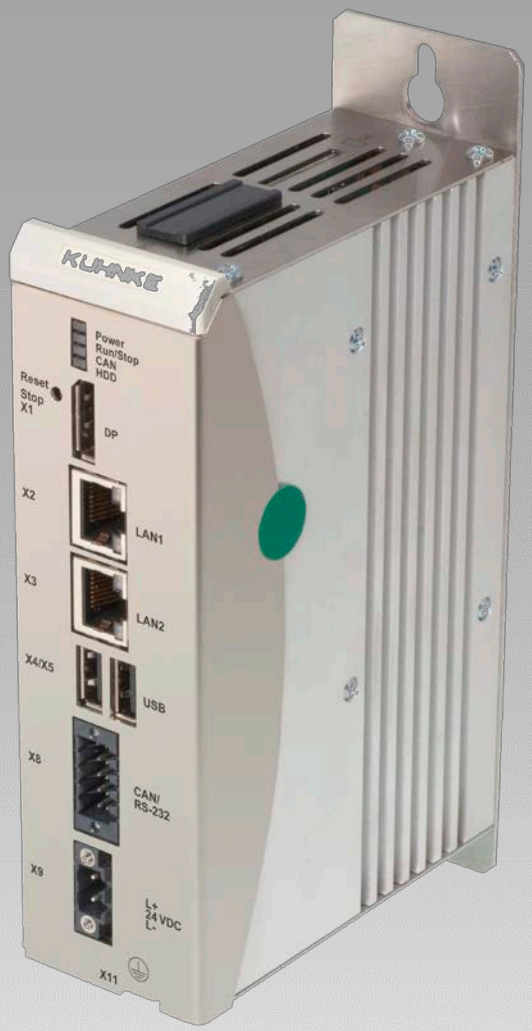
KENDRION



EtherCAT®

Motion + CNC

User Guide

Econo 206 / 226

Compact PLC

E 858 GB

15.09.2021

PRECISION. SAFETY. MOTION.

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1 Preface

1.1 Legal Notice

Contact Details

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1.1.1 Version Details

Modification History

Date	Comments / Modifications
24.06.2021	Original version
25.08.2021	CANopen and web configuration details added Software licences, IT security
15.09.2012	Additions and corrections

1.2 About this Manual

This technical information is primarily directed to system designers, project engineers and device developers. It does not contain any availability information. We reserve the rights for errors, omissions and modifications. Pictures are similar.

1.2.1 Limitation of Liability

Specifications are for description only and are not to be understood as guaranteed product properties in a legal sense. Exact properties and characteristics shall be agreed in the specific contract. Claims for damages against us - on whatever grounds - are excluded, except in instances of deliberate intent or gross negligence on our part.

1.2.2 Terms of Delivery

The general conditions of sales and service of Kendrion Kuhnke Automation GmbH shall apply.

1.2.3 Copyright

1.2.4 Software licences

Firmware

The units' firmware contains open source software. Some of this software is subject to the following and other open source licences:

- GNU General Public License (GPL)
- MIT License
- BSD Zero Clause License
- GNU Lesser General Public License (LGPL)
- Mozilla Public License (MPL)
- FreeType License (FTL)

Within three years of delivery, customers may buy the source code of the free software from Kendrion Kuhnke product management at net costs.

CODESYS

Like all other CODESYS products, the CODESYS runtime version installed in this system is subject to CODESYS GmbH's end user licence agreement (EULA) as published on the CODESYS website.

1.2.5 Warranty

Warranty is subject to the provisions of the conditions of sale of Kendrion Kuhnke Automation GmbH or any contractual agreements between the parties.

1.3 Reliability, Safety

1.3.1 Applicability

For reasons of personal safety and to avoid material damages when working with or handling this Kendrion Kuhnke product, you are advised to take heed of the notes and information contained in this instruction manual.

1.3.2 Target Group of the Instruction Manual

This instruction manual contains all information necessary for the use of the described product (control unit, control terminal, software, etc.) according to instructions. It is written for design, project planning, servicing and commissioning experts. For proper understanding and error-free application of technical descriptions, instructions for use and particularly of notes of danger and warning, extensive knowledge of automation technology is compulsory.

1.3.3 Intended Use

Kendrion Kuhnke's products are designed, developed and manufactured for standard industrial use. They must not be used for any other purposes than the ones specified in the catalogue or the associated technical documentation. Proper and safe operation depends on the products being transported, stored, lined up, mounted, installed, put into service, operated, and serviced correctly. Ambient conditions must be within the admissible limits. Notes and information in the associated documentation apply at all times.

1.3.4 Reliability

Reliability of Kendrion Kuhnke products is brought to the highest possible standards by extensive and cost-effective means in their design and manufacture.

These include:

- selecting high-quality components,
- quality agreements with our suppliers,
- actions to avoid static charges when handling MOS circuits,
- worst case planning and design of all circuits,
- visual inspections at various stages of fabrication,
- computer-aided tests of all assemblies and their interaction in the circuit,
- statistical assessment of the quality of fabrication and of all returned goods for the immediate taking of appropriate corrective actions.

1.3.5 Hazard and Other Warnings

Despite the actions described in section 0, the occurrence of faults or errors in electronic control units - even if most highly improbable - must be taken into consideration.

Please pay particular attention to the additional notices which we have marked by symbols throughout this instruction manual. While some of these notices make you aware of possible dangers, others are intended as a means of orientation. They are described further down below in descending order of importance.

Every alert and hazard warning is made up as follows:

Type and source of risk

Potential consequences of non-observance

⇨ Preventive measures

	DANGER
	A DANGER warning makes you aware of an immediately hazardous situation which WILL cause a serious or fatal accident if not observed.

	WARNING
	A WARNING makes you aware of a potentially hazardous situation which MAY cause a serious or fatal accident or damage to this or other devices if not observed.

	CAUTION
	A CAUTION alert makes you aware of a potentially hazardous situation which MAY cause an accident or damage to this or other devices if not observed.

	NOTE
	A NOTE makes you aware of a potentially hazardous situation which MAY cause damage to this or other devices if not observed.

1.3.6 Other Notices

	Information
	This symbol draws your attention to additional information concerning the use of the described product. This may include cross references to information found elsewhere (e.g. in other manuals).

1.3.7 Electrical Safety

Our products normally become part of larger systems or installations. The information below is intended to help you integrate the product into its environment without dangers to humans or material/equipment.

	DANGER
	Non-observance of the instruction manual *Measures for the prevention of dangerous faults or errors may be rendered ineffective or new hazard sources created.* ⇨ *Thoroughly read the instruction manual* ⇨ *Take particular heed of the hazard warnings*

	Information
	To achieve a high degree of conceptual safety in planning and installing an electronic controller, it is essential to exactly follow the instructions given in the manual because wrong handling could lead to rendering measures against dangers ineffective or to creating additional dangers.

Project Planning

- 24 VDC power supply: generate as electrically safely separated low voltage. Suitable devices include split-winding transformers built in compliance with European Standard EN 60742 (corresponds to VDE 0551).
- Power breakdowns or power fades: the program structure is to ensure that a defined state at restart excludes all dangerous states.
- Emergency-off installations must comply with EN 60204/IEC 204 (VDE 0113). They must be operative at any time.
- Safety and precautions regulations for qualified applications have to be complied with.
- Please pay particular attention to the notices of warning which, at relevant places, will make you aware of possible sources of dangerous mistakes or faults.
- Relevant standards and VDE regulations are to be complied with in every case.
- Control elements are to be installed in such a way as to exclude unintended operation.
- Lay control cables such that interference (inductive or capacitive) is excluded if this interference could influence controller operation or its functionality.

Maintenance and Servicing

- Precautions regulation BGV A3 (Elektrische Anlagen und Betriebsmittel) to be observed when measuring or checking a controller after power-up. This applies to section 8 (Admissible deviations when working on parts) in particular.
- Spare parts: Only use parts approved of by Kendrion Kuhnke. Only genuine Kendrion Kuhnke modules may be used in modular controllers.
- Modular systems: always plug or unplug modules in a power-down state. You may otherwise damage the modules or (possibly not immediately recognisably!) inhibit their functionality.
- Always dispose of (rechargeable) batteries as hazardous waste.

1.3.8 IT Security

Kendrion Kuhnke products are designed for use in closed (private) industrial network environments.

In case such industrial networks are open to public access (e.g. via fully accessible network interfaces) or otherwise externally accessible (e.g. via data links and public (Internet) traffic), the integrator and operator must take appropriate organisational and technical precautions to protect the in-house network and ensure IT security.

	Information
	To find information about how to safely operate equipment, systems and networks, please refer to the texts published by BSI (Federal Office for Information Security), other publicly available sources and IEC 62443.

1.3.9 Electromagnetic Compatibility

Definition

Electromagnetic compatibility is the ability of a device to function satisfactorily in its electromagnetic environment without itself causing any electromagnetic interference that would be intolerable to other devices in this environment.

Of all known phenomena of electromagnetic noise, only a certain range occurs at the location of a given device. It is defined in the relevant product standards.

The design and immunity to interference of programmable logic controllers are internationally governed by standard
IEC 61131-2 which, in Europe, has been the basis for European Standard
EN 61131-2.

	Information
	Refer to IEC 61131-4, User's Guideline, for general installation instructions to be complied with to ensure that hardware interface factors and the ensuing noise voltages are limited to tolerable levels.

Interference Emission

Interfering emission of electromagnetic fields, HF
compliant to EN 55011, limiting value class A, Group 1

	Information
	If the controller is designed for use in residential areas, high-frequency emissions must comply with limiting value class B as described in EN 55011. *Fitting the controller into earthed metal cabinets and installing filters in the supply lines may produce a shielding compliant to the above standard.*

General Notes on Installation

As component parts of machines, facilities and systems, electronic control systems must comply with valid rules and regulations, depending on their field of application.

General requirements concerning the electrical equipment of machines and aiming at the safety of these machines are contained in Part 1 of European Standard EN 60204 (same as VDE 0113).

Electrical Immission Safeguard

To eliminate electromagnetic interference, connect the control system to the protective earth conductor. Practice best cable routing.

Cable Routing and Wiring

Keep power circuits separate from control circuits:

- DC voltages 60 V ... 400 V
- AC voltages 25 V ... 400 V

Joint laying of control circuits is allowed for:

- shielded data signals
- shielded analogue signals
- unshielded digital I/O lines
- unshielded DC voltages < 60 V
- unshielded AC voltages < 25 V

Location of Installation

Ensure that temperatures, contaminations, impact, vibration or electromagnetic interference are no impediment to the installation.

Temperature

Consider heat sources such as general heating of rooms, sunlight, heat accumulation in assembly rooms or control cabinets.

Contamination

Use suitable casings to avoid possible negative influences due to humidity, corrosive gas, liquid or conducting dust.

Impact and Vibration

Consider possible influences caused by motors, compressors, transfer lines, presses, ramming machines and vehicles.

Electromagnetic Interference

Consider electromagnetic interference from various local sources: motors, switching devices, switching thyristors, radio-controlled devices, welding equipment, arcing, switched-mode power supplies, converters / inverters.

Particular Sources of Interference

Inductive Actuators

Switching off inductances (such as from relays, contactors, solenoids or switching magnets) produces surge voltages. It is necessary to reduce these extra voltages to a minimum.
Reducing elements may be diodes, Z-diodes, varistors or RC elements. Their rating should conform to the specifications provided by the manufacturer or supplier of the actuators.

2 System Description

2.1 Econo

Featuring an EtherCAT master and two Modbus ports, the new Econo model runs as a compact CODESYS-ready control unit. Owing to its easy programming, CODESYS supports efficient engineering. The fully equipped embedded system is built around a scalable single core or multicore i.MX6 processor. All its components are very sturdy and available for a long time.

Properties

- Fanless processor technology does not require any maintenance
- Various software packages for variability
- LAN, OPC UA, EtherCAT® and Modbus ports for network communication
- Industry-compliant interfaces
- CODESYS SoftMotion and CNC+Robotics-ready
- Multicore CPUs available
- RTC

2.1.1 CODESYS

CODESYS is a software platform designed to handle many tasks of industrial automation technology. It is based on the IEC 61131-3 programming system. The tool benefits users with integrated solutions tailored to their practical work and aimed at providing hands-on support with whatever job needs to be done.

