs OK	
C	ETC Connect	green	on	data communication, bus sends data	LED200D
			off	data communication terminated, watchdog expired	

Table 4: Indicator states of the Status LEDs



3.2.1.2 Status of the LEDs 1-8

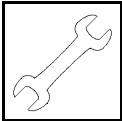
The ECX-DIO is equipped with 8 green LEDs (1-8) for the indication of the status of the DIO channels.

LED	Indication function = DI/O channel status	Name in Schematics Diagram
1	DIO1	LED580D
2	DIO2	LED580C
3	DIO3	LED580B
4	DIO4	LED580A
5	DIO5	LED581D
6	DIO6	LED581C
7	DIO7	LED581B
8	DIO8	LED581A

Table 5: Indication of LEDs 1-8

LED	State of channels DIO1...DIO8
off	input voltage level is below the lower switching threshold (input voltage ≤ 6.0 V) and output status is 'off'
on	input voltage level is higher than the upper switching threshold (input voltage ≥ 8.2 V) or output status is 'on'

Table 6: Status of channels DIO1...DIO8



3.2.2 EtherCAT LEDs

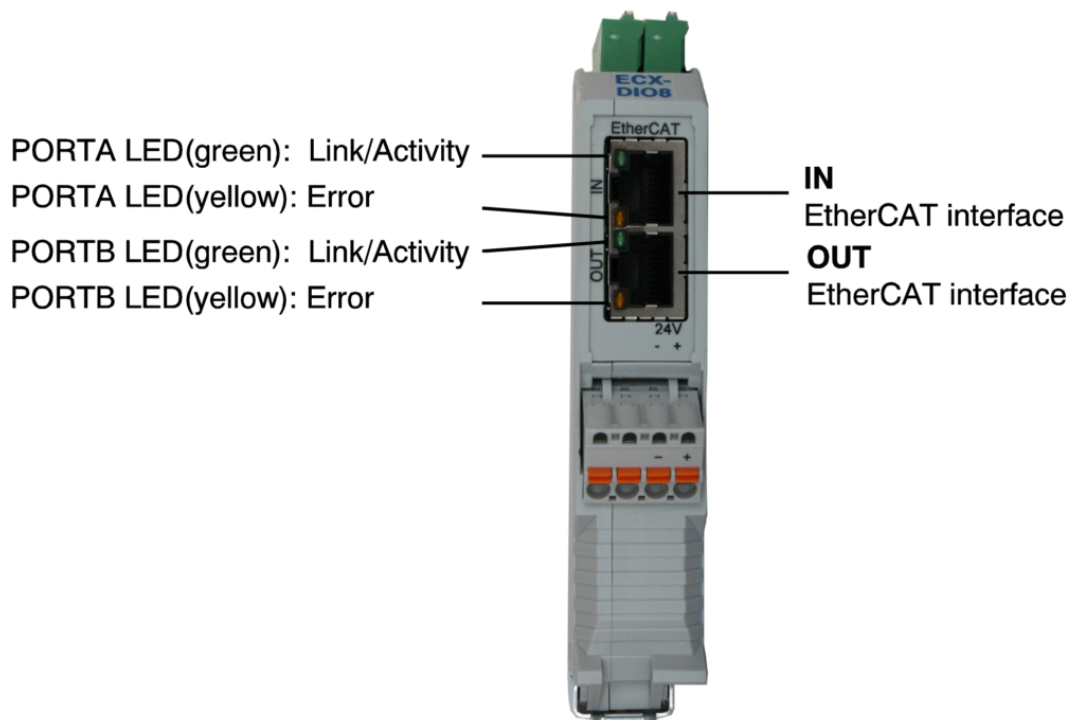


Fig. 4: Position of the EtherCAT-LEDs

The EtherCAT LEDs are integrated in the RJ45 sockets. The green LEDs indicate the Link/Activity state of the corresponding port. The yellow LEDs indicate physical layer Rx errors.

LED		Display function	
Name	Colour	Indicator state	Description
Link/ Activity	green	on	EtherCAT link of the port, without activity
		blinking	EtherCAT link of the port and EtherCAT activity (reception of Ethernet data)
		off	no EtherCAT link of the port
Error	yellow	single flash	physical layer Rx error occurred on the port
		off	no physical layer Rx error on the port

Table 7: Indicator states of the Status LEDs



3.3 Installation of the Module Using InRailBus Connector

3.3.1 Connection of the Power Supply Voltage

The power supply voltage can be connected via the +24V connector for the power supply voltage or via the InRailBus connector.



Attention:

Please note the safety instructions containing the requirements on power supply current (see page 4).



Attention:

It is **not permissible** to feed through the power supply voltage through the ECX station from the InRailBus terminal plug to the 24 V power supply connector (and vice versa) to supply other ECX stations! A feed through of the +24 V power supply voltage can cause damage on the ECX modules.



Attention:

The connections for the 24V power supply are internally connected and must not be supplied by two independent current sources at the same time!

