

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

ALL MANUFACTURERS

CX2030-0130/4GB

EMBEDDED PC CPU MODULE

Used with the applicable Beckhoff CX2000 embedded PCs configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Beckhoff official manufacturer documentation

3 Transport and storage

Transport

NOTICE

Short circuit due to moisture

Moisture can form during transport in cold weather or in the event of large temperature fluctuations.

Avoid moisture formation (condensation) in the embedded PC, and leave it to adjust to room temperature slowly. If condensation has occurred, wait at least 12 hours before switching on the embedded PC.

Despite the robust design of the unit, the components are sensitive to strong vibrations and impacts. During transport the embedded PC must be protected from

- high mechanical stress and
- use the original packaging for shipping.

Table 1: Dimensions and weight of the individual modules.

	CX2020	CX2030	CX2040
Dimensions (W x H x D)	144 mm x 99 mm x 91 mm		
Weight	approx. 1160 g	approx. 1165 g	approx. 1230 g

Storage

- Remove the battery from the Embedded PC if storage temperatures exceed 60 °C. The battery should be stored separate from the Embedded PC in a dry environment at a temperature between 0 °C and 30 °C.
The preset date and time are lost if the battery is removed.

4.1 Configuration of the basic CPU module

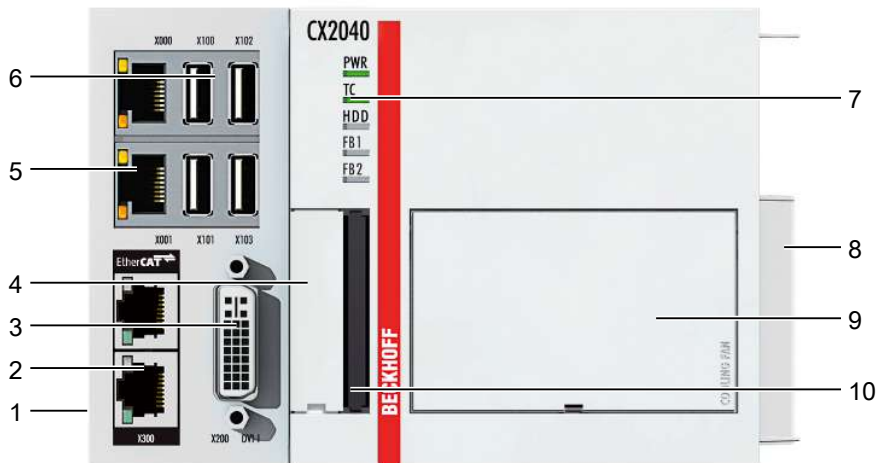


Fig. 2: Example: Embedded PCs CX2040 with active cooling.

Table 3: Legend for the configuration of the basic CPU module

No.	Component	Description
1	Multi-pin connection (left)	Extension through system modules and fieldbus modules of type CX2500.
2	Optional interface (X300).	Space for interfaces such as RS232, EtherCAT, CANopen or others. The optional interface must be ordered ex factory and cannot be retrofitted retrospectively.
3	DVI-I interface (X200).	Interface for a monitor or Panel.
4	Battery compartment [► 79] (under the front flap).	Power supply for the battery-backed clock for time and date.
5	RJ45 Ethernet interfaces (X000, X001).	For connecting to local networks, internet or EtherCAT.
6	USB interfaces (X100, X101, X102, X103).	Interfaces for peripherals such as mouse, keyboard or USB memory.
7	<u>D</u> iagnostics <u>L</u> EDs. [► 74]	Diagnostic LEDs for power supply, TwinCAT, CFast card and optional interface.
8	Multi-pin connection (right)	Connection for extension modules of type CX2550 and for power supply units of type CX2100.
9	<u>F</u> an cartridge [► 79] (under the front flap).	The fan cartridge is provided as standard for the CX2040. The CX2020 and CX2030 can be ordered with active cooling ex factory.
10	CFast card slot.	Slot for industrial CFast cards.