CODESYS supports all five languages specified in IEC 61131-3 (International Electrotechnical Commission):

- IL (Instruction List)
- ST (Structured Text), based on PASCAL for structured programming
- LD (Ladder Diagram)
- FBD (Function Block Diagram)
- SFC (Sequential Function Chart)

Apart from the standard IEC languages, CODESYS also supports:

- CFC (Continuous Function Chart) is a FD (function diagram) editor with a fully configurable graphical layout: whereas FD editors are network-based and automatically arrange the function blocks, CFC lets users place the blocks anywhere such that feedback effects can be created without any temporary variables. This feature makes the language the perfect choice for creating an overview of the application.

Fieldbus Technology

The CODESYS programming system allows the direct configuration of CANopen (device variant), Modbus and EtherCAT fieldbuses. Protocol stacks can be separately installed as CODESYS libraries for some systems.

CODESYS Control

CODESYS Control is a soft PLC runtime system installed in Econo and adapted to its hardware. It turns Econo into an industrial controller in conformity with IEC 61131-3. This runtime system also features some extra functions that let the controller communicate with other components in its automation environment.

Visualisation

An editor integrated in the CODESYS programming system allows users to create complex visualisation screens and to animate them by means of the application variables. The appropriate visualisation elements are provided by the software. Once created, the screens may help to test an application or to start it up in the programming system's online mode, for example. Running the optional visualisation clients **CODESYS HMI** and **CODESYS WebVisu** makes the screens a means of operating the machine or system.

Software Releases

Various software options or combined software options are available for installation in the devices. Please ask product management for the combination that best fits your needs.

Software Options		
Option	**Identification**	**Function**
CODESYS WebVisu	**WV**	A control unit running CODESYS WebVisu lets you display your own screens created in CODESYS in any web browser environment anywhere in the world.
CODESYS SoftMotion	**SM**	Use your standard IEC 61131-3 development interface to plan single or multi-axis movements up to and including the plotting of curves - together with the logic application. A Motion Controller running CODESYS SoftMotion provides the PLC programming system with a kit of motion functions. Motion Controllers running CODESYS SoftMotion support many user project planning variants for the given motion tasks by providing PLCopen-certified motion modules, the entire functionality of the IEC 61131-3 programming interface and other tools.
CODESYS SoftMotion CNC+Robotics	**SM CNC**	3D-CNC motion control for Motion Controllers with a complete set of 3D-CNC and/or robotics functions including interpolator and kinematic transformations. CODESYS SoftMotion CNC+Robotics provides you with an editor as a convenient way of configuring complex groups of robot axles. Run the editor, choose the appropriate kinematics, set its parameters and link them to the physical robot axles. Standardised function blocks process the robot functions in conformity with PLCopen MotionControl Part 4.

For further information, refer to the product pages of CODESYS GmbH.

Linux

Linux supports a large number of CPU architectures, has an almost endless number of drivers and is highly portable and scalable, all of which make it rank among today's most powerful embedded operating systems. Linux also supports the simple implementation of systems subject to strict real-time requirements.

Advantages:

- Real-time capability
- Low memory requirements
- Large selection of drivers
- MultiCore compatibility
- Long-term availability

3 Product Description

3.1 General Description

The compact controller's powerful processor board with integrated industrial interfaces allows users to run all control and display functions in a single unit.

It is designed for use in machine switching cabinets. Mechanical, system and cabinet engineers benefit from Econo's flexibility when designing powerful applications with a small footprint.

3.2 Front View of Econo 206 / 226

3.3 Application

3.3.1 Intended Use

Econo is an ARM-based control platform for switching cabinets or terminal boxes.

This range of products provides you with a powerful and flexible system for a wide range of practical applications, specifically in the fields of mechanical engineering and switching cabinet construction:

- control using standardised software tools for all areas of mechanical engineering
- operation and visualisation of automatic equipment
- operation and visualisation with the display terminal taken down for use in automatic machines and info terminals
- a single unit for the visualisation and real-time control of general-purpose machine systems
- motion control

3.3.2 Foreseeable Misuse

Place of Installation

The unit is solely permitted for use in fully enclosed control cubicles or rooms.

Exhaust heat develops down the side of the unit, i.e. at the aluminium heat sink. Verify that the place of installation is ventilated properly.

	NOTE
	Damage to the unit *Choosing the wrong place of installation may cause damage to the unit.* ⇨ Check section Technical Data for the admissible ambient conditions and the unit's mounting position.

Design Constraints for High-risk Activities

It is neither designed nor intended for use in customer systems or together with third-party materials which have been shown to potentially cause fatal or serious personal injury or material or environmental damage if the product fails or produces a fault ("High Risk Use ").

High-risk use applications are strictly prohibited.

	DANGER
	Danger caused by malfunctions ***Fatality, serious personal injury or serious material or environmental damage*** ⇨ High-risk use applications are strictly prohibited.

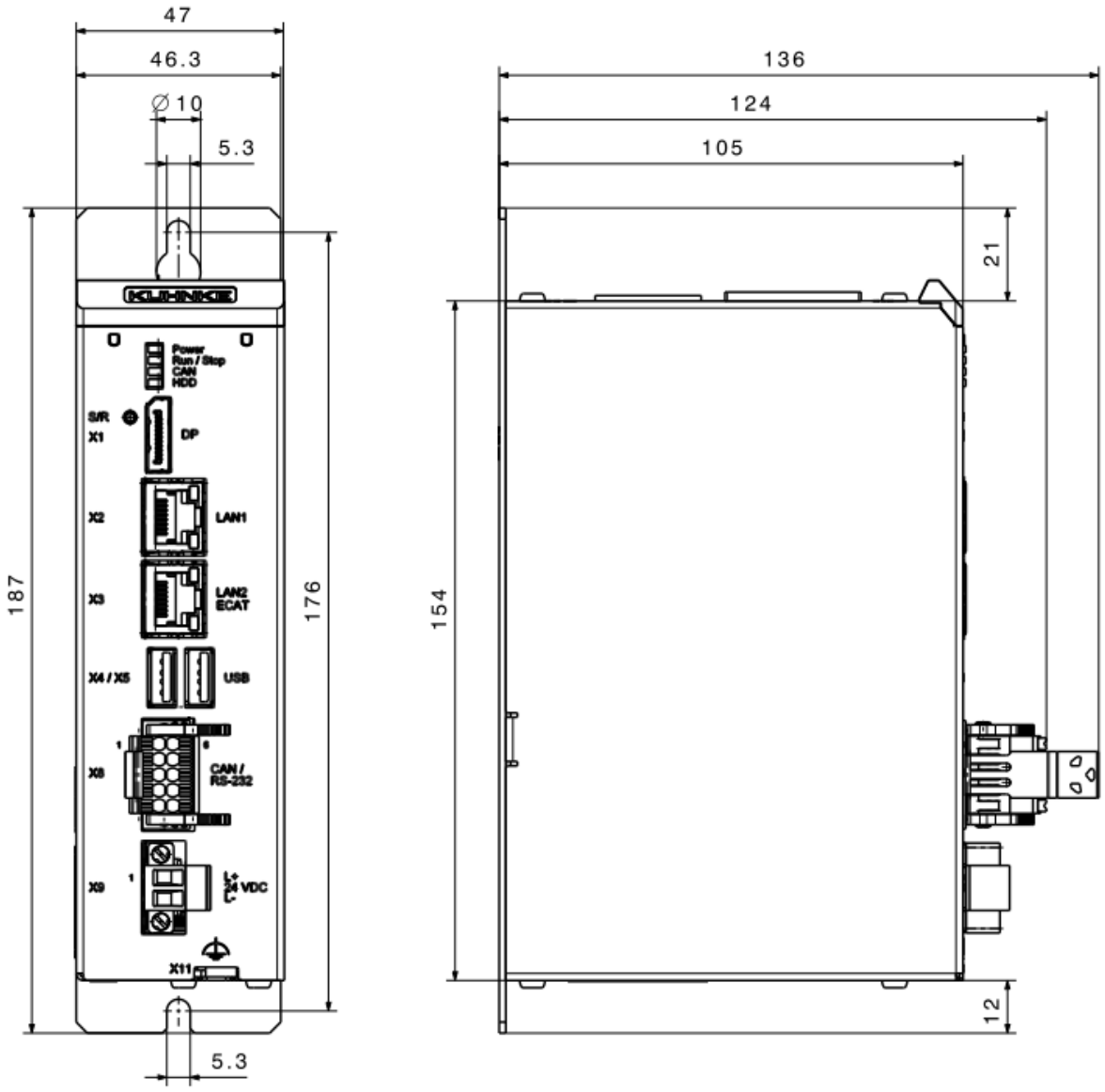
3.4 Technical Data

3.4.1 General Specifications of Kuhnke Econo 206/306*

General Specifications			
Product name	Econo 206	Econo 216 (Special)	Econo 226
Integrated I/Os			
Processor	Freescale i.MX6 Solo, 1 GHz	i.MX6 DualLite, 1 GHz	i.MX6 Quad Core, 1 GHz
Clock	Battery-buffered real-time clock		
Software	Operating system: RT Linux; Application: CODESYS PLC, WebVisu, Motion		
RAM	512 Mb (DDR3)		1 Gb RAM (DDR3)
Flash	256 Mb SLC flash		256 Mb SLC flash
			4 Gb eMMC
Remanent buffer	128 kb		
Disk drives	1x SD card slot (bootable)		
Networks	2x Ethernet 1 Gbit – RJ45		
Ports	1x RS-232, 1x RS-485 (electrically insulated), 2x USB 2.0 host		
Fieldbus interfaces	EtherCAT® over Ethernet, Modbus TCP, Modbus RTU, OPC UA		
Graphics adapter	For factory testing only UXGA resolution display port (1600 x 1200), optional DVI adapter		
Power supply	24 VDC (+20% /- 15%), (power supply unit rated for control tasks)		
Power consumption			
Service conditions			
Mounting position	Vertical; please contact product management for other mounting positions		
Storage temperature	-25 °C...+70 °C		
Operating temperature	0 °C...+55 °C if installed vertically 0 °C...+50 °C if installed horizontally		
Rel. humidity	Front: 100% / installation space: 5...95% (@ 25° C)		
Mechanical properties			
Housing	IP 20, stainless steel, aluminium heat sink		
Installation	Screws		
Weight	850 g		
Dimensions (WxHxD)	50 mm x 190 mm x 115 mm		

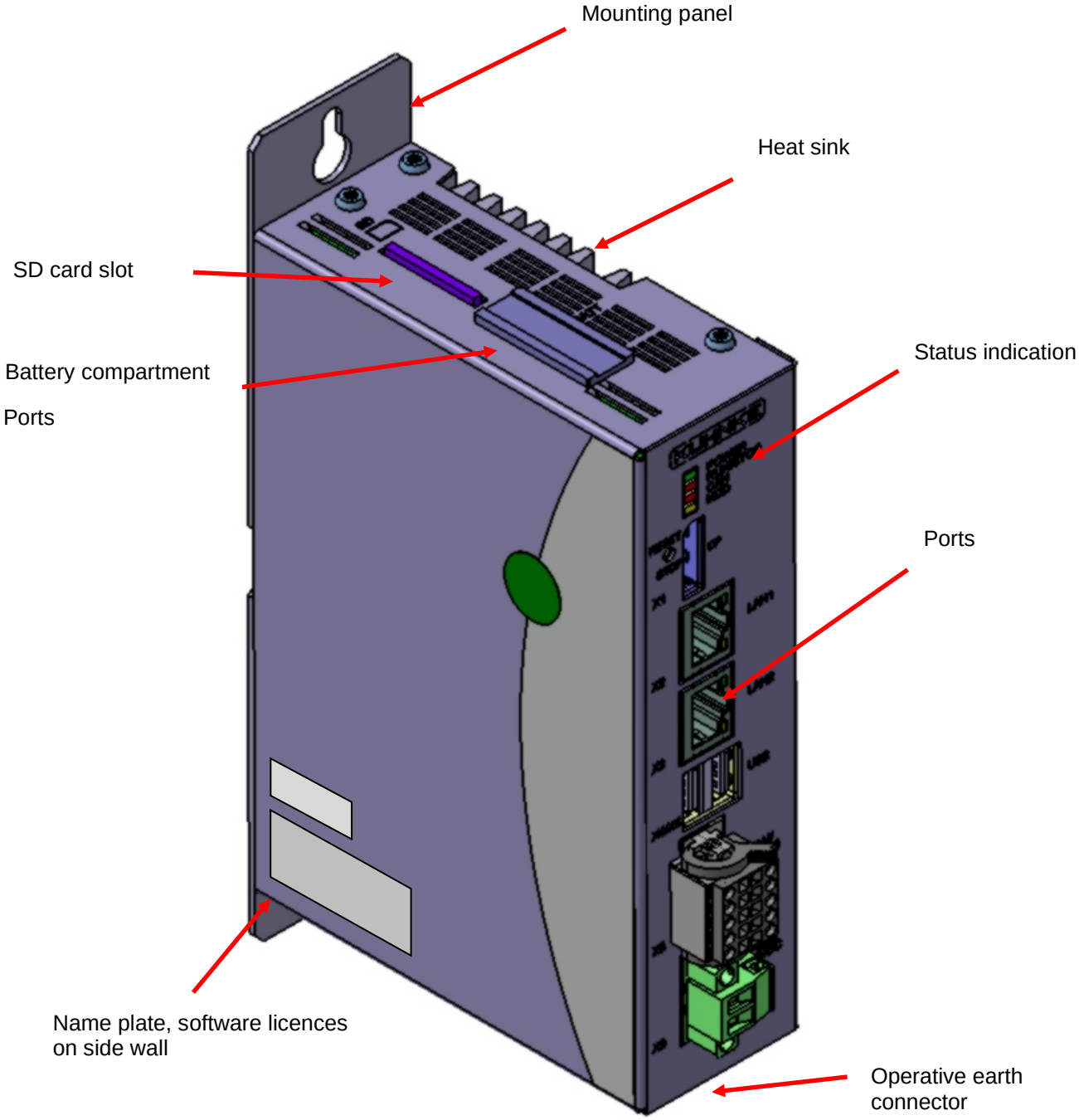
* The technical data is an example applicable to one Econo 306 version

