



TYPE APPROVAL CERTIFICATE

Certificate no.:
TAA00002D4
Revision No:
2

This is to certify:

that the **Programmable Controller**

with type designation(s)

Embedded PC CX5130/CX5140, CX5230/CX5240 and EtherCAT Coupler/Terminals

issued to

Beckhoff Automation GmbH & Co. KG
Verl, Germany

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft

Application:

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Location classes:

Temperature D

Humidity B

Vibration B

EMC A/B*

Enclosure Required protection according to the Rules shall be provided upon installation on board.

Issued at **Hamburg** on **2025-04-08**

This Certificate is valid until **2030-04-07**.

for **DNV**

DNV local unit: **Essen**

Approval Engineer: **Heinz Scheffler**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

Embedded PC CX51x0-01ST

- [X]: 3 = Intel-Atom® multi-core processor 1,75 GHz
- 4 = Intel-Atom® multi-core processor 1,91 GHz
- [S]: operating system = 0, 1, 2, 3, 4, 5, 6 or 7
- [T]: TwinCAT = 0, 1, 2, 3 or 5

Interfaces: 2x Gigabit Ethernet ports, 4x USB 2.0, 1x DVI-I

Memory: 4096MB DDR3 RAM

I/O connection: E-bus or K-bus, automatic recognition

Optional Interface:

- CX51x0-N031 = RS485 interface, D-sub socket, 9-pin
- CX51x0-M510 = CANopen master, D-sub plug, 9-pin
- CX51x0-B510 = CANopen slave, D-sub plug, 9-pin
- CX51x0-M310 = PROFIBUS master, D-sub socket, 9-pin
- CX51x0-B310 = PROFIBUS slave, D-sub socket, 9-pin
- CX51x0-B110 = EtherCAT slave, EtherCAT IN and OUT (2 x RJ 45)
- CX51x0-M930 = PROFINET RT, controller interface, Ethernet (2 x RJ45)
- CX51x0-B930 = PROFINET RT, device, Ethernet (2x RJ 45 switch)
- CX51x0-B950 = EtherNet/IP slave, Ethernet (2 x RJ 45 switch)

Embedded PC CX52x0-01ST

- [X]: 3 = Intel Atom® x5-E3930, 1.3 GHz, 2 cores
- 4 = Intel Atom® x5-E3940, 1.6 GHz, 4 cores
- [S]: operating system = 8
- [T]: TwinCAT = 5

Interfaces: 2x Gigabit Ethernet ports, 4x USB 3.0, 1x DVI-D

Memory: 4 GB (C5230) / 8 GB (C5240) DDR4 RAM

I/O connection: E-bus or K-bus, automatic recognition

TwinCAT 3 platform level

Ethernet module CX2500-0060

- Ethernet module for CX5240

EtherCAT Coupler

- EK1100: EtherCAT Coupler
- EK1101: EtherCAT Coupler with ID switch
- EK1110: EtherCAT Extension

EtherCAT Terminals Digital Input

- EL/ES1002: 2-channel digital input terminal 24 V DC, 3 ms
- EL/ES1004: 4-channel digital input terminal 24 V DC, 3 ms
- EL/ES1008: 8-channel digital input terminal 24 V DC, 3 ms
- EL/ES1012: 2-channel digital input terminal 24 V DC, 10 µs
- EL/ES1014: 4-channel digital input terminal 24 V DC, 10 µs
- EL/ES1018: 8-channel digital input terminal 24 V DC, 10 µs
- EL/ES1084: 4-channel digital input terminal 24 V DC, negative switching
- EL/ES1088: 8-channel digital input terminal 24 V DC, negative switching
- EL/ES1094: 4-channel digital input terminal 24 V DC, negative switching
- EL/ES1098: 8-channel digital input terminal 24 V DC, negative switching
- EL1804: 4-channel digital input, 24 V DC, 3 ms, 2-wire connection
- EL1808: 8-channel digital input, 24 V DC, 3 ms, 2-wire connection