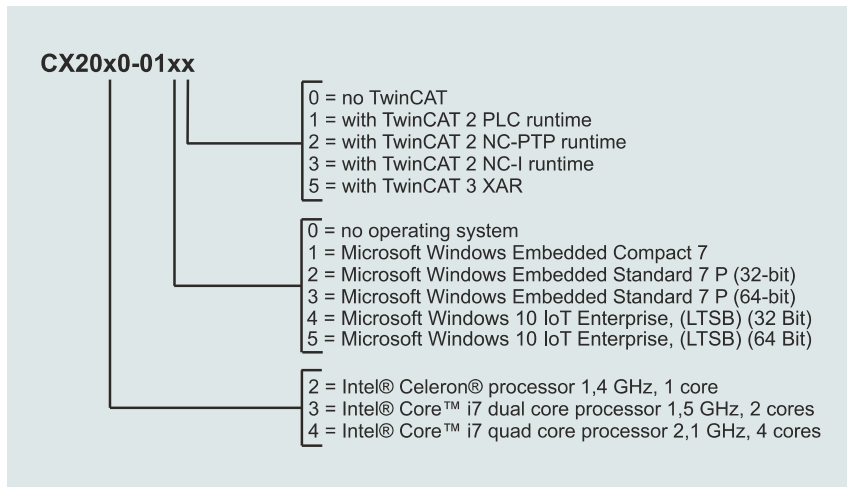


Fig. 4: Nomenclature for the basic CPU module.

The basic CPU module CX2020, CX2030 and CX2040 is available with the following software options:

Table 5: CX20x0, ordering information for software.

Module	no operating system	Windows Embedded Compact 7	Windows Embedded Standard 7 P (32-Bit)	Windows Embedded Standard 7 P (64-Bit)	Windows 10 IoT Enterprise, 32 Bit	Windows 10 IoT Enterprise, 64 Bit	no Twin-CAT	Twin-CAT 2 PLC- Runtime	Twin-CAT 2 NC-PTP- Runtime	Twin-CAT 2 NC-I- Runtime	Twin-CAT 3 XAR
CX20x0-0100	X	-	-	-	-	-	X	-	-	-	-
CX20x0-0110	-	X	-	-	-	-	X	-	-	-	-
CX20x0-0111	-	X	-	-	-	-	-	X	-	-	-
CX20x0-0112	-	X	-	-	-	-	-	-	X	-	-
CX20x0-0113	-	X	-	-	-	-	-	-	-	X	-
CX20x0-0115	-	X	-	-	-	-	-	-	-	-	X ¹⁾
CX20x0-0120	-	-	X	-	-	-	X	-	-	-	-
CX20x0-0121	-	-	X	-	-	-	-	X	-	-	-
CX20x0-0122	-	-	X	-	-	-	-	-	X	-	-
CX20x0-0123	-	-	X	-	-	-	-	-	-	X	-
CX20x0-0125	-	-	X	-	-	-	-	-	-	-	X
CX20x0-0130	-	-	-	X	-	-	X	-	-	-	-
CX20x0-0135	-	-	-	X	-	-	-	-	-	-	X
CX20x0-0140	-	-	-	-	X	-	X	-	-	-	-
CX20x0-0141	-	-	-	-	X	-	-	X	-	-	-
CX20x0-0142	-	-	-	-	X	-	-	-	X	-	-
CX20x0-0143	-	-	-	-	X	-	-	-	-	X	-
CX20x0-0150	-	-	-	-	-	X	X	-	-	-	-
CX20x0-0155	-	-	-	-	-	X	-	-	-	-	X

¹⁾ TwinCAT 3 supports only one CPU core. Applies to CX2030 and CX2040.

A CX20x0 Embedded PC with Microsoft Windows Embedded Compact 7 requires a CFast card with a minimum capacity of 20 GB. For Microsoft Windows Embedded Standard 7 P and Microsoft Windows 10 IoT Enterprise a CFast card with a minimum capacity of 40 GB is required.

6 Commissioning

6.1 Selecting the appropriate CX2100 power supply unit

The basic CPU module requires a power supply unit of type CX2100-0xxx. Connect the power supply unit to the multi-pin port on the right of the basic CPU module.

When selecting a CX2100-0xxx power supply unit, always check whether the peak power consumption of the overall system with all connected USB devices, expansion, system and fieldbus modules can be covered by the selected power supply unit.

In horizontal installation position, any CX2100-0xxx power supply unit can be used.

Table 24: Power supply units for horizontal installation position.

Basic CPU module	Power supply units
CX2020 CX2030	• CX2100-0004 (45 W) • CX2100-0014 (130 W, from HW version: 2.4) • CX2100-0904 (45 W, capacitive UPS) • CX2100-0914 (100 W, external battery pack can be used) • CX2100-0024 (240 W)
CX2040	• CX2100-0014 (130 W, from HW version: 2.4) • CX2100-0914 (100 W, external battery pack can be used) • CX2100-0024 (240 W)

The Embedded PCs CX2020 and CX2030 can be ordered with active cooling ex factory, for operation in vertical or horizontal installation position. In this case only CX2100-0014 or CX2100-0914 power supply units should be used, which feature additional ventilation openings and larger heat sinks.