3.5 Dimensions



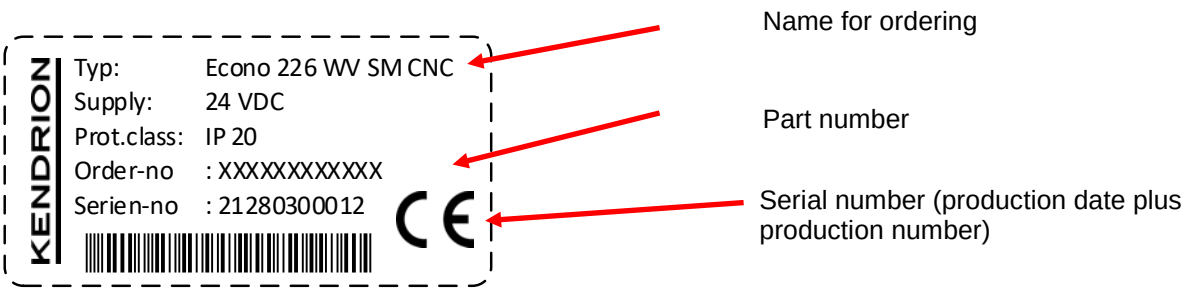
4 Construction and Functionality

4.1 Brief Description



4.2 Labelling and Identification

4.2.1 Name Plate



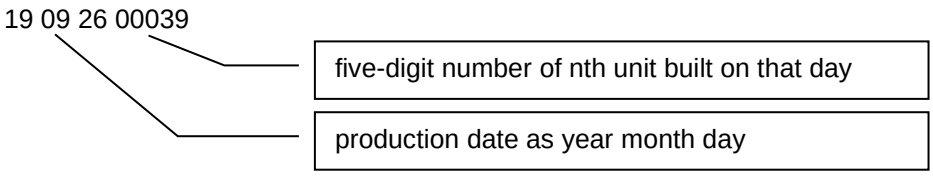
4.2.2 Serial Number

The numerical code incorporates the production date and a serial number. Kendrion Kuhnke can use the numerical code to distinctly identify the model, software and hardware release date. It is a means of traceability.

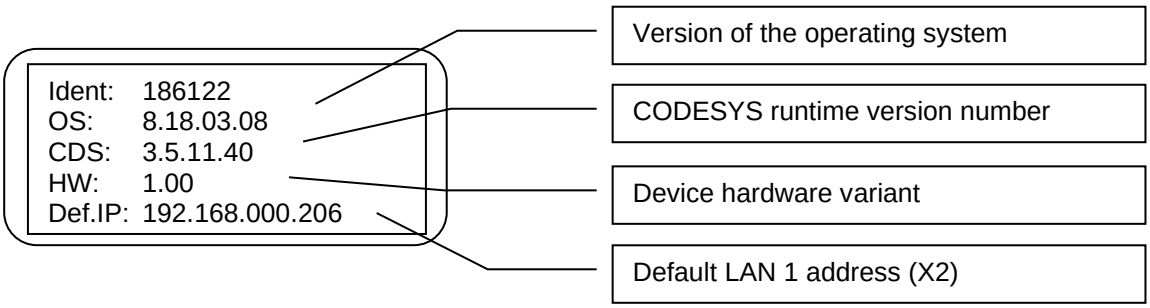
Make-up of Serial Number:

YY MM DD NNNNN

Example:
The unit shown above is number 00039 manufactured on 05th June 2015.



Version at Time of Delivery



Software Licence Identification

Depending on your model, different licence labels will be affixed to the side of the device to identify the operating system and the application software.

4.3 Contents of Package

The Econo package contains:
Main unit, stuffing, connector kit

4.4 Transport and Storage

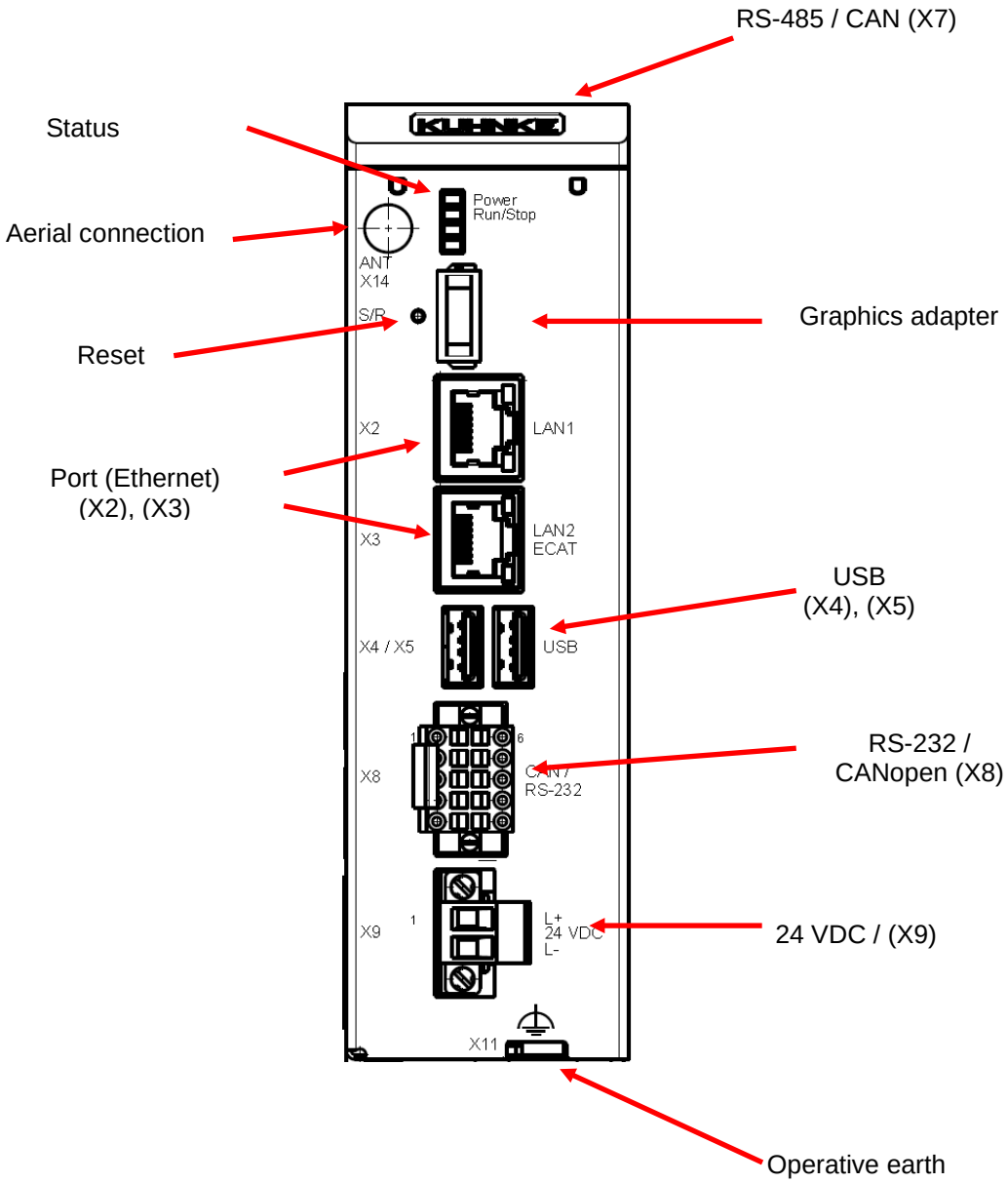
Despite the unit's rugged construction, its components inside are still sensitive to impact and vibration. Transport and keep Econo in its original packaging and ensure that the ambient conditions are as specified at all times during transport and storage. Refer to manual section → 9.3.3 Admissible Ambient Conditions for admissible ambient and transport condition details.

The unit contains a permanently installed lithium/metal button cell. None of the package items has to be labelled on any transport route (as of 11/2018).

!	***NOTE***
	Humidity *Damage to the unit* ⇨ Verify that no moisture (condensation) is able to collect on the unit when transporting it in cold temperatures or if it is exposed to extremely varying temperatures. Allow the unit to slowly warm up to room temperature before putting it into operation.

4.6 Connectors of Econo

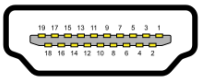
External connectors attach at the Econo front, top and bottom. All connectors are of the plug-in type.



4.6.1 Graphics Adapter

Use for factory testing only.

Econo supports an external monitor to help with operation, putting into service or servicing. Contact our product management for further details of how to use the HDMI interface.



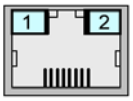
Optional DVI adapter

4.6.2 Ethernet "LAN1" (X2)

The on-board 10/100 Mbit base-T Ethernet adapter attaches the unit to a network through its RJ-45 connector. The runtime system lists port LAN1 as eth1.

The LEDs labelled "LNK" and "RCV" tell you whether the unit is properly connected to the network.

Pin Wiring:



LAN1
X2

X2	LAN1	
Connector	Pin	**Function**
 RJ45	1	TX+
	2	TX-
	3	RX+
	4	75 Ohm
	5	75 Ohm
	6	RX-
	7	75 Ohm
	8	75 Ohm
LED "LNK"	green / orange	data link
LED "RCV"	orange	activity

Information

Connector "X3" is provided for use as EtherCAT fieldbus interface. The LAN configuration lists this connector as eth0.

NOTE

Unauthorised access to the computer

Controller failure and data loss

⇨ Integration in networks granting public access requires the user to take appropriate measures aimed at preventing unauthorised access.

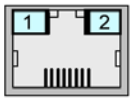
4.6.3 Ethernet "LAN2 / ECAT" (X3)

The on-board 10/100/1000 Mbit base-T Ethernet adapter attaches the unit to a network through its RJ-45 connector. The runtime system lists port LAN2 as eth0.

Use Ethernet adapter LAN2 / ECAT / eth0 to link in any other Ethernet-based fieldbus system such as EtherCAT. Use your CODESYS project to configure both the interface and the network.

The LEDs labelled "LNK" and "RCV" tell you whether the unit is properly connected to the network.

Pin Wiring:



LAN2 / ECAT
X3

X3	LAN2	
Connector	Pin	**Function**
 RJ45	1	TX+
	2	TX-
	3	RX+
	4	75 Ohm
	5	75 Ohm
	6	RX-
	7	75 Ohm
	8	75 Ohm
LED "LNK"	green / orange	data link
LED "RCV"	orange	activity

NOTE

Unauthorised access to the computer

Controller failure and data loss

⇨ Integration in networks granting public access requires the user to take appropriate measures aimed at preventing unauthorised access.

4.6.4 USB 2.0 (host) (X4), (X5)

The two USB host ports are made for attaching USB peripherals. They provide a max. total current of 0.5 A.

Pin Wiring:

X4 / X5	USB	
Connector	**Pin**	**Function**
 USB	B1	VCC
	B2	D-
	B3	D+
	B4	GND

	NOTE
	USB port overload by excessive power consumption *Machine failure and/or data loss* ⇨ Only attach USB peripherals whose total power needs do not exceed 0.5 A or supply external power to the USB peripherals by adding an active hub to the line, for example.

	NOTE
	Electromagnetic interference in industrial environments *Machine failure and/or data loss* ⇨ Mind that the USB interface is not designed for use in industrial environments but just as a service interface for loading software updates or data up into or down from the control unit.

USB Sticks

USB stick users should consider the following points:

- The USB port is mechanically designed to support up to 1,000 plug/unplug operations.
- Pulling off a USB stick during operation is allowed only when no more file operations are being performed. Failure to comply may render the USB stick useless!
  If a program still has a file open when the USB stick is pulled, you will find it impossible to close the directory that the file belongs to. In this situation, the system will not respond to any file or directory operation requests because it would be expected to read from a device that is no longer available. Therefore, before pulling off the USB stick, you should always ensure that no program still has an open file loaded from the stick.

4.6.5 Serial Communication RS-485 / CAN2 (X7)

The current device model does not support the **CAN port**.

The interfaces connecting to X7 are not electrically insulated. Both interfaces are terminated internally.

Pin wiring:

X7 CAN	
Pin	**Function**
1	RS-485_L
2	RS485_H
3	RS-485_GND
4	CAN_H
5	CAN_L
6	CAN_GND

Connection Data

Mating Connector (X9 – Example)	
Type	Two-row female PUSH-IN spring connector
Poles	6, two rows
Order data	Weidmüller: 2446490000
Wire cross section	min. 0.14 mm² max. 1.5 mm² (max. 1 mm² on AEH with collar)
Bolt flange	0.25 Nm tightening torque, 0.4 x 2.5 screwdriver

Technical Data

RS 485	
Signal	RS 485
Baud rate	max. 115,200 baud, (57.600, 19.200, 9600)
Electrical insulation	no galvanic isolation
Termination	integrated, hard-wired

CAN 2	
Signal	RS 485
Baud rate	max. 1 Mbps, (500, 250, 125 kbps)
Electrical insulation	galvanic isolation
Termination	integrated, hard-wired

4.6.6 Serial Communication RS-232 / CAN1 (X8 – Device Variant)

The system uses COM3 for access to the **RS-232** port. The **RS-232** port is not electrically insulated.

Pin Wiring

RS 232

X8 RS 232	
Pin	**Function**
1	RxD
2	TxD
3	GND
4	Shield
5	Shield

The CAN port complies with standard ISO 11898 and supports baud rates of up to 1 Mbps. This port is electrically insulated.

Pin Wiring

CANopen

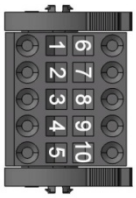
X8 CAN	
Pin	Function
6	CAN_H
7	CAN_L
8	CAN_GND
9	CAN_H
10	CAN_L

Technical Data

RS 232	
Quantity	1
Signal	RS 232
Baud rate	max. 115,200 baud, (57.600, 19.200, 9600)
Electrical insulation	no galvanic isolation

CAN 1	
Signal	RS 485
Baud rate	max. 1 Mbps, (500, 250, 125 kbps)
Electrical insulation	galvanic isolation
Termination	attached to the connector

Connection Data



Mating Connector (X8 – Example)	
Type	Two-row female PUSH-IN spring connector
Poles	10, two rows
Order data	Weidmüller:
Wire cross section	min. 0.14 mm² max. 1.5 mm² (max. 1 mm² on AEH with collar)
Bolt flange	0.25 Nm tightening torque, 0.4 x 2.5 screwdriver

	Information
	You may connect the CAN termination (wired 120 Ω resistor) directly to the pins.

4.6.8 Power Supply "24VDC", (X9)

On-board Power Supply Unit (PSU)

A PSU inside Econo supplies 24 VDC (+25% /- 20%). The PSU is electrically insulated and protected against reverse polarity.

Both the cord and the power supply unit must have external protection against short circuit and overload triggering at max. 10 A.

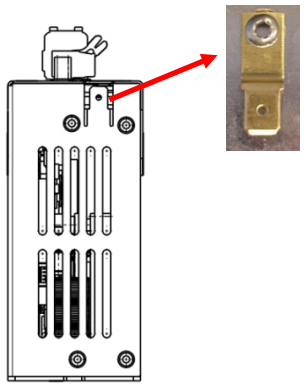
Pin Wiring:

X9 24 VDC Power Supply	
Pin / symbol	**Function**
1 / L+	External power supply 24 VDC (18 V ... 32 V)
2 / L-	External power supply, GND

Connection Data

X9 Mating Connector	
Type	Screwed connection with spring bushing
Poles	2, single row
Order data	Phoenix MSTB 2.5/2-G-5.08 Part number: 1777989
Wire cross section	flexible min 0.2 mm^2 flexible max. 2.5 mm^2

4.6.9 Operative Earth "X11"



Connect operative earth to the protective earth conductor of the switching cabinet or the system that the PC is installed in. Use the flat plug (6.3 mm x 0.8 mm) or the earth bolt at the back of the unit.

Verify that the cross section is not less than 2.5 mm^2. Try to keep the lead to the cabinet terminal as short as possible.

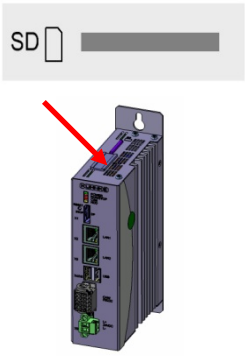
	Information
	A low-impedance earth conductor improves the dissipation of interference received via external power supply cables, signal cables or cables of peripheral units.

4.6.10 Aerial Connection (X14 – Device Variant)

Optional, model-specific aerial connection

Refer to the "Wireless LAN" notice for further information.

4.6.11 SD Card



Econo features an SD card slot located on the top next to the battery compartment. A SD icon marks the slot.

It accepts SD (SD 1.0 or SD 1.1) and SDHC (SD 2) cards at up to 32 Gb capacity run at maximum transfer speed (Class 10).

The file system is FAT32.

Gold-plated contacts ensure that contact resistance is low and that the drive lasts for up to 10,000 plug/unplug action cycles.

The SD card slot has a push-in/push-out plug & eject mechanism. You may have to use a flat object to help you plug in or eject the card.

Industrial vs. commercial products

To operate the unit in industrial environments, you should preferably use industry-grade SD cards instead of commercial ones.

Features of industry-grade SD cards:

- SLC or iMLC memory
- Secure write and clear cycles
- Longer period of availability and early discontinuation announcement

	NOTE
	Soft PLC fails to start *Control unit / machine failure* SLC technology SD cards of type AF1GSDI-5ACXX supplied by ATP are used to run the unit as a control PC with a CODESYS soft PLC. Using other than the above SD cards may jeopardise operational safety.

	NOTE
	Electrostatic discharge (ESD) *Inappropriate handling will destroy the memory card* ⇨ SD cards are susceptible to electrostatic discharge (ESD). Please take account of the instructions on how to handle memory cards.

	Information
	The SD card slot has no hot-plug capability. It will therefore detect cards only if they were plugged in at the time of booting the unit. SD cards have no hot-swap capability.

4.6.12 Retain Variables

By default, the retain memory capacity is limited to 128 kb. Please contact Kendrion's Product Management to inquire about larger retain data ranges. Please contact Kendrion's Product Management should your project require larger volumes of retain data.

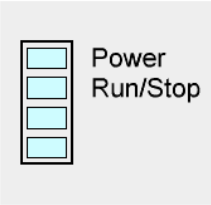
	Information
	When running systems equipped with a mass storage device you may generally ask whether it makes sense to use large volumes of retain data.

4.7 Indicators and Controls, Econo

4.7.1 Status LEDs

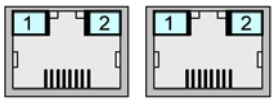
The status LEDs indicate the state of the panel PC's modules. RUN / STOP is reserved for indicating the status of the soft PLC, if any.

Indicators:



LED Description		
Designation	**LED**	**Explanation**
Power	off	No 24 VDC power supply
	blue	24 VDC power supplied
Run/Stop	off	No application loaded
	yellow	Device is booting
	green	PLC status is "run"
	red	PLC status is "stop"
	2x flashing red	Low voltage detected
LED1	off	No CAN communication
	flashing yellow	CAN communicating
LED2	off	No CAN communication
	flashing yellow	CAN communicating

4.7.2 Ethernet "LAN1" (X2), "LAN2" (X3)



LAN1 X2 LAN2 / ECAT X3

LED Both LAN1 and LAN2		
Designation	**LED**	**Explanation**
1	off	10 Mbps
	green	100 Mbps
	orange	1000 Mbps
2	off	
	orange	Connected
	flashing orange	Activity

4.7.3 Stop/Reset Button

The Reset/Stop button is located beneath the status LED at bottom side of the unit.

To avoid it being pushed unintentionally, the Stop/Reset button can be operated using a pointed object (pen, screwdriver) only.

The first push for less than 3 seconds "Stops" the CODESYS PLC program. Run/Stop changes from green to red. Pushing the button again for less than 5 seconds "Starts" the CODESYS PLC program again, Run/Stop changes from red to green ... etc.

Pushing the Stop/Reset button for longer than 4 seconds resets the unit. The Run/Stop LED changes from red to orange. You can now release the Stop/Reset button. The unit will boot.

!	***NOTE***
	Hardware reset *Data loss* ⇨ A hardware reset stops the PLC processor. This affects both the PLC program and all the ports. Briefly press the Reset button again to quit this status. This will restart the hardware and re-initialise (default="0") all the variables with the exception of the RETAIN variables.

4.8 Accessories and Tools

5 Installation and Operation

	Information
	Before installing, servicing or putting Econo into operation, please also read the safety information in the preface of this document.

5.1 Mechanical Installation

5.1.1 Installation

Econo is a modern electronic assembly. Handle - specifically mount, operate and service - with care.

Econo mounts on a DIN rail inside the switching cabinet. However, you can also choose to install the unit on any other even surface using the flange fitting.

To ensure that enough air gets in, leave at least 30 mm to the top and 30 mm to adjacent devices or cabinet surfaces below. The unit can be stacked onto other units.

Please take note of the admissible ambient conditions during storage and operation as summarised in the Technical Data tables.

	Information
	The unit is solely permitted for use in fully enclosed control cubicles or rooms. *Take heed of the applicable DIN/VDE regulations or their national equivalents when installing the unit in a switching cabinet.*

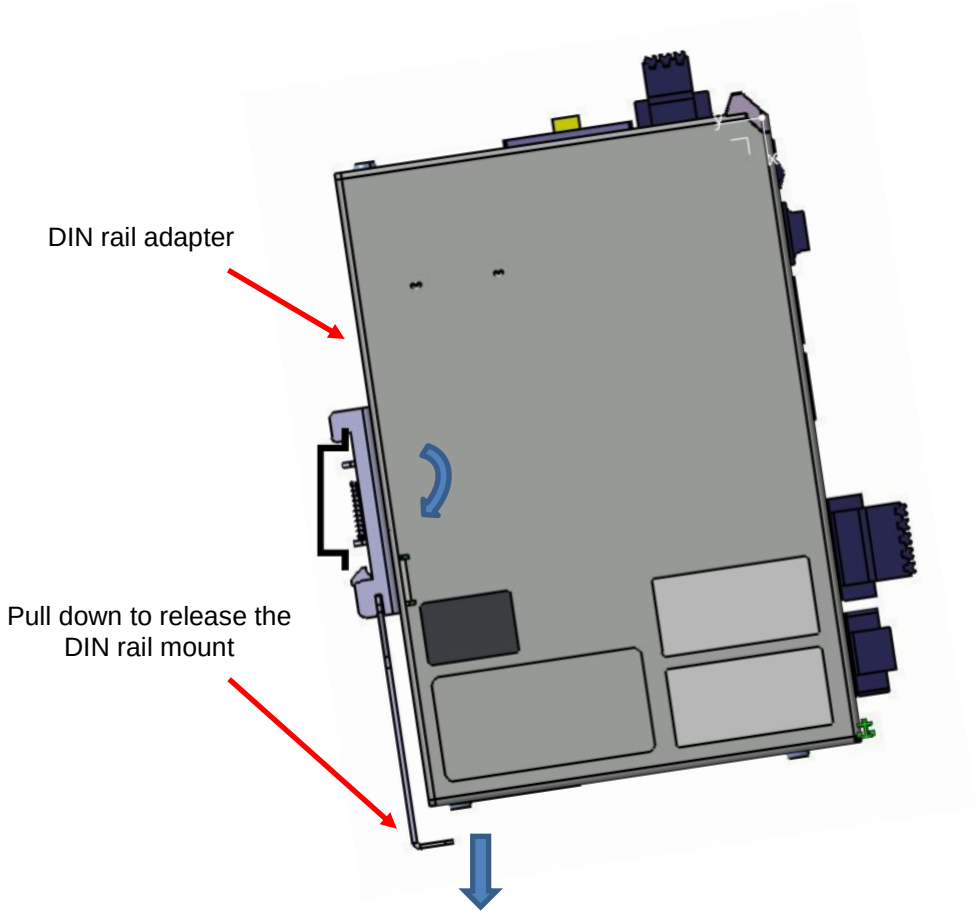
	Information
	Please remember that the plate and screws must not only be able to sustain the weight of the device but also that of the cables. *The second SD card slot is located on the back of the unit. Before fully installing it, check whether a storage medium will have to be inserted.*

DIN Rail

The unit is intended for installation on a 35 mm rail (to DIN EN 60715 TH: TH 35). Mount the rail horizontally with the modules' Ethernet connectors pointing away from the wall.

Mounting procedure:

- ⇨ Place the unit's DIN rail adapter on top of the DIN rail.
- ⇨ Use a screwdriver to pull down the clamp's retaining spring and open the mount.
- ⇨ Place the unit straight on the rail.
- ⇨ Remove any load from the retaining spring.

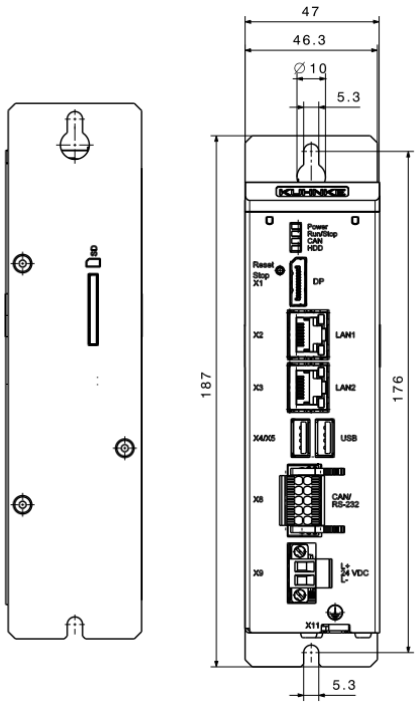


Mounting Using a Flange Fitting (Special Model)

Econo can be optionally equipped with a flange fitting for mounting the unit on any straight surface. Please contact our Project Management, as necessary.

Mounting procedure:

- ⇨ Drill holes into the mounting surface as shown on the illustration.
- ⇨ Turn all but approx. 5 mm of the screws into the holes drilled into the mounting surface.
- ⇨ Put on the device and push down.
- ⇨ Turn in the screws until tight.



5.2 Electrical Installation

The connectors are located at the front of Econo as described in section Connectors.

Proceed in the order below to wire up Econo:

- ⇨ turn off the unit,
- ⇨ unplug the unit from the mains/power supply,
- ⇨ attach all cables to Econo and any peripheral units,
- ⇨ check that all cables are firmly attached at both (female and male) ends,
- ⇨ reconnect all units with the mains/power supply.

5.2.1 Operative Earth

Operative earth is not a safeguard but a means of improving the immunity to noise. It is solely intended to dissipate noise current but not to protect persons from contact.

The unit's operative earth has 2 connectors: Either one of the 6.3 mm x 0.8 mm blade connectors or the earth bolt at the back of the unit.

Take heed of the following points to ensure that noise currents are safely dissipated:

- Try to keep a very short distance between the unit and the central earth bonding point on the control cabinet.
- Check that the cable/earth conductor diameter is 2.5 mm² or greater

Take heed of the specified conductor shielding; check that all data link cables attached to the unit have shielded wires and attach to the unit's earthing terminals.

	Information
	Earth wires should be short and have a large surface (copper mesh). Refer to http://de.wikipedia.org/wiki/ground_(electronics) or a similar source for further details

5.2.2 System Power Supply

Terminals L+ and L- of connector X9 are used to supply power to Econo. The wires should have a cross section of 0.75 mm² to 2.5 mm² and a connector sleeve. Connect the wires to the terminals and tighten the screw-type terminals using a screwdriver.

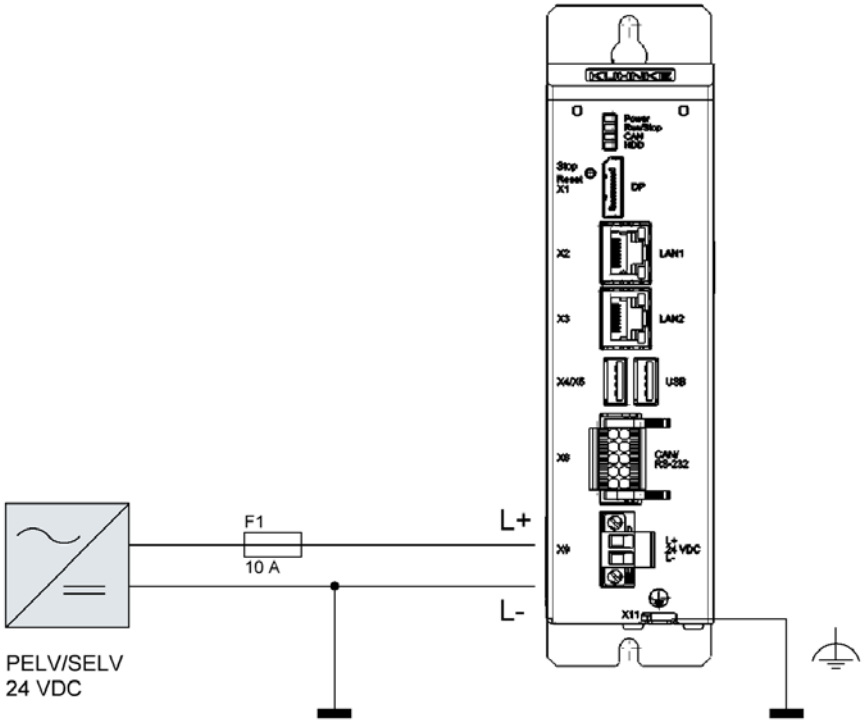
Check the pin wiring specified for the unit's power supply connector when wiring up the unit.

	CAUTION
	Damage to the unit due to supplying excessive or the wrong power *Wrong voltage or wrong polarity of the connectors may destroy the unit.* ⇨ Please refer to the pin wiring shown on the unit → 4.6.7 Power Supply "X9"

I/O Power Supply Fusing

The cord must have external protection against short circuit and overload tripping at max. 10 A, min. 60 V.

Power Supply Wiring Example



5.2.3 EtherCAT "X3"

EtherCAT is an industry-grade real-time Ethernet fit for use for both hard and soft real-time requirements of automation technology. Please take heed of the notices below to ensure safe operation of your EtherCAT fieldbus system.

- To connect your EtherCAT devices, only use category 5 (CAT5) Ethernet cables pursuant to EN 50173 or ISO/IEC 11801.
- Owing to the automatic cable detection feature (auto crossing) you can interconnect EtherCAT devices by both symmetrical (1:1) and crossover cables.
- Up to 100 metres length of cable are allowed between any two EtherCAT devices.

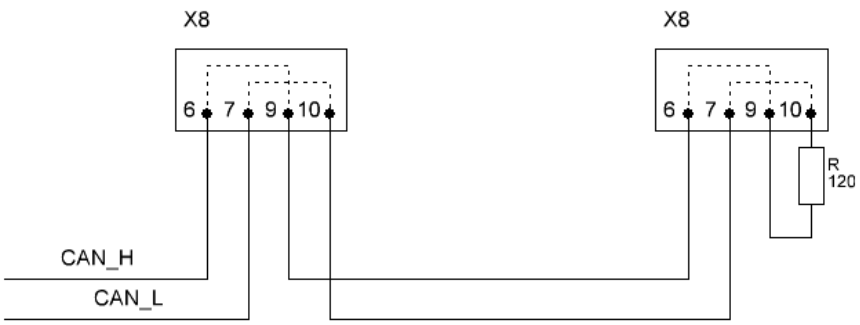
	Information
	Torsional and permanent tensile stress near the Ethernet cable connector strain the connections. An Ethernet connector with too much play and insufficient guidance in its socket will provoke tipping in the plug connections which often causes contact and, thus, fieldbus interruptions. *Vibration tests show that the robustness of a connection increases with the depth of plugging the connector into the socket. Mechanical requirements of vibration and impact resistance are commonly known to be stricter in industrial environments than in IT environments.* *Depending on the manufacturer and system, the plugging depths of commercially available connectors vary from about 8 mm to almost 12 mm and are rated at about 9 mm for standard connectors. According to manufacturer specifications, connectors designed for industrial environments have a plugging depth of up to 11.8 mm.*

5.2.4 CAN / CANopen Station (X7), (X8)

CAN is a 2-wire bus that all stations are connected to in parallel. To avoid voltage reflection, verify that the bus is terminated by a 120 ohm (or 121 ohm) termination resistor at either end. You will need these resistors even if cables are very short.

Connector CAN1 (X8) has double CAN terminals. If your unit is a bus end point, you may connect a termination to one of them. The easiest way to do so is to directly attach a wired 120 Ω resistor to the plug contacts. If your unit is located somewhere along the bus, the spare contacts are used to attach the next station.

The CAN2 (X7) interface is not electrically insulated. In this case, the next station or the termination must therefore connect to some other point.



Length of CAN Bus

The maximum length of a CAN bus is limited by the signal transit time. Mind to adapt the baud rate to the actual line length.

Length of CAN Bus	
Length	Max. Baud Rate
< 20 m*	1 Mbps
< 100 m	500 kbps
< 250 m	250 kbps
< 500 m	125 kbps
< 1000 m	50 kbps

5.2.5 Modbus RTU

For the time being, the on-board CODESYS MODBUS RTU configurator is out of order due to a fault in the communication changeover mechanism. CODESYS knows about and will handle the problem soon.

You may use Kendrion's MODBUS RTU library until use of the on-board configurator has been approved. Please contact Kendrion's Product Management, as necessary.

5.2.6 Modbus TCP

Ethernet-TCP/IP networks use the "Transport Control Protocol" (TCP) to transfer the Modbus TCP application protocol for Modbus. The target device can use interfaces LAN 1 or LAN 2 for protocol implementation. It is then selected in the master configuration of the CODESYS Development System.

5.3 Putting into Service

5.3.1 General Start-up Information

!	***NOTE***
	Risk of burns *The unit's surface may become as hot as 70 °C. Unprotected contact causes a risk of burning yourself.* ⇨ Avoid direct contact with the unit in operation. Put on suitable safety gloves before touching the unit.

Have the following tools at hand for starting the unit for the first time:

- USB keyboard
- USB mouse
- unit with web browser installed

5.3.2 Start-up Prerequisites

- Functional earth is connected.
- All cables are attached properly.
- Power is supplied to the unit.

5.3.3 Turning on the Unit

Connect the unit to the power supply.

The user interface of the operating system displays after the boot-up routine. Remember that the display resolution is set in the Image. In case a soft PLC is installed, it starts automatically.

5.3.4 Turning off the Unit

Since there is no shutdown routine for these units, you may unplug the power supply straight from the unit.

5.4 Configuration

A web interface is used to configure Econo → . After logging in, you can check and change various system settings and/or display system information.

5.1 Web Interface

5.1.1 IP Address

Econo 06 units are set to a permanent IP address and subnet mask in the factory.

IP address LAN 1 (X2): 192.168.0.216

Subnet mask: 255.255.255.0

To connect to the unit for the first time, mind that your PC's IP address must be in the same range as that of the unit.

This many involve changing your PC's IP address.

!	***NOTE***
	Duplicate IP addresses *Assigning the same IP address to two different devices may cause serious network problems.* ⇨ Check your network for duplicate IP addresses. ⇨ To put the unit into operation, we recommend using a direct network connection between the unit and your programming PC and assign set IP addresses to both. You may have to use a cross-over network cable.

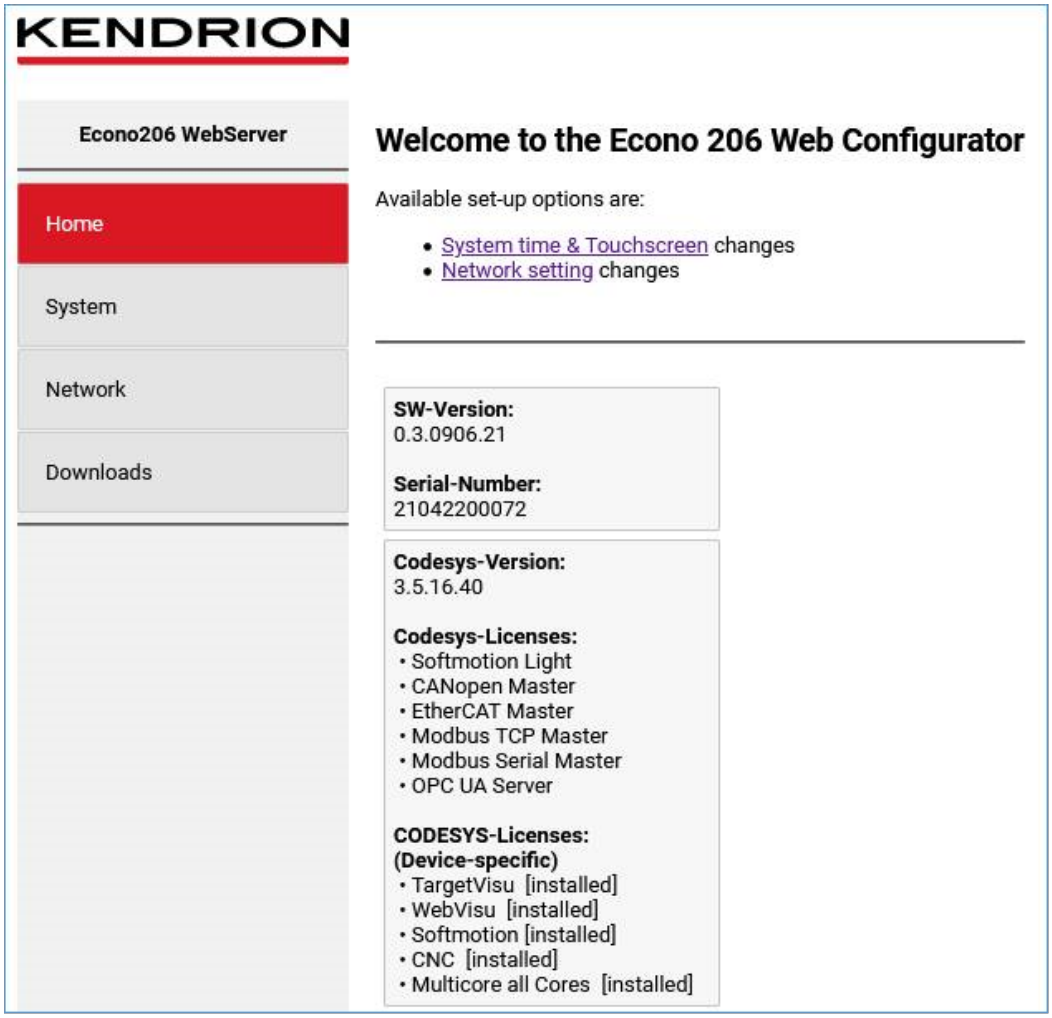
5.1.2 Web Interface – Login

First of all, run a browser application on your PC to launch the web interface of Scout/Econo 06-series units. Internet Explorer, Chrome and Firefox are the current choice of browsers.
Type the following IP address into your browser's address bar:

LAN 1 connection (X2)
http://192.168.0.216

LAN 2 connection (X3)
http://192.168.0.216

The following web site displays:

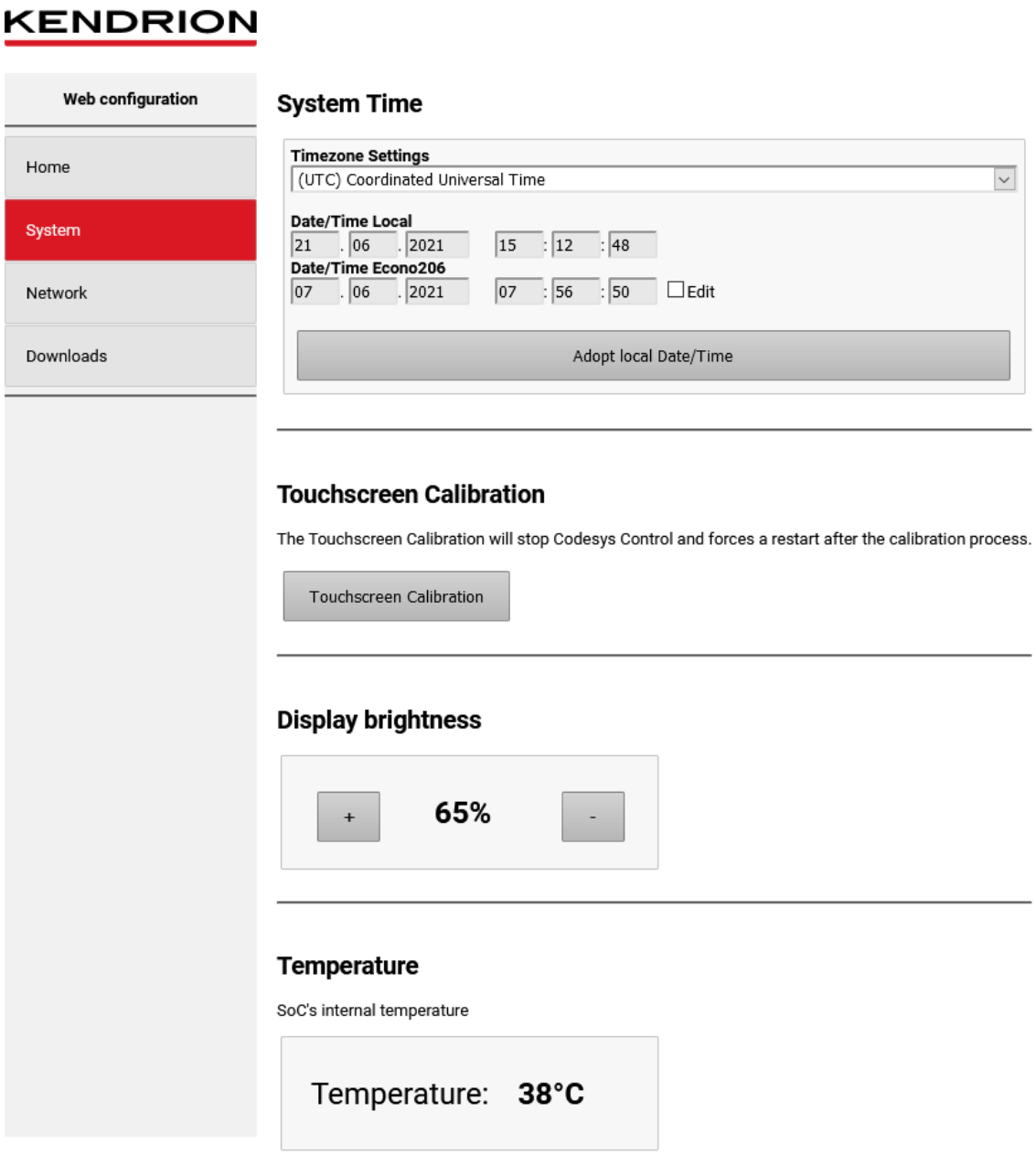


*The actual web interface view depends on the options available to you

Information

- Version of the software installed
- Serial number of the device
- CODESYS runtime version
- Default interfaces and fieldbuses supported
- Optional licences for interface and fieldbus support

5.1.3 Web Interface – System



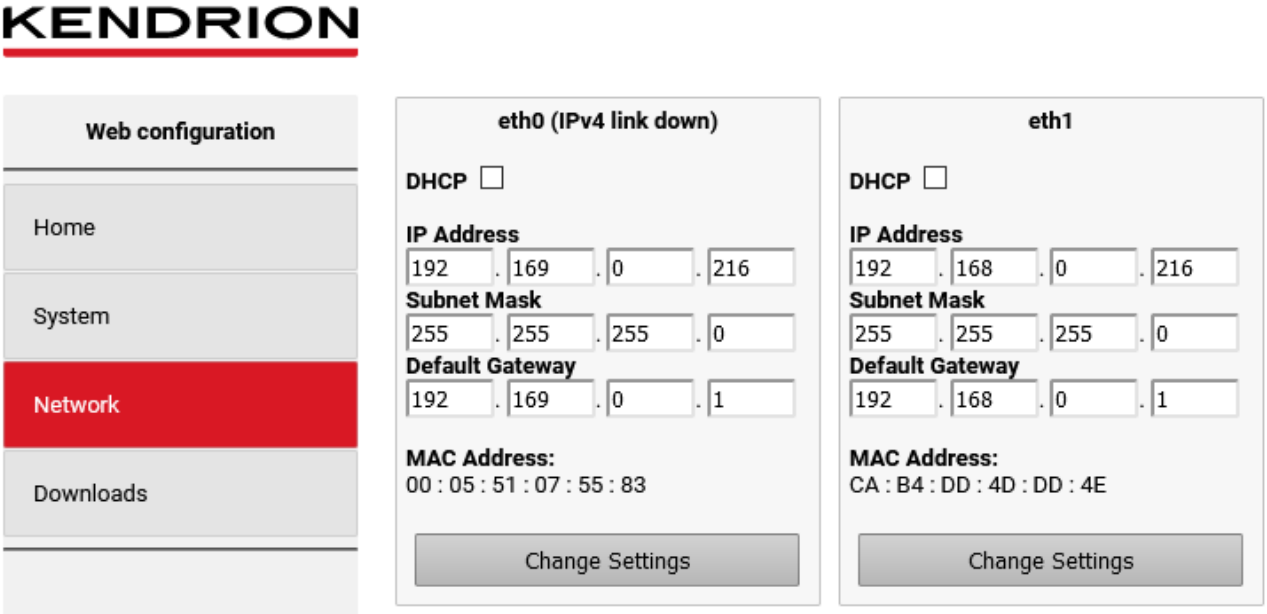
*The actual web interface view depends on the options available to you

Settings:

- Date and time
- Start Touch Calibration
- Display brightness
- Temperature of processor core

Your settings will be saved when quitting the page

5.1.4 Web Interface – Network

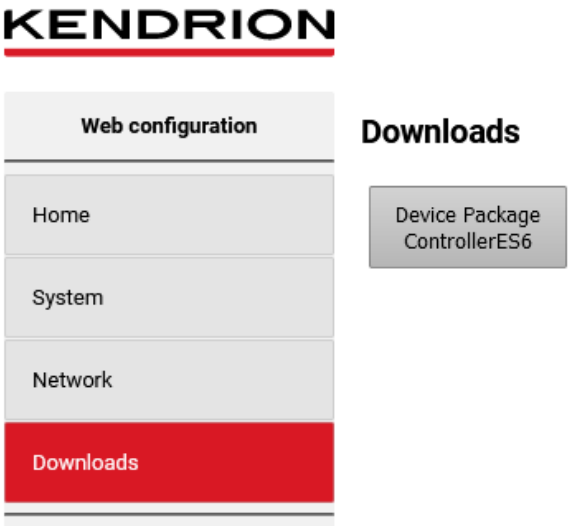


*The actual web interface view depends on the options available to you

Settings

- LAN1 & LAN2 network configuration

5.1.5 Web Interface – Downloads



*The actual web interface view depends on the options available to you

Settings

- Download of Device Package ControllerES6
  - CODESYS Device Description
  - Device Description of the integrated optional I/Os
  - CODESYS library "CmpEconoIECStatusControl"

5.3 Diagnosis

5.3.1 Indicators

	Information
	Refer to sections 4.7.1 Indicators and 4.7.2 Ethernet "LAN1" (X2), "LAN2" (X3) to find details of the unit's indicators.

5.3.2 Table of Faults

Table of Faults		
Description	**Possible Cause**	**Recommended Action**
Date and time are not stored permanently	The battery buffering the real-time clock is low.	Replace battery → 0 Replacing the Battery

5.4 Maintenance / Servicing

5.4.1 General

Only qualified persons are allowed to work on Econo.

⚠	***CAUTION***
	Wrong or excessive supply voltage *Electric shock hazard* ⇨ Do not plug, mount, unplug or touch the connectors during operation! You may otherwise provoke destruction or malfunction. Turn off all power sources before working on the unit. This also applies to any peripherals connected such as encoders, programming devices with external power source, etc.

5.4.2 Servicing

Econo requires neither servicing for the specified service life nor any action if it is kept and operated at the admissible ambient conditions specified in section Technical Data.

5.4.3 Preventive Maintenance

Replacing the Battery

Under the plastic cover of the unit, there is a 3 V lithium battery for buffering the power supply to the real-time clock. The battery lasts for about 4 to 6 years. After that time, the battery should be replaced.

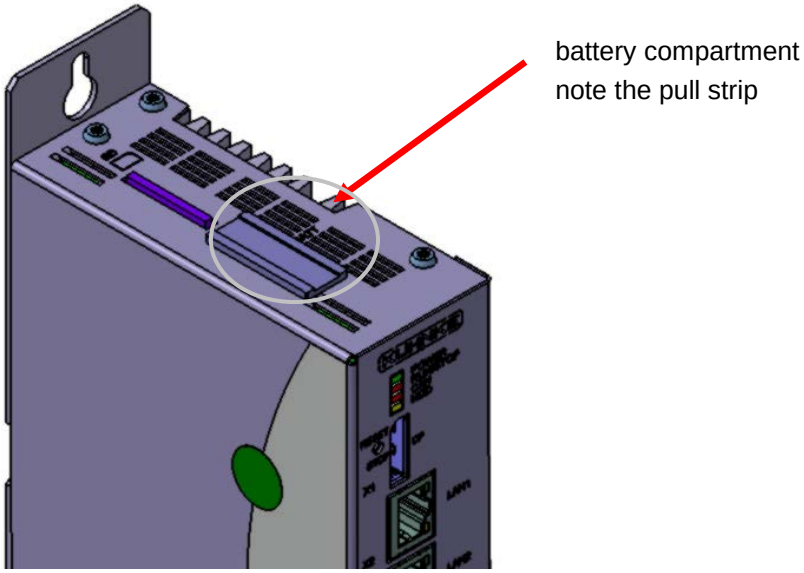
To retain the date and time settings, you should replace the battery while the unit is running. Please use the pull strip to remove the old battery and remember to put the strip back in for ease of later replacement.

Replace the lithium battery (type CR2032) with a battery of the same type.

Procedure

⇨ Remove the black plastic cover from the battery compartment and carefully pull at the pull strip to remove the battery.

⇨ Insert the new battery and pull strip, checking the battery for correct type and polarity.



	Information
	Date and time settings cannot be saved if the battery is discharged.

	Information
	Do not throw the old lithium battery into the domestic waste. *Dispose of the battery compliant to local regulations concerning the disposal of hazardous waste (e.g. by taking it to the special collecting points).*

5.5 Durability

5.5.1 Repairs / Customer Service

	Information
	Only the manufacturer or customer service providers authorised by the manufacturer are allowed to do repairs and perform corrective maintenance.

5.5.2 Warranty

The statutory period and conditions of warranty apply. Warranty expires if unauthorised attempts are made to repair the unit / product or any other intervention is performed.

5.5.3 Taking out of Service / Disposal

Disposal requires the device to be disassembled and entirely taken apart. All metal components can be given to metal recycling.

Electronic Scrap

Sort and dispose of electronic components by type. For details on proper disposal please check your national laws and regulations making sure that your method of disposal complies with them.

Treat the packaging as recyclable paper and cardboard.

6 Specific Device Functions

6.1 System Information

CODESYS library "kics_sysinfo" contains the hardware-specific device information. Run the Library Manager to add the library to your project.

The Library Manager hosts short a documentation of every available function blocks and functions. Please contact Kendrion Kuhnke's Product Management if you need further information.

6.2 Temperature Sensor

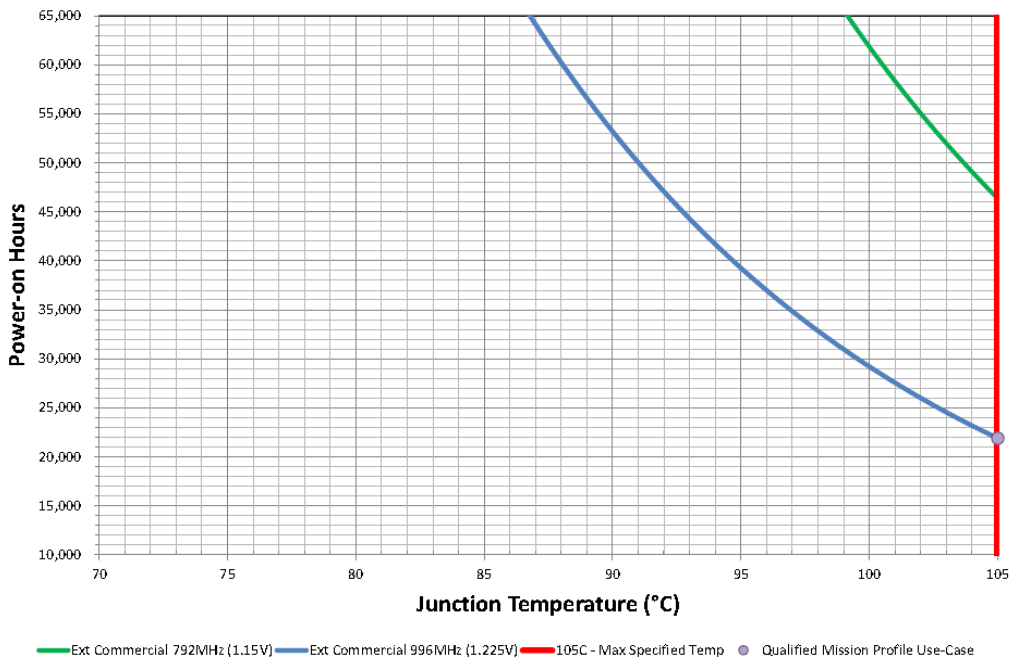
Run the web interface to take a reading of the temperature sensor in the CPU. The reading allows you to judge the capacity load usage of the unit and the ventilation. The table below relates the CPU temperature to the ambient temperature at about 80% CPU load.

The CPU's rated maximum working temperature is 105 °C.

CPU working temperature after thermal compensation		
Conditions	Ambient temperature	CPU temp.
Power supplied: 28.8V 80% CPU load	20 °C	54 °C
	30 °C	64 °C
	40 °C	74 °C
	50 °C	82 °C
	60 °C	92 °C

The graph below illustrates how the CPU life depends on the CPU temperature. To prevent the CPU from wearing down prematurely, try not to exceed max. 100 °C under continuous duty. Ensure sufficient ventilation when the unit is operating.

In extended commercial mode, both Scout and Vico run at 792 MHz (green borderline).



Temperature Monitoring

Use the following hands-on limits should your project require that the unit's temperature be monitored:

- Alert at CPU temperature >=95 °C for longer than 10 minutes (machine keeps running).
- Alert at CPU temperature >=99 °C for longer than 15 minutes (machine stops).
- Alert at CPU temperature >=102 °C for longer than 15 seconds (machine stops).
- Alert at CPU temperature >=104 °C for longer than 1 second (machine stops).

6.3 IT Security

Automation devices contain functional units that should be protected. These include the conventional control and regulation functions and algorithms but also the facility users' production and other data. Since there is no automation solution without faults, some potential weak points and causes of risks remain.

Whereas the main threat is from LAN networks, attackers may also use local interfaces.

Consider the following routes of attack:

- Interfaces (USB, LAN, WLAN, Bluetooth,…..)
- Services, drivers, protocols (RPC, HTTP(S),…..)
- Authentication, encoding (compulsory registration, encrypted password)
- Physical access (closed rooms, cabinets)
- Third-party systems or personnel

Take every effort to avoid exposing the PLC and controller networks to open networks or the Internet. Safeguarding should include extra data link layers such as remote access via VPN as well as sophisticated firewalls. As a basic rule, you should disable or restrict the access to all interfaces you do not need. Segmentation (e.g. by a router with a firewall) may be another effective means of protection.

	NOTE
	Unauthorised access to the computer *Controller failure and data loss* ⇨ Integration in networks granting public access requires the user to take appropriate measures aimed at preventing unauthorised access.

6.4 Fonts

The following fonts are installed in the factory:

LiberationSans-Italic.ttf
LiberationMono-Regular.ttf
LiberationSans-Bold.ttf
LiberationMono-BoldItalic.ttf
LiberationSans-Regular.ttf
LiberationSerif-Bold.ttf
LiberationMono-Italic.ttf
LiberationSerif-Italic.ttf
LiberationSans-BoldItalic.ttf
LiberationSerif-BoldItalic.ttf
LiberationSerif-Regular.ttf
LiberationMono-Bold.ttf

Please contact Kendrion Kuhnke's product management to add other/your own fonts to the ones installed.

6.5 Kernel Update Tool

Please contact Kendrion's Product Management if you need to update the kernel / operating system.

6.6 System Functions

6.6.1 SSH Link

SSH is a network protocol, which lets you establish a safe and encrypted network connection to the unit.
To do so under Windows, you will need an SSH client such as Putty.

You will need the following details to log in using SSH:

Server address:	
User name:	root
Password:	-
Port	

6.6.2 Autostart

Run background application "systemd" to configure any other applications you may wish to run on Scout. It takes some experience to actually configure this feature. Our product management is there to help you.

6.6.3 Remote Connection

You may use another network computer to operate the device. Prerequisites are to run a "VNC Viewer" on the network computer and to open a TCP/IP line to the control unit.

	Information
	A VNC Viewer grants you unrestricted access to the unit's mass storage device. To protect the unit against unauthorised access, you are advised to disable this service if you operate the unit in a machine or system.

	NOTE
	Deletion of system files *Risk of destroying the unit or provoking malfunctions* ⇨ Do not delete any files unless you know them exactly ⇨ Never delete any files relevant to operating the system

7 Operating System

7.1 Linux

Linux Yocto plus RT extension

8 CODESYS DEVELOPMENT SYSTEM

8.1 Installing CODESYS on the Project Engineering PC

CODESYS is a device-independent control unit programming system. It conforms to standard IEC 61131-3 and supports all standardised IEC programming languages plus the integration of C code routines and object-orientated programming.

In conjunction with runtime system CODESYS Control Win it also allows the use of "multi-device" and "multi-application" programs. Owing to its component-based architecture, it supports customer-specific configurations of and extensions to the user interface.

Before installing CODESYS, please read and take note of the system requirements:

System Requirements

Operating system: Windows XP

- RAM: 1024 Mb
- Hard disk: 1 Gb
- CPU: Pentium V, Centrino > 3.0 GHz, Pentium M > 1.5 GHz

8.1.1 Installing the Device Description in the CODESYS Development System

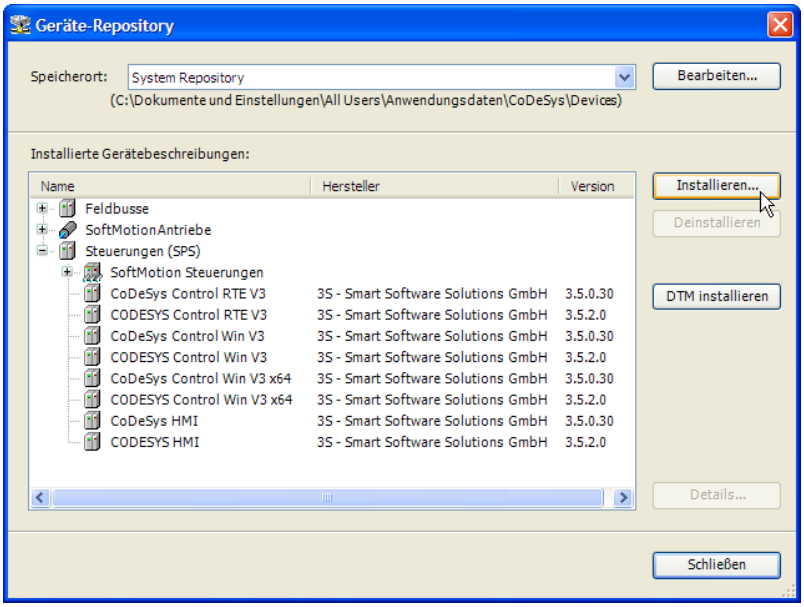
Before the IEC 61131-3 development tool can be used to operate a device, the CODESYS Development System is to be made known to the device as the runtime system.