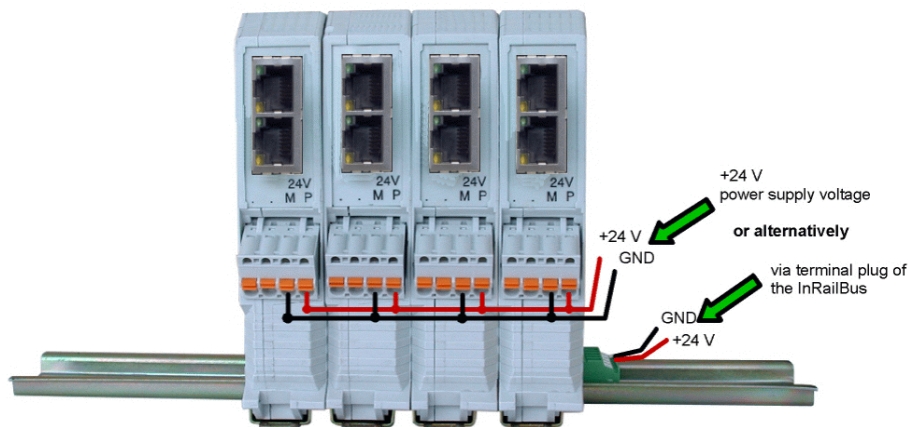


Fig. 5: ECX-Station

Earthing of the Mounting Rail



Note:

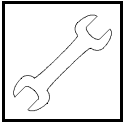
The functional earth contact (FE) has to be connected to the mounting rail. Please note, that the impedance of the connector cable has to be kept as low as possible.

The functional earth contact is a current path of low impedance between circuits and earth, that is not intended as protection measure, but improves the stability. It is not a protection against accidental contact for persons.



Note:

The EG conformity (see page 34) can only be warranted, if the earthing via the mounting rail is made as described herein.



Hardware-Installation

3.3.2 Module Installation Using a Mounting Rail Bus Connector

If the power supply voltage shall be fed via the InRailBus, please proceed as follows:



Attention:

The pins 1,2 and 3 of the mounting rail bus connector are reserved and must not be connected!

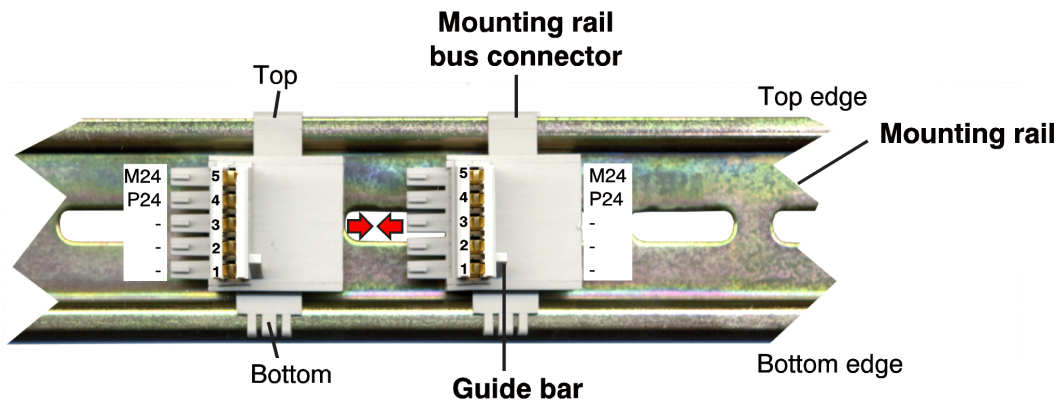


Figure 6: Mounting rail with bus connector

1. Position the InRailBus connector on the mounting rail and snap it onto the mounting rail using slight pressure. Plug the bus connectors together to contact the communication and power signals (in parallel with one). The bus connectors can be plugged together before or after mounting the ECX..
2. Place the ECX module with the DIN rail guideway on the top edge of the mounting rail.



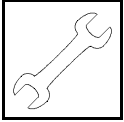
Figure 7 : Mounting ECX modules



3. Swivel the ECX module onto the mounting rail in pressing the module downwards according to the arrow as shown in figure 7. The housing is mechanically guided by the DIN rail bus connector.
4. When mounting the ECX module, the metal foot catch snaps on the bottom edge of the mounting rail. Now the module is mounted on the mounting rail and connected to the InRailBus via the bus connector. Connect the bus connectors and the InRailBus if not already done.



Figure 8: Mounted ECX-module



Hardware-Installation

3.3.3 Connecting Power Supply to InRailBus

To connect the power supply via the InRailBus, a terminal plug (order no.: C.3000.02) is needed. The terminal plug is not included in delivery and must be ordered separately (see order information).

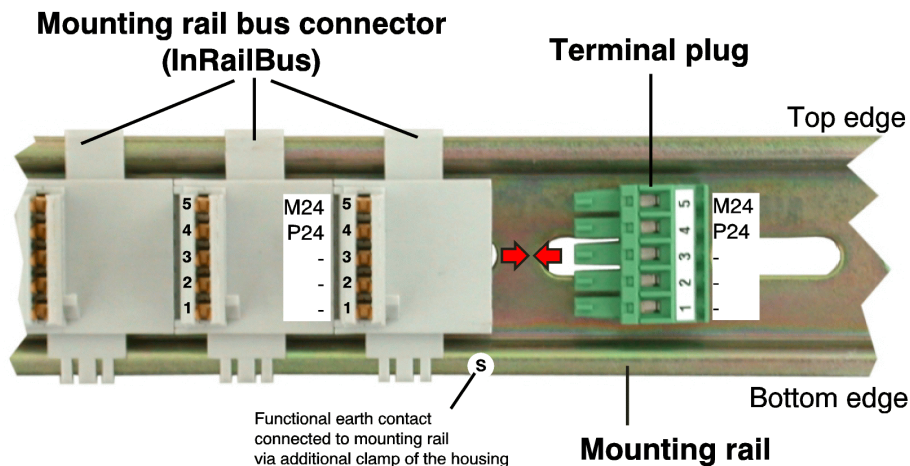


Fig. 9: Mounting rail with InRailBus and terminal plug



Attention:

The pins 1,2 and 3 of the mounting rail bus connector are reserved and must not be connected!