EtherCAT Terminals Digital Output

- EL/ES2002: 2-channel digital output terminal 24 V DC, 0.5 A
- EL/ES2004: 4-channel digital output terminal 24 V DC, 0.5 A
- EL/ES2008: 8-channel digital output terminal 24 V DC, 0.5 A
- EL/ES2652: 2-channel relay output terminal 230V AC/300 V DC, 1A
- EL2784: 4-channel digital output terminal 30 V AC/DC, 2 A, solid state
- EL2788: 8-channel digital output terminal 30 V AC/DC, 2 A, solid state
- EL2794: 4-channel digital output terminal 30 V AC/DC, 2 A, solid state
- EL2798: 8-channel digital output terminal 30 V AC/DC, 2 A, solid state
- EL2808: 8-channel digital output, 24 V DC, 0.5 A, 2-wire connection
- EL2809: HD-EtherCAT-terminal, 16-channel-digital-output 24V DC, 0.5A
- EL2819: HD-EtherCAT-terminal, 16-channel-digital-output 24V DC, 0.5A with diagnostics

EtherCAT Terminals Analog Input

- EL/ES3041: 1-channel analog input terminal 0...20 mA, single-ended, 12 bit
- EL/ES3042: 2-channel analog input terminal 0...20 mA, single-ended, 12 bit
- EL/ES3044: 4-channel analog input terminal 0...20 mA, single-ended, 12 bit
- EL/ES3214: 4-channel input terminal PT100 (RTD) for 3-wire connection
- EL3074: 4-channel analog input, multi-function, ± 10 V, ± 20 mA, 12 bit
- EL3204-0200: 4-channel analog input, temperature, RTD/NTC, 16 bit

EtherCAT Terminals Analog Output

- EL/ES4011: 1-channel analog output, current, 0...20 mA, 12 bit
- EL/ES4012: 2-channel analog output, current, 0...20 mA, 12 bit
- EL/ES4014: 4-channel analog output, current, 0...20 mA, 12 bit
- EL/ES4034: 4-channel analog output, voltage, ± 10 V, 12 bit

EtherCAT Terminals Position measurement

- EL5112: 2-channel encoder interface, incremental

EtherCAT Terminals Interface

- EL/ES6001: 1-channel communication interface, serial, RS232
- EL/ES6021: 1-channel communication interface, serial, RS422/RS485
- EL6070 | EtherCAT Terminal, license key for TwinCAT 3.1
- EL6751: 1-channel communication interface, CANopen, master/slave
- EL6751-0010: 1-channel communication interface, CANopen, slave
- EL6090: Display terminal with navigation switch, operating hours counter

EtherCAT System Terminals

- EL9210: Potential supply terminal, 24 V DC, with diagnostic and fuse
- EL9410: Power supply terminal for E-bus, with diagnostics
- EL9540-0010: System terminal, surge filter and field supply
- EL9550-0010: System terminal, surge filter system and field supply

Application/Limitation

Location classes:

- **EMC A:** CX51x0-N031; EK1100; EK1101; EL1808; EL2808; EL3074; EL3204-0200; EL/ES4011; EL/ES4012; EL/ES4014; EL/ES6021; EL6751, EL6751-0010
- **EMC B:** Only with filter type EPCOS SIFI A B84111A0000B110

Please observed the "Notes for operation of the Beckhoff Ether CAT Terminal System in the Marine Sector (DNV), Version: 2024-09-23, 1.2.0 regarding the required Surge filter.

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV rules for classification of ships Pt.4 Ch.9 Control and monitoring systems.

Product certificate

If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After certification the clause for software control will be put into force.

Software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV GL for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Type Approval documentation

Test Reports: TAA00002D4-List of Test Reports, Rev. 2.0

Documents: TAA00002D4-List of Documents, Rev. 3.0

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.

Marking of product

- Model name
- Manufacturer name
- Serial number

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE