KENDRION

User Manual

Kuhnke Vico 404, 704, 1004

Touch Panel with CODESYS HMI/PLC
WEB terminal with HTML 5 browser

E 854 EN 23.06.2025

PRECISION. SAFETY. MOTION.

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1 Foreword

1.1 Imprint

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1.1.1 Release Information

Manual history

Date	Comments / Changes
28.03.2019	Original version with OS-Linux
15.04.2020	Expansion to include devices with PLC function
09.08.2021	Using Wi-Fi
24.01.2022	Device functions added
16.06.2022	Information about the serial port corrected
23.08.2022	USB - RS485 Adapter
28.03.2024	Access web visualization in a browser Remanent variables
07.01.2024	Open Source License Information
26.06.2025	Extension with new firmware, security notes

1.2 About this guide

This technical information is intended primarily for designers, project engineers and device developers. It does not provide any information about delivery options. Changes, omissions and errors excepted. Illustrations similar.

1.2.1 Limitations

The data provided are for product description purposes only and are not to be understood as a guaranteed quality of the product in the legal sense. Quality agreements are reserved for the specific contractual relationship. Any claims for damages against us – regardless of the legal basis – are excluded, unless we are guilty of intent or gross negligence

1.2.2 Terms of delivery

The general terms and conditions of sale and performance of Kendrion Kuhnke Automation GmbH apply.

1.2.3 Urhebeschutz / Copyright

1.2.4 Licenses

Firmware

The firmware of the devices contains open source software.

A list of the packages used and the corresponding licenses can be found on the device in the web interface under the menu item "System->Legal page".

The source code of the free software can be requested from Kendrion Kuhnke Support Steuerungstechnik at cost price within three years of delivery of the device.

CODESYS

The installed CODESYS Runtime, like all CODESYS products, is subject to the terms of the End User License Agreement (EULA) of CODESYS GmbH, which can be viewed on the CODESYS website.

1.2.5 Warranty Policy

With regard to the warranty, reference is made to the provisions of the terms and conditions of sale of Kendrion Kuhnke Automation GmbH or, if available, to the existing contractual agreements.

1.3 Reliability, safety

1.3.1 Scope

This instruction manual contains information that you must observe for your personal safety and to avoid property damage when working with the Kuhnke product.

1.3.2 Responsibility of the designer and operator

The operator's responsibility for a technical device is to use the manual properly and to follow the instructions and safety guidelines contained therein. This is critical to ensuring user safety, enabling flawless device operation, and ensuring regulatory compliance.

Exemplary points:

- Intended use of the device
- The documentation must be available and accessible.
- Only sufficiently qualified and authorized personnel may assemble, install, commission and maintain the device.
- Ensure compliance with the instructions in the manual.
- The national and international regulations for the control of machines and systems must be observed.

1.3.3 Target group of the user manual

This user manual contains the necessary information for the intended use of the described product (control unit, control terminal, software, etc.). It is aimed at specialist personnel from design, project planning, service and commissioning. Comprehensive knowledge of automation technology is required for the correct understanding and error-free implementation of technical descriptions, operating information and, in particular, hazard and warning information.

1.3.4 Intended use

Kuhnke products have been designed, developed and manufactured for ordinary industrial use. and may only be used for the applications provided for in the catalogue and in the associated technical documentation. The flawless and safe operation of the products requires proper transport, proper storage, installation, assembly, installation, commissioning, operation and maintenance. The permissible environmental conditions must be observed. Notes in the associated documentation must be observed.

1.3.5 . Reliability

The reliability of KUHNKE products is driven as high as possible through extensive and cost-effective measures in development and production.

These include:

- Selection of high-quality components,
- Quality agreements with our suppliers,
- Measures to prevent static charges when handling MOS circuits,
- Worst-case dimensioning of all circuits,
- Visual inspections at various stages of production,
- Computer-aided testing of all assemblies and their interaction in the circuit,
- Statistical evaluation of the production quality and all returned goods for the immediate initiation of corrective measures.

1.3.6 Hazard and warning information

Despite the fact that the 1.3.4 In accordance with the measures described, the occurrence of errors in electronic control systems must be expected, no matter how unlikely they may be.

Please pay special attention to the additional instructions that we have marked with symbols in this manual. Some of these hints draw attention to dangers, others serve more as orientation for the reader. In order of decreasing importance, they are described below.