The Embedded PC CX2040 is equipped with a fan cartridge as standard. It can be operated in vertical or horizontal installation position and requires power supply units of type CX2100-0014 or CX2100-0914.

Table 25: Power supply units for vertical or horizontal installation position.

Basic CPU module	Accessories	Power supply units
CX2020 CX2030	CX2900-0200 fan option required	• CX2100-0014 (130 W) • CX2100-0914 (100 W, external battery pack can be used)
CX2040	Fan ex factory	• CX2100-0024 (240 W)

6.2 Mounting

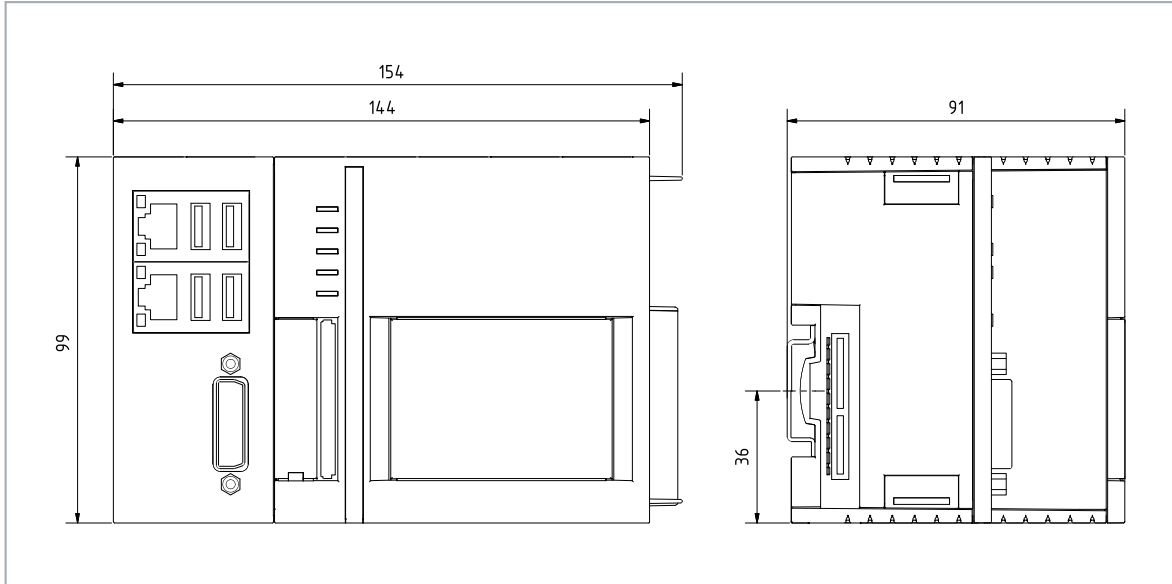


Fig. 19: CX2020 and CX2030 Embedded PC, dimensions.

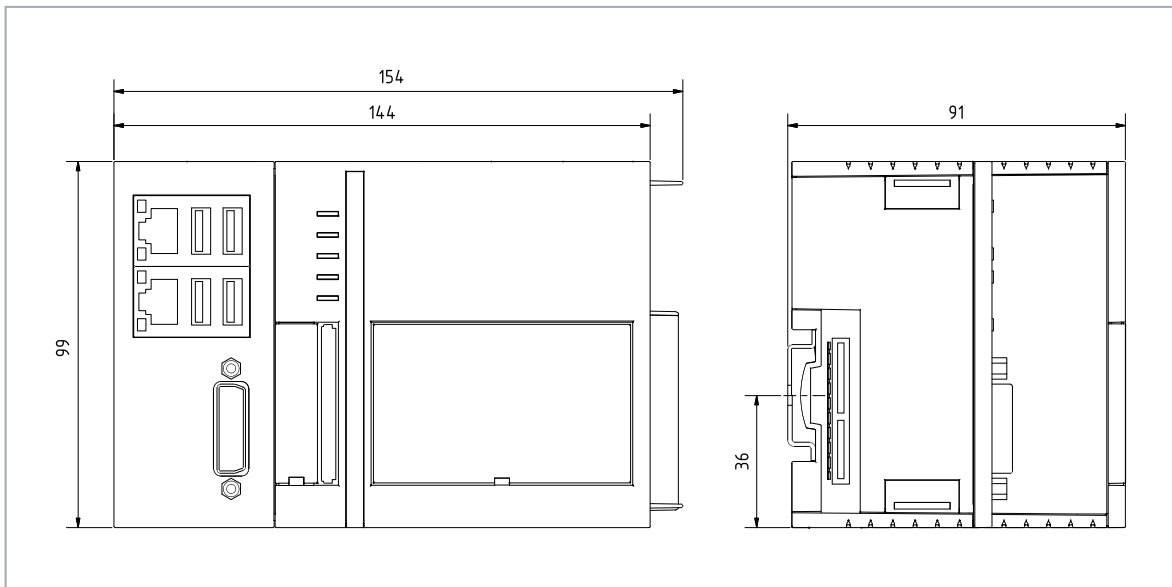


Fig. 20: CX2040 Embedded PC, dimensions.

6.2.3 Note the permissible installation positions

NOTICE

Overheating

The Embedded PC may overheat if the installation position is incorrect or the minimum distances are not adhered to. Adhere to the maximum ambient temperature of 60°C and the mounting instructions.

Install the Embedded PC horizontally in the control cabinet on a mounting rail, in order to ensure optimum heat dissipation. Only Embedded PCs with active cooling can be operated vertically or horizontally.

Table 27: Embedded PC CX20x0, installation position depending on the cooling option.

Embedded PCs	Horizontal installation position	Vertical and horizontal installation position
CX2020	X	-
CX2030	X	-
CX2040 with active cooling	X	X
CX2020 with CX2900-0200 fan option	X	X
CX2030 with CX2900-0200 fan option	X	X

Note the following specifications for the control cabinet:

- The Embedded PC should only be operated at ambient temperatures between -25 °C and 60 °C. Measure the temperature below the Embedded PC at a distance of 30 mm to the cooling fins, in order to determine the ambient temperature correctly.
- Adhere to the minimum distances of 30 mm above and below the Embedded PC.
- Additional electrical equipment affects the heat generation in the control cabinet. Select a suitable control cabinet enclosure depending on the application, or ensure that excess heat is dissipated from the control cabinet.

Permitted installation position without fan

The Embedded PC must be installed horizontally on the mounting rail. Ventilation openings are located at the top and bottom of the housing. This ensures an optimum airflow through the Embedded PC in vertical direction. In addition, a minimum clearance of 30 mm above and below the Embedded PC is required, in order to ensure adequate ventilation.

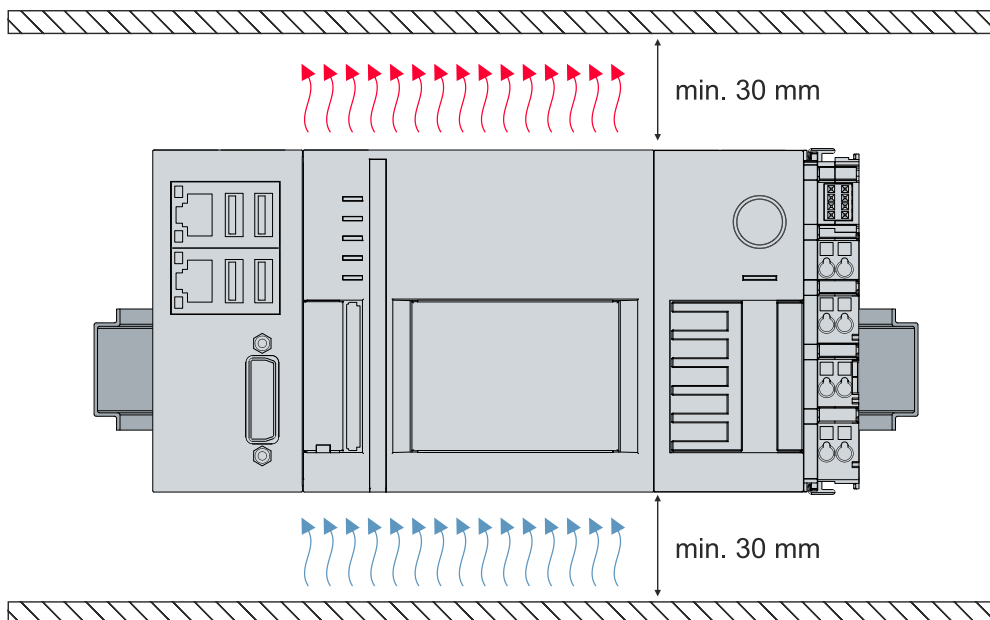


Fig. 21: Embedded PC CX20x0, horizontal installation position.