Plug the terminal plug into the socket on the right of the mounting-rail bus connector of the InRailBus, as described in Fig. 9. Then connect the power supply voltage via the terminal plug.

3.4 Remove the ECX Module from the InRailBus

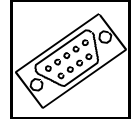
If the ECX module is connected to the InRailBus please proceed as follows:

Release the module from the mounting rail in moving the foot catch (see Fig. 8) downwards (e.g. with a screwdriver). Now the module is detached from the bottom edge of the mounting rail and can be removed.



Note:

It is possible to remove individual devices from the ECX station without interrupting the InRailBus connection, because the contact chain will not be interrupted.



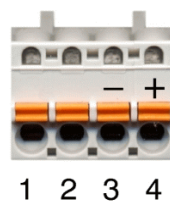
4. Connector Assignment

4.1 Power Supply Voltage 24 V (X101)

Device connector: Phoenix-Contact MSTBO 2,5/4-G1L-KMGY

Line connector: Phoenix-Contact FKCT 2,5/4-ST, 5.0 mm pitch, spring-cage connection,
Phoenix-Contact order no.: 19 21 90 0 (included in the scope of delivery)
For conductor connection and conductor cross section see page 23.

Pin Position:



Pin Assignment:

Labelling on Housing	24V			
			-	+
Labelling on connector			-	+
Pin No.	1	2	3	4
Signal	P24 (+ 24 V)	M24 (GND)	M24 (GND)	P24 (+ 24 V)



Attention:

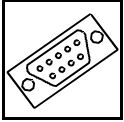
If the +24 V power supply voltage is connected to other ECX modules via the 24V power supply connector (X101, pin 3/4 to X101, pin 1/2), the current may not exceed 8 A!

Please refer also to the connecting diagram on page 10.

Signal Description:

P24... power supply voltage +24 V

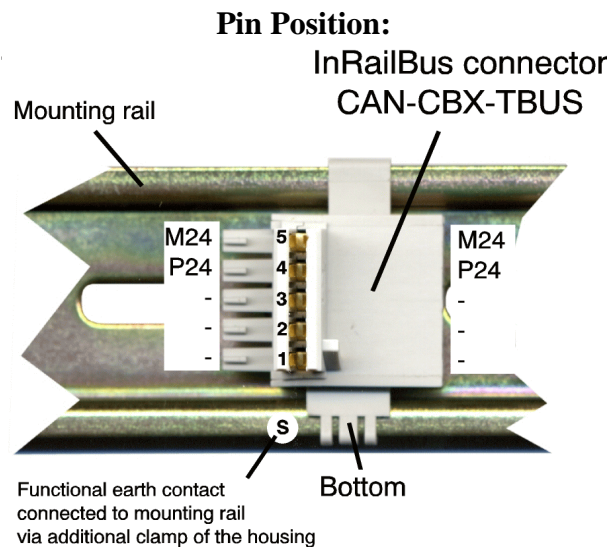
M24... reference potential



Connector Pin Assignment

4.2 Power Supply Voltage via InRailBus Connector (X100)

Connector type: Mounting rail bus connector CAN-CBX-TBUS
(Phoenix-Contact ME 22,5 TBUS 1,5/5-ST-3,81 KMGY)

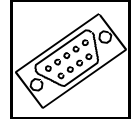


Pin Assignment:

Pin	Signal
5	M24 (GND)
4	P24 (+24 V)
3	Do not connect!
2	Do not connect!
1	Do not connect!
S	FE (PE_GND)

Signal Description:

P24... power supply voltage +24 V
M24... reference potential
FE... functional earth contact (EMC)(connected to mounting rail potential)



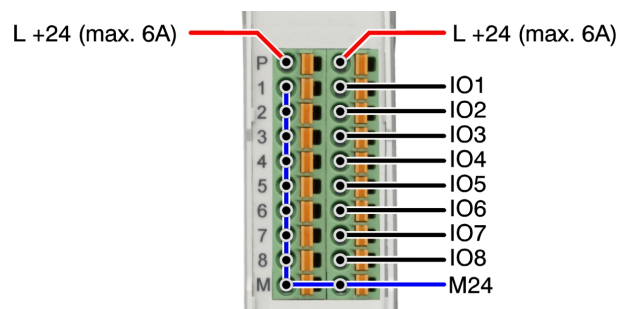
4.3 Digital In/Outputs (X500)

Device connector: Phoenix Contact Combicon MCDN 1,5/10-G1-3,5 RNP26THR

Line connector: Phoenix Contact Combicon 2x FMC 1,5/10-ST-3,5 (spring-cage connections)
(contained in the scope of supply)

For conductor connection and conductor cross section see page 23.