The content in the hazard and warning information is structured as follows:

Type and source of danger

Possible consequences of non-compliance

⇨ Measures to prevent

	***DANGER***
	The notice with DANGER refers to an immediately dangerous situation which, if the notice is disregarded, will inevitably lead to a serious or fatal accident.

	***WARNING***
	The WARNING note refers to a potentially dangerous situation that failure to comply with the advice could lead to a serious or fatal accident or damage to this device or other devices.

	***CAUTION***
	The note CAUTION refers to a potentially dangerous situation that if the advice is disregarded, it may lead to an accident or may cause damage to this device or other equipment.

	***HINT***
	The notice refers to a potentially dangerous situation that, if the notice is disregarded, could potentially lead to damage to this device or other devices.

1.3.7 Other notes

	***Information***
	This mark draws attention to additional information concerning the use of the product described. It can also be a cross-reference to information found elsewhere (e.g. in other manuals).

1.3.8 Electrical safety

Our products usually become part of larger systems or plants. The following tips are intended to help integrate the product into the environment without danger to people and machines/systems.

	***DANGER***
	Disregard for the operating instructions *Precautions to prevent dangerous errors can be overridden or additional sources of danger can be created.* ⇨ Read the operating instructions carefully ⇨ Pay special attention to hazard warnings

	***Information***
	In order to achieve the highest level of conceptual safety when designing and installing an electronic control unit, it is essential to follow the instructions contained in the operating instructions exactly, as incorrect handling may override precautions to prevent dangerous errors or create additional sources of danger.

When planning a project , consider

- 24 V DC supply: Generated as a safely electrically isolated extra-low voltage. Transformers with separate windings that are designed in accordance with EN 60742 (in accordance with VDE 0551) are suitable, for example.
- In the event of power failures or dips: the program must be set up in such a way that a defined state is established during restart, which excludes dangerous conditions.
- Emergency stop devices must be implemented in accordance with EN 60204/IEC 204 (VDE 0113) and must be effective at all times.
- The safety and accident prevention regulations applicable to the specific incident must be observed.
- Please pay particular attention to the hazard warnings, which are intended to draw attention to possible sources of error at the appropriate point.
- In any case, the relevant standards and VDE regulations must be complied with.
- Install controls in such a way that unintentional actuation is excluded.
- Route control cables in such a way that there are no interferences (inductive or capacitive) that could affect the function of the control unit.

Observe during servicing or servicing

- When measuring and testing the control unit is switched on, the accident prevention regulation BGV A3 (Electrical systems and equipment must be observed), in particular §8 (Permissible deviations when working on parts).
- Spare parts: Use only those spare parts that are approved by KUHNKE. Only original KUHNKE modules may be used in the modular control units.
- For modular systems: Modules may only be plugged in or removed from the control system when there is no voltage. Otherwise, they can be destroyed or their function (possibly not immediately recognizable!) impaired.
- Batteries and accumulators, if available, should only be disposed of as hazardous waste.

1.3.9 IT Security

Kendrion Kuhnke products are designed to operate within closed industrial networks.

If the industrial networks are publicly accessible, e.g. through freely accessible network interfaces, or publicly accessible, e.g. through data connections via public data traffic (Internet), then the integrator and operator must take appropriate organisational and technical security measures to protect the internal network and ensure IT security.

	Information
	Information for the safe operation of plants, systems, machines and networks can be found in the information brochures of the BSI and IEC 62443, among others.

1.3.10 CODESYS Security

Automation devices contain functional units that are worth protecting. This includes classic control and regulation functions and algorithms, but also production data of the system users. Since no automation solution is error-free, there are potential, risky vulnerabilities.

A threat exists mainly via LAN networks, but attacks via local interfaces are also possible.

The following attack paths must be considered:

- Interfaces (USB, LAN, WLAN, Bluetooth,.....)
- Services, Drivers, Protocols (RPC, HTTP(S),..)
- Authentication, encryption (force login, encrypt PW)
- Physical access (locked rooms, cupboards)
- External systems, external employees

As much as possible, avoid exposing the PLC and control networks to open networks and the Internet. For protection, use additional layers of security such as a VPN for remote access and install firewall mechanisms. In principle, all unnecessary interfaces and services should be deactivated or access restricted. Effective protection of automation devices can also be carried out via segmentation, e.g. routers with firewalls.

	HINT
	Third-party access to the computer *Control failure and data loss* ⇨ When integrating into publicly accessible networks, the user must take appropriate measures to prevent unauthorized access.