If vibrations and impact occur in the same direction as the mounting rail, the Embedded PC must be secured with an additional bracket, in order to prevent it slipping.

13 Technical data

Table 41: Technical data, dimensions and weights.

	CX2020	CX2030	CX2040
Dimensions (W x H x D)	144 mm x 99 mm x 91 mm		
Weight	approx. 1160 g	approx. 1165 g	approx. 1230 g

Table 42: Technical data, general data.

Technical data	CX2020	CX2030	CX2040
Processor	Intel® Celeron® 827E 1,4 GHz, single-core	Intel® Core™ i7 2610UE 1,5 GHz, dual-core	Intel® Core™ i7 2715QE 2,1 GHz, quad-core
Main memory	2 GB DDR3-RAM	2 GB DDR3-RAM	4 GB DDR3-RAM
Flash memory	20 GB or 40 GB, CFast card with extended temperature range (optionally extendable)		
NOVRAM integrated	128 kB		
Power supply	24 V DC (-15 %/+20 %)		
max. power consumption	21 W	27 W	32 W
Dielectric strength	500 V (supply / internal electronics)		
Operating system	Microsoft Windows Embedded Compact 7 Microsoft Windows Embedded Standard 7 P Microsoft Windows 10 IoT Enterprise LTSC		
Control software	TwinCAT-2-PLC-Runtime, -NC-PTP-Runtime, -NC-I-Runtime TwinCAT 3		
Diagnostics LED	1 x power, 1 x TC status, 1 x flash access, 2 x bus status		
Clock	Internal battery-backed clock for time and date (battery replaceable)		
Approvals	CE, UL		

Table 43: Technical data, I/O terminals.

Technical data	Description
I/O connection	via power supply unit (E-bus or K-bus, automatic detection)
Power supply for I/O terminals	max. 2A
Current load of the power contacts	max. 10 A
Process data on the K-bus	max. 2048 bytes input and 2048 bytes output
max. number of terminals (K-bus)	64 (255 with K-bus extension)
max. number of terminals (E-bus)	up to 65534 terminals.

Table 44: Technical data, environmental conditions.

Technical data	Description
Ambient temperature during operation	-25 °C to +60 °C
Ambient temperature during storage	-40 °C to +85 °C See notes under: Transport and storage [► 13]
Relative humidity	95% without condensation
Vibration resistance	10 frequency sweeps in 3 axes 10 Hz < f < 58.1 Hz displacement 0.15 mm, constant amplitude 58.1 Hz < f < 500 Hz acceleration 2 g (~ 20 m/s ²), constant amplitude conforms to EN 60068-2-6
Shock resistance	1000 shocks in each direction, in 3 axes 15 g, 11 ms according to EN 60068-2-27
EMC immunity	according to EN 61000-6-2
Electromagnetic emission	according to EN 61000-6-4
Protection class	IP 20

Table 45: Technical data, graphic specifications.

Technical data	CX2020	CX2030	CX2040
Processor graphics	Intel® HD Graphics	Intel® HD Graphics 3000	Intel® HD Graphics 3000
Graphic memory	128 MB (Shared Memory)		
Base clock frequency	350 MHz	350 MHz	650 MHz
Max. dynamic graphic frequency	800 MHz	850 MHz	1.2 GHz
Shader Model	4.1		
DirectX	10.1		
OpenGL	3.1		

Table 46: Technical data, interfaces.

Technical data	Description
LAN	2 x RJ 45, 10/100/1000 MBit/s
USB	4 x USB 2.0 each rated at 500 mA, type A
DVI-I	Resolution on the monitor in pixels: 640 x 480 to 1920 x 1200

Table 47: Technical data, optional interfaces.

Technical data	Description
DVI-D	Resolution on the monitor in pixels: 640 x 480 to 1920 x 1200
DisplayPort	Resolution on the monitor in pixels: max. 2560x1600
RS232	D-Sub plug, 9-pin Electrical isolation 500 V
RS422/RS485	D-Sub plug, 9-pin Electrical isolation 500 V
EtherCAT slave	2 x RJ 45, EtherCAT IN and OUT 100 MBaud
PROFIBUS	D-Sub plug, 9-pin 9,6 kbaud to 12 Mbaud
CANopen	D-Sub plug, 9-pin 10 kbaud to 1,000 kbaud
PROFINET RT	2 x RJ-45 switches