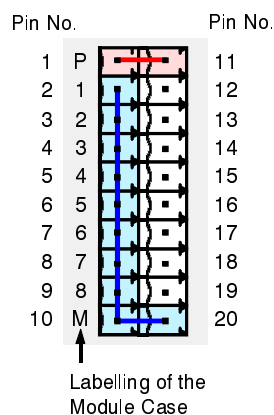
Connector top view:



Pin Assignment:

Signal	Pin
L + 24 V	1
M24	2
	3
	4
	5
	6
	7
	8
	9
	10

Pin Position:



Pin Assignment:

Pin	Signal
11	L + 24 V
12	IO1
13	IO2
14	IO3
15	IO4
16	IO5
17	IO6
18	IO7
19	IO8
20	M24

Signal Description:

L +24 V... supply voltage of the digital outputs

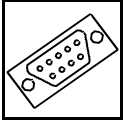
M24... reference potential

IO1-8... signals of the digital IOs 1-8



Attention!

The maximum current load of the connector pins is 6A/pin. If all 8 outputs are to be operated with the maximum admissible load, the supply voltage has to be connected to pins 1 and 11. These pins are connected to each other on the PCB.

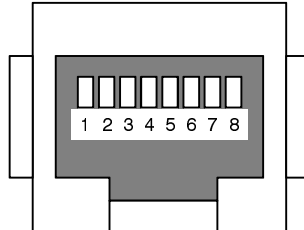


Connector Pin Assignment

4.4 EtherCAT Ports IN, OUT(X320A/B)

Connector type: 8-pin RJ45 socket

Pin Position:



Pin Assignment:

Pin	Port IN X320A Signal	Port OUT X320B Signal	Meaning
1	Tx0+ (TxD+)	Tx1+ (TxD+)	Transmit Data +
2	Tx0- (TxD-)	Tx1- (TxD-)	Transmit Data -
3	Rx0+ (RxD+)	Rx1+ (RxD+)	Receive Data+
4	-	-	-
5	-	-	-
6	Rx0- (RxD-)	Rx1- (RxD-)	Receive Data-
7	-	-	-
8	-	-	-

Tx0+/-, Rx0+/-...

Tx1+/-, Rx1+/-

-...

EtherCAT data lines of port IN

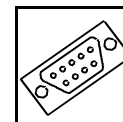
EtherCAT data lines of port OUT

unused



Note:

Permissible cable types: Cables of category 5e or higher have to be used to grant the function in networks with up to 100 Mbits/s. esd grants the EC conformity of the product if the wiring is carried out with shielded twisted pair cables of class SF/UTP or higher.



4.5 Conductor Connection/Conductor Cross Sections

The following table contains an extract of the technical data of the line connectors.


Interface	Power Supply Voltage 24 V ^[1]	Digital In/Outputs ^[2]
Connector type plug component (Range of articles)	FKCT 2,5/..-ST KMGY	FMC 1,5/..- ST-3,5
Connection method	spring-cage connection	spring-cage connection
Stripping length	10 mm	10 mm
Conductor cross section solid min.	0.2 mm ²	0.2 mm ²
Conductor cross section solid max.	2.5 mm ²	1.5 mm ²
Conductor cross section stranded min.	0.2 mm ²	0.2 mm ²
Conductor cross section stranded max.	2.5 mm ²	1.5 mm ²
Conductor cross section stranded, with ferrule without plastic sleeve min.	0.25 mm ²	0.25 mm ²
Conductor cross section stranded, with ferrule without plastic sleeve max.	2.5 mm ²	1.5 mm ²
Conductor cross section stranded, with ferrule with plastic sleeve min.	0.25 mm ²	0.25 mm ²
Conductor cross section stranded, with ferrule with plastic sleeve max.	2.5 mm ²	0.75 mm ²
Conductor cross section AWG/kcmil min.	24	24
Conductor cross section AWG/kcmil max	12	16
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, min.	0.5 mm ²	n.a.
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, max.	1 mm ²	n.a.
Minimum AWG according to UL/CUL	26	24
Maximum AWG according to UL/CUL	12	16

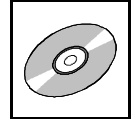
n.a. ... not allowed



5. Quick Start Guide

For a quick start with a simple configuration for the event-triggered transmission of data the following steps are necessary:

Step		see page
	Read the safety notes at the beginning of the manual carefully before you start with the installation!	4
1	Mount the ECX-DIO8 module	15
2	Connect the interfaces (power supply voltage, EtherCAT, digital I/Os)	10
3	End of hardware installation	-
4	Continue with the software configuration	25



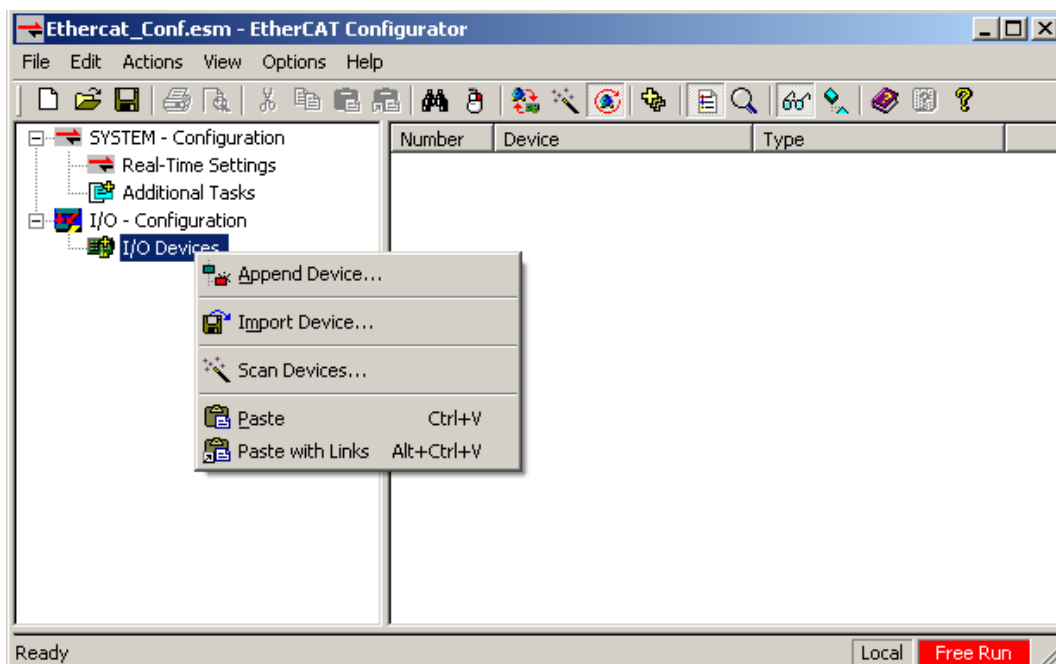
6. Software



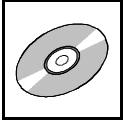
Attention!

Read the safety notes at the beginning of the manual carefully before you start with the installation! (See page 4)

1. Mount the ECX-DIO8 module and connect the interfaces (power supply voltage, EtherCAT, digital I/Os) as described on page 10.
2. Save the XML file of the ECX-DIO8 received from esd for example as:
C:\Programme\EtherCAT Configurator\EtherCAT\ESD ECX-DIO8.xml
3. Start your EtherCAT Configurator. In this chapter the configuration is shown using the example of the Beckhoff's EtherCAT Configurator.
4. Click *I/O Device* with the right mouse button and choose *Append Device...* in the menu.

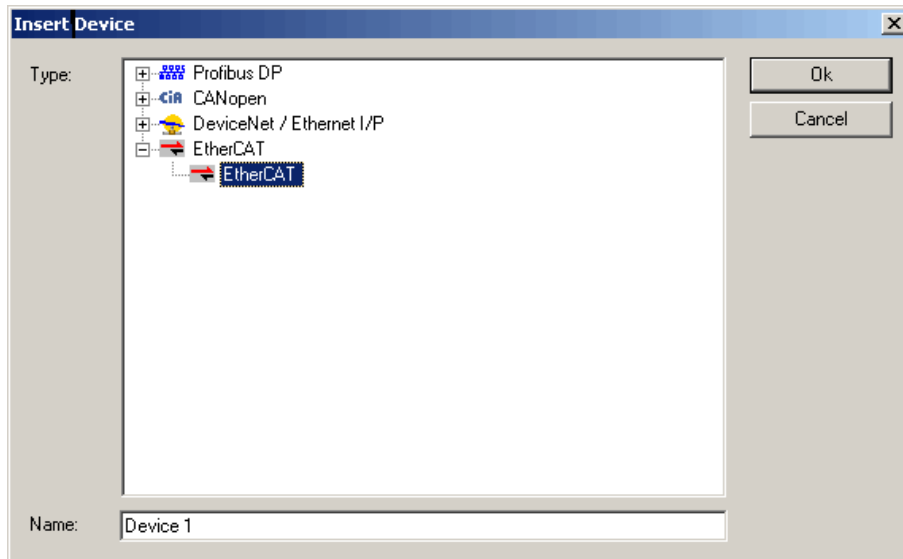


The dialog window *Insert Device* is opened.

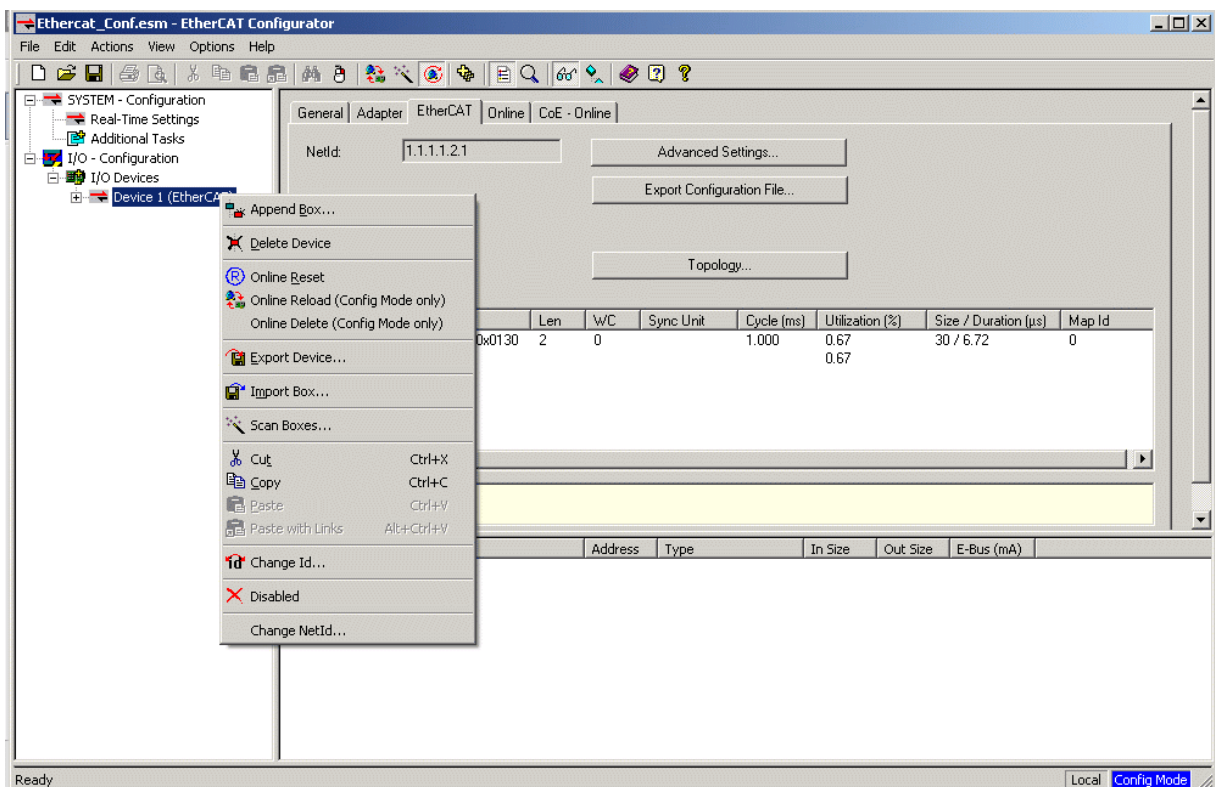


Software

5. Select the EtherCAT Device in this dialog window and confirm with OK.

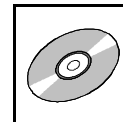


6. The EtherCAT Device 1 is appended. Click *Device 1(EtherCAT)* with the right mouse button and choose *Scan Boxes...* or *Append Box...* in the menu.

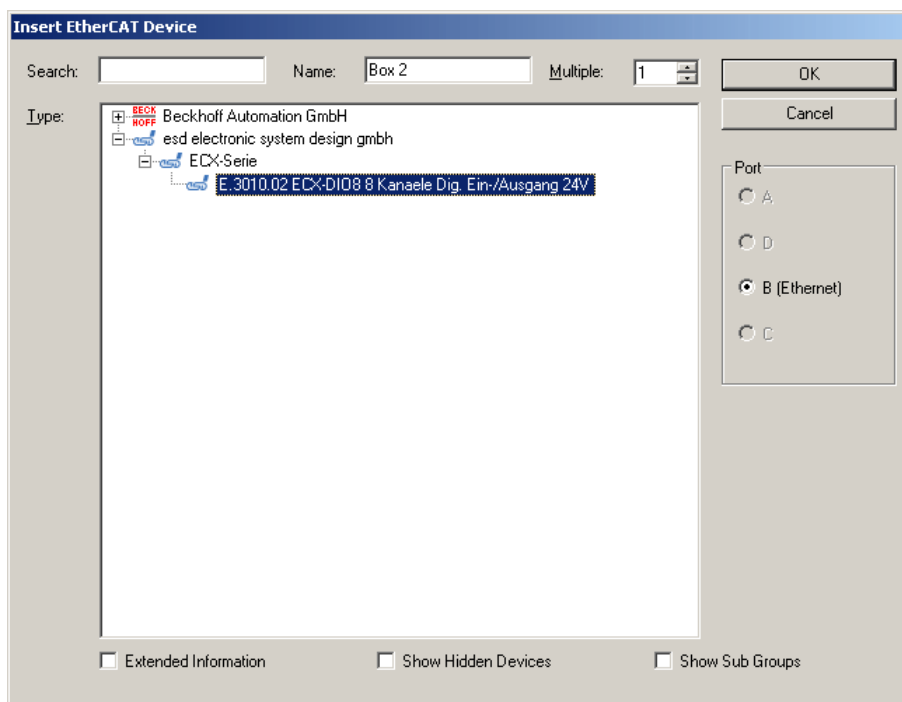


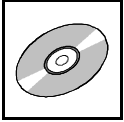
If you choose *Scan Boxes...* continue with 8.

If you choose *Append Box...*, the following dialog box *Insert EtherCAT Device* is opened.



7. Select the esd ECX-DIO8 in this dialog window and confirm with OK.





Software

8. The ECX-DIO8 (Box 1) is now shown in the EtherCAT Configurator.
- The input and output variables contained in the XML file of the ECX-DIO8 are displayed as CANopen Process Data Objects(PDO). The PDOs are listed in the *PDO List* of the *Process Data* tab.

The ECX-DIO8 uses

- 8 PDOs (1A00_h-1A07_h) for the inputs of channel 1-8
- 1 PDO (1A08_h) as DiagChannel
- 8 PDOs (1600_h-1607_h) for the outputs of channel 1-8.

The screenshot shows the EtherCAT Configurator window with the 'Process Data' tab selected. The left sidebar shows the device tree with 'Box 1 (ECX-DIO8 2.0)' expanded. The main area displays the 'PDO List' and 'PDO Assignment' tables.