	HINT
	Please note the security information issued by CODESYS and continuously updated at: ***https://www.codesys.com/security***

1.3.11 Electromagnetic compatibility

Definition

Electromagnetic compatibility is the ability of a device to operate satisfactorily in the electromagnetic environment without itself causing electromagnetic interference that would be unacceptable to other equipment present in that environment.

Of all known electromagnetic interference phenomena, only a corresponding part of interference occurs depending on the location of a device in question. These faults are specified in the relevant product standards.

The IEC 61131-2 standard, which has been implemented at European level in the EN 61131-2 standard, applies internationally for the design and immunity of programmable logic controllers.

	***Information***
	General installation regulations that must be followed in order to limit coupling factors and consequently interference voltages to levels that can be withstood are contained in IEC 61131-4, Guide for Users.

Interference emission

Emission of electromagnetic fields, HF
according to EN 55011, limit class A, group 1

	***Information***
	If the control unit is to be used in residential areas, the limit value class B according to EN 55011 must be complied with with regard to interference emission. This can be achieved by installing the control system in grounded metal cabinets and by installing filters in the supply lines.

General Installation Instructions

Electronic control systems as part of machines, plants and systems require the consideration of applicable rules and regulations, depending on the area of application.

General requirements for the electrical equipment of machinery with the aim of machine safety are contained in the EN 60204 Part 1 standard (equivalent to VDE 0113).

Protection against external electrical influences

If provided, connect the control system to the protective conductor to dissipate electromagnetic interference. Ensure favorable cable routing.

Running of cables

Separate installation of power circuits, not together with control circuits:

- Dc 60 V ... 400 V
- Alternating voltage 25 V ... 400 V

Joint laying of control circuits possible:

- Data signals, shielded
- Analogue signals, shielded
- Digital I/O lines, unshielded
- DC voltages < 60 V, unshielded
- AC voltage < 25 V, unshielded

Installation Location

Make sure that there are no impairments in terms of temperature, impurities, shock, vibration and electromagnetic influence.

Temperature

Attention to heat sources, such as room heating, solar radiation, heat accumulation in assembly rooms and control cabinets.

Impurities

Use of appropriate housings to avoid possible adverse effects from moisture, corrosive gases, liquids and conductive dust.

Shock and vibration

Consideration of possible influences by engines, compressors, transfer lines, presses, pile drivers and vehicles.

Electromagnetic influence

Attention to electromagnetic interference from various sources on site: motors, switching devices, switching thyristors, radio-controlled devices, welding equipment, electric arcs, switching power supplies, power converters/inverters.

Special sources of interference

Inductive Actuators

When inductors (e.g. relay coils, contactors, solenoid valves and actuator solenoids) are switched off, overvoltages occur. It is necessary to dampen these interference voltages to a permissible level. Damping elements can be diodes, Z-diodes, varistors and RC elements. For the appropriate dimensioning, the technical specifications of the manufacturer or supplier of the actuators must be observed.

1.4 Quality and environmental management

1.4.1 Reliability

The reliability of Kendrion KUHNKE products is maximized through extensive development and manufacturing efforts. These include the selection of high-quality components, binding quality agreements with suppliers, computer-aided testing of all assemblies and their interaction in the circuit. This is complemented by the statistical evaluation of manufacturing quality and returns in order to initiate immediate corrective measures if necessary.

1.4.2 Disposal and recycling

Kontron's products are manufactured with environmental standards in mind, with many of the components used being recyclable. The final disposal of this product at the end of its useful life is subject to applicable national, state, or local laws and regulations. Further information on environmentally friendly disposal and recycling can be found in this guide under the points Decommissioning and disposal.

1.4.3 Information on the REACH Regulation and SVHC Information

In accordance with Article 33 of the REACH Regulation, we would like to inform you that SVHC substances may be contained in certain components in a concentration of more than 0.1% (% by weight). These substances are necessary for the functionality or manufacturing processes of the product. We would like to point out that the substances used in this product do not pose any risks to health or the environment under normal use.

2 System description

2.1 Kuhnke Vico

The new Kuhnke Vico 04 series is a high-performance display device in industrial-grade device design for modern operating concepts. The installed software package CODESYS HMI makes it possible to visualize data from one or more CDESYS V2 / V3 controllers on a remote Kuhnke Vico 04.

The visualization is developed either independently or together with the PLC application in the free CODESYS Development System. The Vico 04 series is based on a powerful ARM Cortex-A8 processor, combined with a resistive touch display.

All components are robust and available for a long time.