A separate plug-in, the Device Repository, provides the local system and your projects with the device definition management functions. Among other features, it contains commands of category Devices which you will normally find in the Tools menu.

- Open the Tools menu and pick Device Repository...
- Screen Device Repository is displayed
- Expand the tree at Control Units (PLC)

The Device Repository hosts the descriptions of all devices currently installed on the local system and makes the devices available for CODESYS programming. Devices are installed in and uninstalled directly from the Device Repository.

Screen Device Descriptions Installed displays the Name, Vendor and Version of every device that is currently installed. Click on the plus and minus signs to expand or collapse the branches.



To Install a Device Description

Click on Install... to install a new device on the local system and make it available for use in the programming system.

Screen Install Device Description is displayed to let you search the system for the associated device description file. If you are looking for a standard device, set the file type filter to "*.**devdesc.xml**" (device description). Another option is to find vendor-specific description files such as *gsd files of Profibus DP modules or *.eds and *.dcf files of CAN devices.

Clicking on OK confirms your settings, closes the screen and adds the device to the tree shown on screen Device Repository. Look at the bottom of screen Device Repository to find messages on any installation error (e.g. missing files referenced by the device description).

Device Description

All Scout variants equipped with an iMX6 processor system use Device Description "ContollerES6". Run the Web Configurator and open its Download menu to load this Device Description and the one for the integrated optional 4DI/4DO from the unit.

Variant	Device Id	Device Name
Econo XX6	64	ControllerES6
Optional internal 4DI/4DO	1064	ControllerES6IO

To Install a Device Description

Click on Install... to install a new device on the local system and make it available for use in the programming system.

Screen Install Device Description is displayed to let you search the system for the associated device description file. If you are looking for a standard device, set the file type filter to "*.**devdesc.xml**" (device description). Another option is to find vendor-specific description files such as *gsd files of Profibus DP modules or *.eds and *.dcf files of CAN devices.

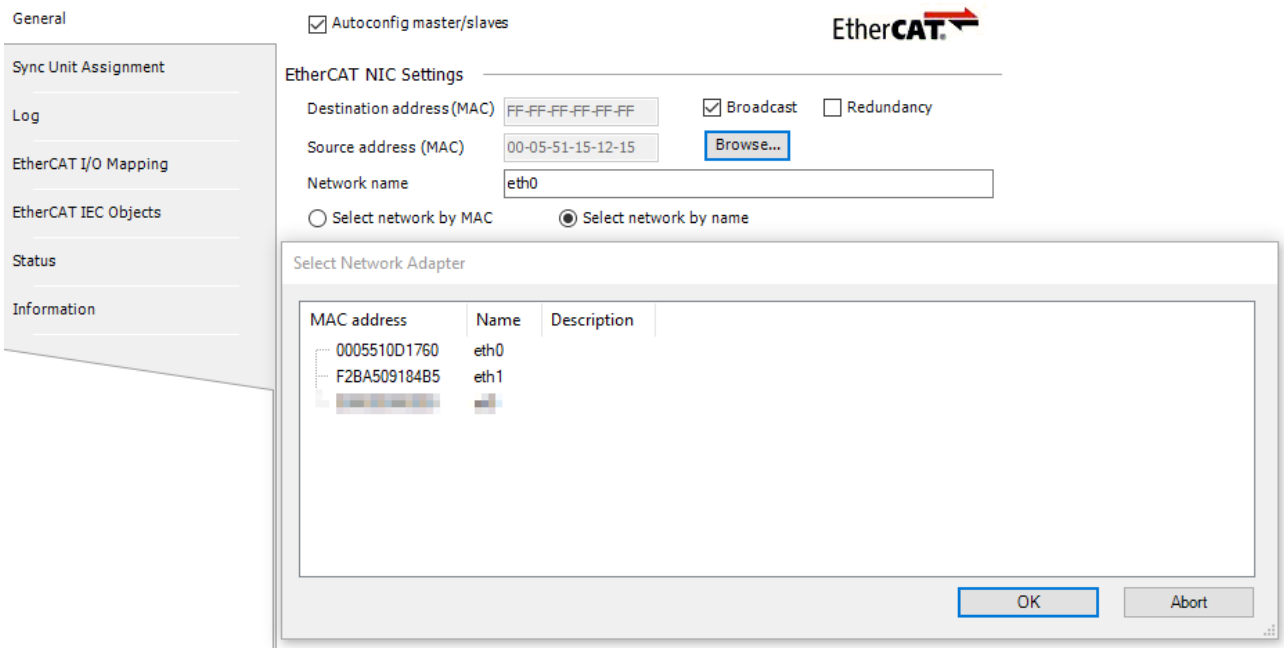
Clicking on OK confirms your settings, closes the screen and adds the device to the tree shown on screen Device Repository. Look at the bottom of screen Device Repository to find messages on any installation error (e.g. missing files referenced by the device description).

To Download a Device Description

The matching Device Description is stored on the device. Display the web configuration page and open the Downloads menu to load it.

On the web configuration screen, go to tab Download and tap on Download DevDescr.

EtherCAT Configuration



9 Appendix

9.1 Technical Data

9.2 Dimensions

9.2.1 Econo

9.3 Applicable Standards and Limits

9.3.1 Safety Standards and Directives

- EN 61131-2:2008
  Programmable logic controllers – Part 2: Equipment requirements and tests

9.3.2 EMC Standards**

EMC immunity to:

- Generic standard EN 61000-6-2:2011 -06
  Electromagnetic compatibility (EMC) – Part 6-2: Generic standards - Immunity for industrial environments
- Product standard EN 61131-2:2008-04
  Programmable logic controllers – Part 2: Equipment requirements and tests

EMC noise emission to:

- Generic standard DIN EN 61000-6-4:2007
  Electromagnetic compatibility (EMC) – Part 6-4: Generic standards - Emission standard for industrial environments
- Product standard EN 61131-2:2008-04
  Programmable logic controllers – Part 2: Equipment requirements and tests

Placing on the market of substances in electrical and electronic equipment.

- The product conforms to the restrictions of use of certain substances pursuant to EU Directive 2011/65/EU, Delegated Directive 2015/863/EU and the German Ordinance on the Use of Substances in Electrical and Electronic Equipment (ElektroStoffV).

9.3.3 Admissible Ambient Conditions

Storage and transport

temperature	-25...+70 °C
relative humidity	5% to 95% at 25°C (no condensation)
vibration	5 to 9 Hz: +/-3.5 mm, 9 to 150 Hz: 9.8 m/ s^2 (1g)
shock	150 m/s^2, 11 ms (15g)

Operation

location of use	for indoor use only; front panel withstands wet environments
altitude	max. 2000 m
ambient temperature	vertical installation: 0...60 °C
relative humidity	5% to 95% at 25°C (no condensation)
vibration	5 to 9 Hz: +/-3.5 mm, 9 to 150 Hz: 9.8 m/ s^2 (1g)
shock	150 m/s^2, 11 ms (15g)

9.4 Regulations and Declarations

9.4.1 Mark of Conformity

The EC-Declarations of Conformity and the associated documentation can be made available to the competent authorities pursuant to the above EU Directive. Please contact the Project Management, as necessary.

CE ✓ RoHS III

9.5 Approvals

Econo 206 has been granted the following approvals:

9.6 Order Specifications

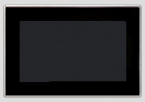
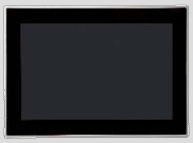
9.6.1 Basic Units

Technical Data

Econo 206 WV	**640 200 207 002 100**
Compact PLC CPU i.MX6 Single Core,1 GHz Operating system: Linux CODESYS Soft PLC, CODESYS TargetVisu, CODESYS WebVisu EtherCAT, CANopen, OPC UA, Modbus TCP/RTU, remanent buffer Power supply unit rated for control purposes, 24 V DC (-20%...+25%)	
Econo 206 WV SM	**640 200 207 012 100**
Compact PLC with SoftMotion CPU i.MX6 Single Core,1 GHz Operating system: Linux CODESYS Soft PLC, CODESYS WebVisu, SoftMotion EtherCAT, CANopen, OPC UA, Modbus TCP/RTU, remanent buffer Power supply unit rated for control purposes, 24 V DC (-20%...+25%)	
Econo 206 WVSM CNC	**640 200 207 022 100**
Compact PLC CPU i.MX6 Single Core,1 GHz Operating system: Linux CODESYS Soft PLC, CODESYS WebVisu, SoftMotion CNC+Robotics EtherCAT, CANopen, OPC UA, Modbus TCP/RTU, remanent buffer Power supply unit rated for control purposes, 24 V DC (-20%...+25%)	
Econo 226 WV	**640 200 209 002 400**
Compact PLC with SoftMotion CNC+Robotics CPU i.MX6 Quad Core,1 GHz Operating system: Linux CODESYS Soft PLC, CODESYS WebVisu licensed for QuadCore units EtherCAT, CANopen, OPC UA, Modbus TCP/RTU, remanent buffer Power supply unit rated for control purposes, 24 V DC (-20%...+25%)	
Econo 226 WV SM	**640 200 209 012 400**
Compact PLC with SoftMotion CPU i.MX6 Quad Core,1 GHz Operating system: Linux CODESYS Soft PLC, CODESYS WebVisu, SoftMotion licensed for QuadCore units EtherCAT, CANopen, OPC UA, Modbus TCP/RTU, remanent buffer Power supply unit rated for control purposes, 24 V DC (-20%...+25%)	
Econo 226 WVSM CNC	**640 200 209 022 400**
Compact PLC with SoftMotion CNC+Robotics CPU i.MX6 Quad Core,1 GHz Operating system: Linux CODESYS Soft PLC, CODESYS WebVisu, SoftMotion CNC+Robotics for QuadCore units EtherCAT, CANopen, OPC UA, Modbus TCP/RTU, remanent buffer Power supply unit rated for control purposes, 24 V DC (-20%...+25%)	

9.6.2 Accessories

Technical Data

Kuhnke Vico 404 HMI	**677 800 00**	
Touch Panel with CODESYS HMI 4.3" display, resolution (4.3") 480 x 272 (PSP) ARM Cortex-A8 - 1 GHz CODESYS HMI		
Kuhnke Vico 704 HMI	**677 800 10**	
Touch Panel with CODESYS HMI 7“ display, resolution 800×480 (WVGA) ARM Cortex-A8 - 1 GHz CODESYS HMI		
Kuhnke Vico 1004 HMI	**677 800 20**	
Touch Panel with CODESYS HMI 10.1" display, resolution 1024x600 (WSVGA) ARM Cortex-A8 - 1 GHz CODESYS HMI		
Vico MT 727 HMI	**677 810 00**	
CODESYS HMI terminal with multitouch screen 7-inch TFT display, wide format (1024x600), typ. 450 cd/m2 Capacitive multitouch screen, glass 1.8 mm thick Glass front resides in milled aluminium frame (with end caps) Processor ARM Cortex A53, i.MX8Mmini quad-core CPU, 4x 1.6 GHz Housing: aluminium at front (IP65), stainless steel at back (IP20) Power supply 24 VDC ± 20%		
Vico MT 1027 HMI	**677 810 10**	
CODESYS HMI terminal with multitouch screen 10.1-inch TFT display, wide format (1280x800), typ. 420 cd/m2 Capacitive multitouch screen, glass 1.1 mm thick Glass front resides in milled aluminium frame (with end caps) Processor ARM Cortex A53, i.MX8Mmini quad-core CPU, 4x 1.6 GHz Housing: aluminium at front (IP65), stainless steel at back (IP20) Power supply 24 VDC ± 20%		
Vico MT 1527 HMI	**677 810 30**	
CODESYS HMI terminal with multitouch screen 15.6-inch TFT display, wide format (1366x768), typ. 350 cd/m2 Capacitive multitouch screen, glass 1.8 mm thick Glass front resides in milled aluminium frame (with end caps) Processor ARM Cortex A53, i.MX8Mmini quad-core CPU, 4x 1.6 GHz Housing: aluminium at front (IP65), stainless steel at back (IP20) Power supply 24 VDC ± 20%		

9.6.3 Malente Headquarters

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