PDO List:

Index	Size	Name	Flags	SM	SU
0x1A00	0.1	Channel 1	MF	0	0
0x1A01	0.1	Channel 2	MF	0	0
0x1A02	0.1	Channel 3	MF	0	0
0x1A03	0.1	Channel 4	MF	0	0
0x1A04	0.1	Channel 5	MF	0	0
0x1A05	0.1	Channel 6	MF	0	0
0x1A06	0.1	Channel 7	MF	0	0
0x1A07	0.1	Channel 8	MF	0	0
0x1A08	2.0	Diag-Channel	MF	0	0
0x1600	0.1	Channel 1	MF	1	0
0x1601	0.1	Channel 2	MF	1	0
0x1602	0.1	Channel 3	MF	1	0
0x1603	0.1	Channel 4	MF	1	0
0x1604	0.1	Channel 5	MF	1	0
0x1605	0.1	Channel 6	MF	1	0
0x1606	0.1	Channel 7	MF	1	0
0x1607	0.1	Channel 8	MF	1	0

PDO Assignment (0x1C10):

Index	Size	Name	Type	Default (hex)
0x1A00	0.1	Channel 1	Input	0.0
0x1A01	0.1	Channel 2	Input	0.1
0x1A02	0.1	Channel 3	Input	0.0
0x1A03	0.1	Channel 4	Input	0.0
0x1A04	0.1	Channel 5	Input	0.0
0x1A05	0.1	Channel 6	Input	0.0
0x1A06	0.1	Channel 7	Input	0.0
0x1A07	0.1	Channel 8	Input	0.0
0x1A08	2.0	Diag-Channel	Input	0.0

PDO Content (0x1A00):

Index	Size	Offs	Name	Type	Default (hex)
0x6000:01	0.1	0.0	Input	BOOL	0.0

Download:

☐ PDO Assignment

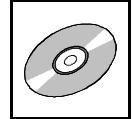
☐ PDO Configuration

Predefined PDO Assignment: (none)

Load PDO info from device

Table:

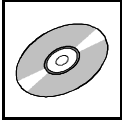
Name	Type	Size	>Addr...	In/Out	User ID	Linked to
Input	BOOL	0.1	26.0	Input	0	
Input	BOOL	0.1	26.1	Input	0	
Input	BOOL	0.1	26.2	Input	0	
Input	BOOL	0.1	26.3	Input	0	
Input	BOOL	0.1	26.4	Input	0	
Input	BOOL	0.1	26.5	Input	0	
Input	BOOL	0.1	26.6	Input	0	
Input	BOOL	0.1	26.7	Input	0	
OutputsLoopback	BYTE	1.0	27.0	Input	0	
OutputsOverload...	BOOL	0.1	28.0	Input	0	
OutputsErrorRaw	BOOL	0.1	28.1	Input	0	
Dummy1	BOOL	0.1	28.2	Input	0	



Inputs current input state

Inputs (SM = 0, Flag = mandatory, fixed)						
Index	Size	Name	PDO Content	Size of PDO Content	Name of PDO Content	Type of PDO Content
1A00 _h	1 Bit	Channel 1	6000 _h , 01	1 Bit	Input	BOOL
1A01 _h	1 Bit	Channel 2	6010 _h , 01	1 Bit	Input	BOOL
1A02 _h	1 Bit	Channel 3	6020 _h , 01	1 Bit	Input	BOOL
1A03 _h	1 Bit	Channel 4	6030 _h , 01	1 Bit	Input	BOOL
1A04 _h	1 Bit	Channel 5	6040 _h , 01	1 Bit	Input	BOOL
1A05 _h	1 Bit	Channel 6	6050 _h , 01	1 Bit	Input	BOOL
1A06 _h	1 Bit	Channel 7	6060 _h , 01	1 Bit	Input	BOOL
1A07 _h	1 Bit	Channel 8	6070 _h , 01	1 Bit	Input	BOOL

Channel	Input IO Pin
Channel 1	IO1
Channel 2	IO2
Channel 3	IO3
Channel 4	IO4
Channel 5	IO5
Channel 6	IO6
Channel 7	IO7
Channel 8	IO8

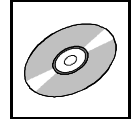


Software

Outputs current output state

Outputs (SM = 1, Flag = mandatory, fixed)						
Index	Size	Name	PDO Content	Size of PDO Content	Name of PDO Content	Type of PDO Content
1600 _h	1 Bit	Channel 1	7000 _h , 01	1 Bit	Output	BOOL
1601 _h	1 Bit	Channel 2	7010 _h , 01	1 Bit	Output	BOOL
1602 _h	1 Bit	Channel 3	7020 _h , 01	1 Bit	Output	BOOL
1603 _h	1 Bit	Channel 4	7030 _h , 01	1 Bit	Output	BOOL
1604 _h	1 Bit	Channel 5	7040 _h , 01	1 Bit	Output	BOOL
1605 _h	1 Bit	Channel 6	7050 _h , 01	1 Bit	Output	BOOL
1606 _h	1 Bit	Channel 7	7060 _h , 01	1 Bit	Output	BOOL
1607 _h	1 Bit	Channel 8	7070 _h , 01	1 Bit	Output	BOOL

Channel	Output IO Pin
Channel 1	IO1
Channel 2	IO2
Channel 3	IO3
Channel 4	IO4
Channel 5	IO5
Channel 6	IO6
Channel 7	IO7
Channel 8	IO8

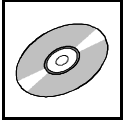


DiagChannel This process data object (Index 1A08_h) contains the variables *OutputsLoopback*, *OutputOverloadError* and *OutputsErrorRaw*.