Properties

- Seamless sealing against dust, dirt and splash water (front)
- Maintenance-free thanks to fanless ARM processor technology
- Secure investment through long-term system availability
- Industry-Grade Interfaces
- CODESYS V3 HMI, RTC

Versions

Software Options		
Option	**Marking**	Function
CODESYS HMI	**CODESYS HMI**	Create modern machine and plant visualizations directly in the CODESYS Development System, which you can then display on Vico HMI devices for operation or diagnostics. The visualization project can be independent of the logic application (i.e. the IEC 61131-3 project). It can connect to several different CODESYS compatible controllers at the same time.
CODESYS PLC	**CODESYS PLC**	Create modern machine and plant visualizations directly in the CODESYS Development System. Expand the visualization with control functions from the PLC modular system from CODESYS.
Browser	**WEB**	HTML5 Web Browser. Chromium is an open-source web browser launched by Google. The browser is pre-installed on the Kuhnke Vico 04 Web devices and can be used in the "full screen standalone" setting for the display of web-based visualizations in plants and machines.

2.2 Embedded Linux

- Customized operating system with real-time capability
- Low storage space requirement
- MultiCore Compatible
- Communication options via various interfaces
- Diverse tools and features
- Current browsers

3 Product

3.1 General description

The Kuhnke Panel offers a powerful processor board with an integrated touch screen and thus enables combined visualization and operation on one device.

The device is designed for use directly on site at the machine. The Kuhnke Vico is a cost-effective visualization system, especially for machine, plant and control cabinet manufacturers.

Front view Kuhnke Vico 404

Front view Kuhnke Vico 704

Front view Kuhnke Vico 1004

3.2 Application

3.2.1 Intended use

The Kuhnke Panel is designed for use directly on site at the machine in an industrial environment. The built-in device can be mounted in electrical cabinets, control panels or control panels.

With this series of devices, a visualization device for various applications is available for mechanical and apparatus engineering.

3.2.2 Terms

The controller may only be used in applications where:

- There are no immediate safety risks for people
- System failures do not cause widespread economic damage
- System integrity is ensured by limited complexity

3.2.3 Foreseeable misuse

Location Requirements

The devices are equipment that may only be installed and operated in lockable housings, cabinets or electrical operating rooms. Access may only be possible for trained or approved personnel. The applicable standards and guidelines for the construction of control cabinets and the arrangement of data and supply lines must be complied with. Make sure that there are no impairments in terms of temperature, impurities, shock, vibration and electromagnetic influence.

The waste heat of the device develops in the side panel, the aluminum heat sink. Sufficient ventilation of the installation area must be ensured.

	***HINT***
	Damage to the device *The device can be damaged by the wrong choice of installation location.* ⇨ Please note the permissible ambient conditions and the installation position of the device in the Technical Data chapter.

Design constraints for high-risk activities

The Product is not designed or intended for use in any customer system or in combination with any third-party materials where the failure or failure of the Product is proven to result in the death or serious bodily injury of any person or to any physical or environmental damage ("High Risk Use").

Its use in high-risk applications is strictly prohibited.

	***DANGER***
	Danger of malfunction ***Death, serious personal injury or serious damage to property or the environment*** ⇨ Its use in high-risk applications is strictly prohibited.

3.2.4 Completely excluded areas of application

The device must not be used in critical infrastructures under any circumstances, as these places particularly high demands on security and reliability. The excluded areas include, in particular, energy supply systems, water and sewerage systems, telecommunications networks and traffic control systems.

It is also excluded from use in safety-critical systems. These include medical devices and life support systems, safety-relevant automotive applications, aerospace systems, nuclear facilities, and rescue and emergency systems.

In addition, the use of the device in high-availability and security applications is prohibited. This applies in particular to systems that directly affect human lives, applications without sufficient resiliency, and systems where failure could have potentially catastrophic consequences.

These restrictions serve to comply with safety standards and protect against serious risks.

3.2.5 Disclaimer

If the defined exclusions of use are not complied with, all warranty and conformity claims expire. In addition, there is an increased risk of personal injury and property damage. In such a case, Kendrion Kuhnke Automation assumes no liability for any resulting damages.

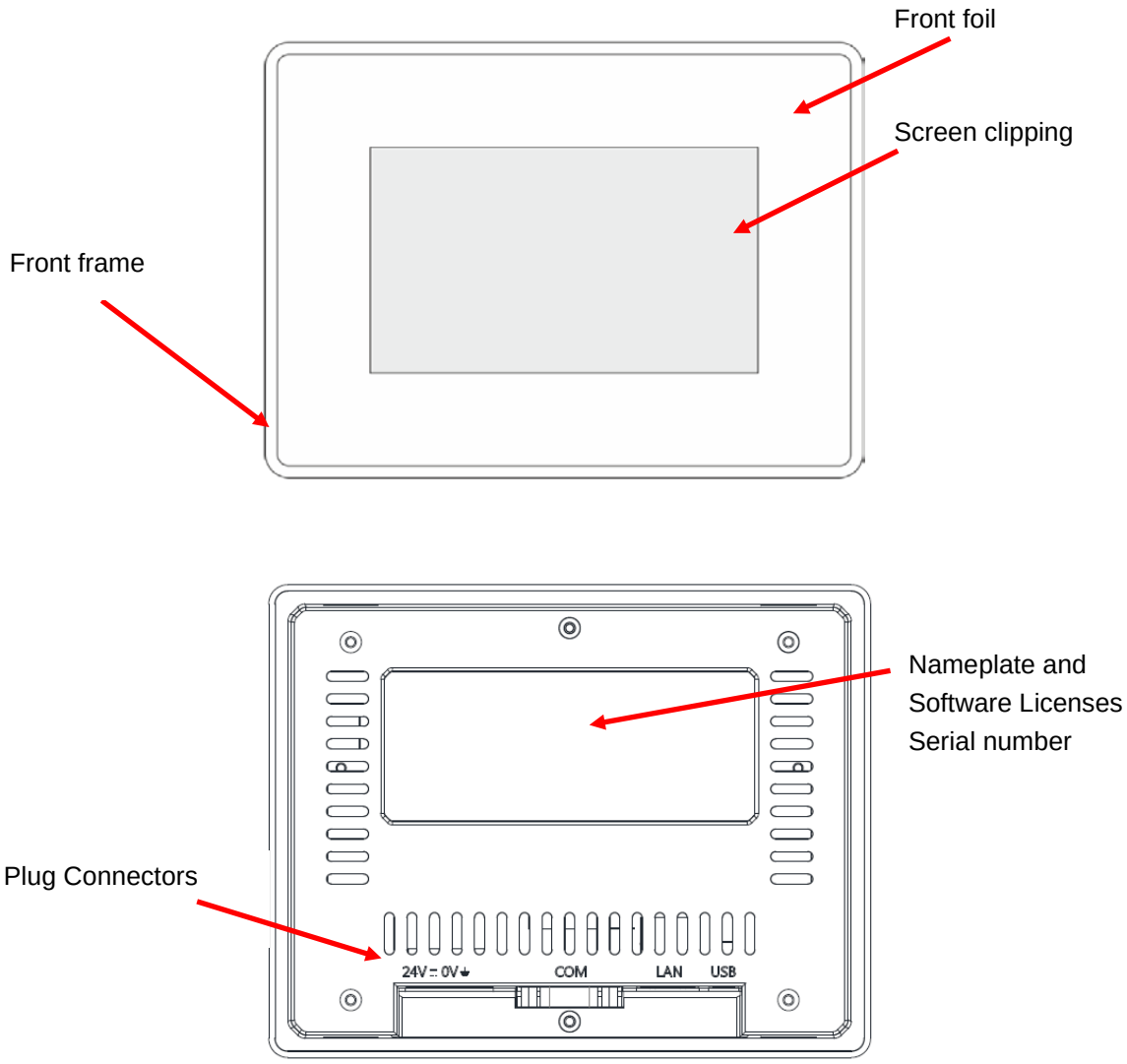
3.3 Technical data Kuhnke Vico

General device data

Product name	Vico 404	Vico 704	Vico 1004
Display size / resolution	4.3" / 480 x 272 (PSP)	7" / 800 × 480 (WVGA)	10.1" / 1024x600, WSVGA
Brightness	200 cd/m²	200 cd/m²	200 cd/m²
Lifetime LED	20000 h (50% max. brightness)		
Touchscreen	Foil Touch, 4-Wire Analog Resistive		
Lifetime	> 1 million actuations		
Backlight	LED white, lifespan > 20000h (@ 50% brightness)		
Processor	ARM Cortex-A8 - 1 GHz		
Clock	Clock and calendar with supercap buffering (buffer time 2 weeks) Accuracy RTC (at 25°C) <100ppm		
Software	Operating System: Linux RT Application: CODESYS V3 HMI or Chromium Web Browser, CODESYS PLC		
RAM	512 MB (DDR3)		
Drives	4 GB flash memory		
Networks	1 x Ethernet 1Gbit – RJ45		
Interfaces	1 x Ethernet 10/100Mbit, 1 x RS-232, 1 x USB 2.0 host, max. 500 mA		
Power supply	24 VDC / (10 ... 32)		
Current consumption @ 24 VDC	0.25 A	0.3 A	0.38 A
Conditions			
Installation location	Control cabinet or control panel with at least IP 54		
Installation position	Horizontal and vertical		
Storage	-20°C... +70°C		
Operating temperature	0°C... +50°C, in vertical installation position 0°C... +40°C, in horizontal installation position		
Environmental Condition	Degree of contamination 2		
Relative humidity	without condensation, relative humidity 5 ... 85%) (at 25°C)		
Vibration	5 ÷ 9 Hz, 7 mm p-p, 9 ÷ 150 Hz, 1 g EN 60068-2-6		
Shock	± 50 g, 11 ms, 3 pulses per axis EN 60068-2-27		
Durability of the front	Solvent resistance Contact for 1/2 hour at 21 ° C, no visible effect: Acetone, Butylcellosolve, Cyclohexanone, Ethyl Acetate, Hexane, Isopropyl Alcohol, MEK, Methylene Chloride, Toluene, Xylene Contact for 24 hours at 49°C, No visible effect: Coffee, ketchup, lemon juice, mustard (slightly yellow stain), tea, tomato juice. UV resistance limited		
Approvals	CE, UL (E202287)		
Mechanical properties			
Case	IP 20, Plastic (PC + ABS)		
Front panel	IP 66, plastic front panel with black insert, Seamless seal against dust, dirt and splash water		
Assembly	In the mounting cut-out with mounting clips		
Weight	0.4 kg	0.6 kg	1 kg
Dimensions (WxHxD)	147 x 107 x 34 [mm]	187 x 147 x 34 [mm]	282 x 197 x 35 [mm]

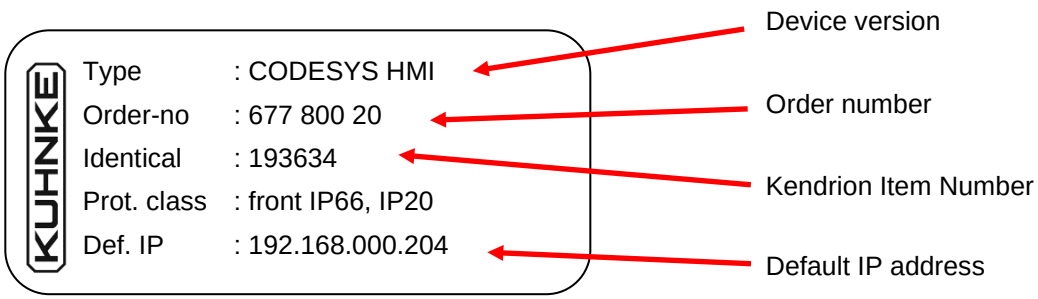
4 Structure and function

4.1 Abstract



4.2 Marking and identification

4.2.1 Nameplate



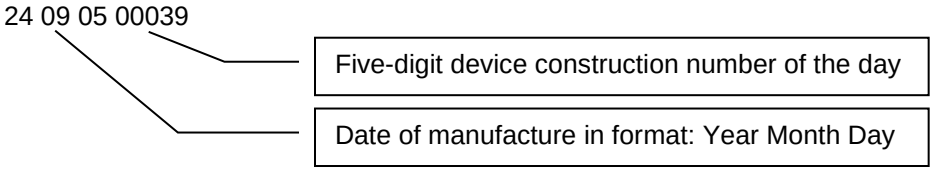
4.2.2 Serial number

The serial number consists of a combination of numbers of the date of manufacture and a sequential number.

Structure of the serial number:

JJ MM DD NNNNN

Example:
The device shown in the picture was manufactured on June 05, 2024 with the serial number 00039.



Software License Marking

Depending on the design of the device, different license stickers for the operating system and the application software can be stuck on the back of the device.

4.3 Scope of delivery

The Kuhnke Vico is supplied with:

Basic unit, supplementary sheet, connection plug, fasteners

4.4 Transport and storage

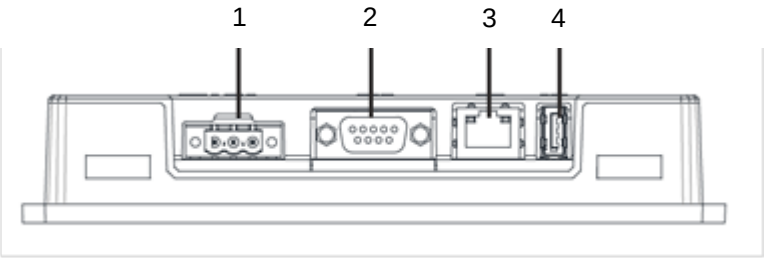
Despite the robust design, the built-in components are sensitive to strong shocks and shocks. Use the original packaging for transport and storage of the Kuhnke Vico. And make sure equipment is only transported and stored in the specified environmental conditions. For information on the permissible environmental conditions during transport, see →3.2 Specifications of this guide.

The device contains a lithium metal button cell that is permanently installed in the device. Labelling of the packages is not necessary for all transport routes (as of 11/2018).

	HINT
	Humidity *Damage to the device* ⇨ When transporting in cold weather or if the device is exposed to extreme temperature fluctuations, make sure that no moisture (condensation) settles on and in the device. The device must be slowly adjusted to the room temperature before it is put into operation.

4.5 Connector overview Kuhnke Vico

The connection level for all external connections is located on the back of the Kuhnke Vico. All connections are pluggable.



1 Power supply
(24V DC -10... 32 VDC)
2 Serial port "COM"
3 Ethernet connection "LAN"
4 USB port "USB"

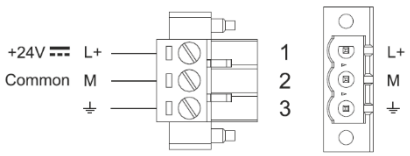
4.5.1 Power supply "24V 0V ⏚ "

Internal power supply

The KUHNKE Vico is equipped with a power supply for an input voltage of 24 VDC (10 VDC). 32 VDC). The power supply is potential-isolated and has built-in reverse polarity protection.

The supply line and the power supply must be protected with external short-circuit and overload protection with a tripping current of max. 10 A.

Plug assignment:



Power supply 24 V DC	
Pin / Symbol	Function
24V	external power supply 24 VDC (10 V ... 32 V)
0V	External power supply GND
⏚	Functional earth

Connection data

Connector	
Type	Screw connection with pull sleeve
	XCFR2
Number of poles	3, Single row
Conductor cross-section	flexible min 1.5 mm2 flexible max. 2.5 mm2
Flex	Approved for minimum 105°C

4.5.2 Functional earth

The connection of the functional earth must be connected to the protective conductor of the cabinet or system in which the panel will be installed. The connection is made via the plug of the power supply.

The minimum cross-section must not be less than 1.5 mm2. The connection to the control cabinet terminal should be as short as possible.

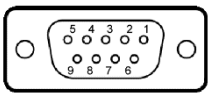
http://de.wikipedia.org/wiki/Datei:Functional_Earth.svg

	Information
	A low-impedance ground connection improves the dissipation of interference transmitted to peripherals via external power cables, signal cables, or cables.

4.5.3 Serial port "COM"

The interface is designed without potential isolation.

Connector assignment



X8 RS 232 / RS-422, RS-485 interface		
PIN	Function	
	RS-232	RS-422, RS-485
1	GND	GND
2		
3	TX	CHA-
4	RX	CHB
5		
6	+5 V output	+5 V output
7	CTS	CHB+
8	RTS	CHA+
9		
10		

	Information
	For RS485 operation, pins 4-3 and 8-7 must be bridged externally.

Connection data

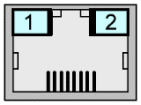
Connector	
Type	D-Sub Socket
Number of poles	9

4.5.4 Ethernet "LAN"

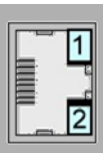
The on-board Ethernet adapter 10/100 Mbit Base-T with RJ-45 connection enables network connection. The status LEDs "LNK" and "RCV" provide information about a successful network connection.

An Ethernet-based fieldbus system such as EtherCAT or Modbus TCP may be connected to the Ethernet adapter LAN. The configuration of the interface and the network is done in the CODESYS project.

Plug assignment:



LAN

LAN		
Plug	**PIN**	Function
 RJ45	**1**	TX+
	2	TX-
	3	RX+
	4	75 Ohm
	5	75 Ohm
	6	RX-
	7	75 Ohm
	8	75 Ohm

Controllers and visualization devices are designed to control machines and cannot fend off attacks from the outside. For this reason, when operating on publicly accessible networks , a robust firewall is necessary that can secure your machine. Use an intelligent router with a firewall that separates your machine's network from the Internet or corporate network.