DiagChannel (SM = 0, Flag = mandatory, fixed)						
Index	Size	Name	PDO Content	Size of PDO Content	Name of PDO Content	Type of PDO Content
1A08 _h	2 Byte	Diag-Channel	6080 _h , 00	1 Byte	OutputsLoopback	BYTE
			6080 _h , 01	1 Bit	OutputsOverloadError	BOOL
			6080 _h , 02	1 Bit	OutputsErrorRaw	BOOL
			6080 _h , 03	1 Bit	Dummy1	BOOL
			6080 _h , 04	1 Bit	Dummy2	BOOL
			6080 _h , 05	1 Bit	Dummy3	BOOL
			6080 _h , 06	1 Bit	Dummy4	BOOL
			6080 _h , 07	1 Bit	Dummy5	BOOL
			6080 _h , 08	1 Bit	Dummy6	BOOL

OutputsLoopback of type byte, contains

Bit	Digital Output
0	Channel 1
1	Channel 2
2	Channel 3
3	Channel 4
4	Channel 5
5	Channel 6
6	Channel 7
7	Channel 8



Software

OutputsOverloadError indicates for a specified period, that an error of the digital outputs is active or has occurred
type: bool, contains '0' or '1'

Value	Meaning
0	OK
1	Error of digital output has occurred

OutputsErrorRaw indicates an error of the digital outputs, just for the short time when it is active
type: bool, contains '0' or '1'

Value	Meaning
0	OK
1	Error of digital output

Dummy1-6 Do not use!
These dummies are only implemented to work around a bug in the Beckhoff Configurator.



7. References

- [1] Phoenix Contact GmbH & Co. KG, Blomberg.
Technical data is taken from COMBICON Online Catalog,
http://www.phoenixcontact.com/assets/interactive_ed/local_us/modules/0000160/index.html
Printed-circuit board connector - FKCT-2,5/4-ST KMGY - 1921900, downloaded 2012-11-21

- [2] Phoenix Contact GmbH & Co. KG, Blomberg.,
Technical data is taken from COMBICON Online Catalog,
http://www.phoenixcontact.com/assets/interactive_ed/local_us/modules/0000160/index.html
Printed-circuit board connector - FMC 1,5/ 5-ST-3,5 - 1952296, downloaded 2012-11-21

8. Declaration of Conformity

EG-KONFORMITÄTSERKLÄRUNG EC DECLARATION OF CONFORMITY



Adresse **esd electronic system design gmbh**
Address **Vahrenwalder Str. 207**
30165 Hannover
Germany

esd erklärt, dass das Produkt
esd declares, that the product
ECX-DIO8

Typ, Modell, Artikel-Nr.
Type, Model, Article No.
E.3010.02

die Anforderungen der Normen
fulfills the requirements of the standards

EN 61000-6-2:2005
EN 61000-6-4:2007/A1:2011

gemäß folgendem Prüfbericht erfüllt.
according to test certificate.

H-K00-0364-09

Das Produkt entspricht damit der EG-Richtlinie „EMV“
Therefore the product corresponds to the EC-Directive 'EMC'

2004/108/EG

Das Produkt entspricht der EG-Richtlinie „RoHS“
The product corresponds to the EC-Directive 'RoHS'

2011/65/EU

Diese Erklärung verliert ihre Gültigkeit, wenn das Produkt nicht den Herstellerunterlagen entsprechend eingesetzt und betrieben wird, oder das Produkt abweichend modifiziert wird.
This declaration loses its validity if the product is not used or run according to the manufacturer's documentation or if non-compliant modifications are made.

Name / Name T. Ramm
Funktion / Title CE-Koordinator / CE Coordinator
Datum / Date Hannover, 2013-02-28

Rechtsgültige Unterschrift / *authorized signature*

9. Order Information


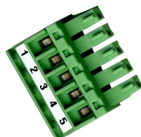

Type	Features	Order No.
ECX-DIO8	EtherCAT I/O module with 8 digital channels, 24 V, nominal output current: 0.5 A (70°C, 24 V), 2-wire, each channel individually selectable as input or output	E.3010.02
Accessories		
CAN-CBX-TBUS 	Mounting-rail bus connector of the CBX-InRailBus for CAN-CBX-modules, (one bus connector is included in delivery of the ECX-module)	C.3000.01
CAN-CBX-TBUS-Connector 	Terminal plug of the CBX-InRailBus for the connection of the +24 V power supply voltage and the CAN interface Female type	C.3000.02
CAN-CBX-TBUS-Connection adapter 	Terminal plug of the CBX-InRailBus for the connection of the +24 V power supply voltage and the CAN interface Male type	C.3000.03

Table 8: Order information

PDF Manuals

Manuals are available in English and usually in German as well. For availability of English manuals see the following table.

Please download the manuals as PDF documents from our esd website www.esd.eu for free.

Manuals		Order No.
ECX-DIO8-ME	Manual in English	E.3010.21

Table 9: Available manuals

Printed Manuals

If you need a printout of the manual additionally, please contact our sales team: sales@esd.eu for a quotation. Printed manuals may be ordered for a fee.