	HINT
	Third-party access to the computer
	Control failure and data loss
	⇨ When integrating into publicly accessible networks, the user must take appropriate measures to prevent unauthorized access.

4.5.5 USB port

Plug assignment:

X4 / X5	USB	
Plug	**PIN**	Function
 USB	B1	VCC
	B2	D-
	B3	D+
	B4	GND

Connection data

Connector	
Type	USB Type A
Type Interface	Host interface V2.0
Power supply	max. 500mA
Connection cross-section	Max 1.5 mm²

HINT

Overloading of USB ports due to excessive power consumption

Machine failure or loss of data

⇨ Only use USB peripherals that do not use more than 0.5A power supply in total or use a third-party power supply of the USB peripherals, e.g. by interconnecting an active hub.

Use of USB sticks

When using USB flash drives, the following points should be considered:

- The mechanical design of the USB port is designed for a maximum of 1,000 mating cycles.
- Unplugging a USB stick during operation is only allowed if all file operations have been completed, otherwise the USB stick may become unusable! If programs still have files open, the directory cannot be removed when the USB stick is removed. In this situation, file or directory operations result in blockages because they are trying to read from a device that is no longer available in the system. Therefore, when pulling the USB stick, it should always be ensured that no program has open files in the USB stick.
- Mountname: /mnt/usbmemory/

4.5.6 Wi-Fi adapter

How to Use USB Wi-Fi Sticks

USB Wi-Fi sticks with the Realtek RTL8192 chipset are supported on devices with Linux kernel version Linux 3.12.10-rt15-00149-gb37bb70 or newer. The WLAN stick can be used, for example, for programming or data exchange if the built-in interface is occupied by a fieldbus. The configuration of the "Wireless Network" takes place after the automatic detection in the user interface. In order for the USB WLAN adapter to be recognized, it must be plugged in at system startup.

	HINT
	USB WLAN adapters are only suitable for use in industrial environments to a limited extent *Disruption of communication by EMC* ⇨ Use USB WLAN adapters only for temporary communication, e.g. in case of maintenance

4.5.7 RS485 Adapter

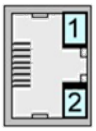
How to Use USB-RS-485 Adapter

If an additional RS-485 interface is required, e.g. for Modbus, a USB adapter with a supported chipset can be used. Please contact support for compatible USB adapters.
The USB2 – RS-485 (inno-maker.com) adapter was successfully tested.

4.6 Displays and controls, Vico

4.6.1 Ethernet "LAN"

LAN



LED Meaning for the Ethernet Interface LAN		
LED 1 (green)	LED 2 (yellow)	Meaning
ON	OFF	No Ethernet connection available
BLINK	ON	LAN connection with 100 Mbit/s
BLINK	OFF	LAN connection with 10 Mbit/s

4.7 Accessories and Tools

Info will follow

5 Installation and operation

	Information
	Before installing, commissioning and servicing the Kuhnke Vico, also read the safety instructions in the foreword of this documentation.

5.1 Mechanical installation

The Kuhnke Vico is a modern electronic assembly that requires care in its handling, i.e. especially in assembly, operation and maintenance. This device is operated via a touch screen, in this case a resistive touch.

Touch screens consist of different circuit layers that are made of different materials. Thus, each layer behaves differently even when the product is exposed to changing climatic or mechanical conditions.

In general, resistive touch screens are very robust, but there are a few basic things to keep in mind when installing the touch screen in an enclosure.

5.1.1 Installation Location

The device is not intended for continuous direct sunlight. This can speed up the aging process of the front panel film.

The device is not intended for permanent contact with corrosive chemical compounds and solvents. Check the resistance of the front panel before installation.

Do not use sharp tools (screwdrivers, etc.) to operate the touchscreen of the screen.

5.1.2 Installation position

The devices may only be installed as described below. The information in the data sheet refers to installation in a metallic mounting plate, e.g. control cabinet door.

	CAUTION
	Risk of overheating and fire!
	The device can also be destroyed at the permissible ambient temperature if convection cooling is not made possible by the installation.
	⇨ Please note the instructions for the installation position

In order to ensure sufficient air circulation, a free space must be provided above, below, to the side and rear of the device. The minimum specified clearance must not be less than 50 mm on all sides. This is valid for all variants.

5.1.3 Installation

In order to achieve the protection classes of the front panel and maintain them permanently, the following instructions must be followed:

- The cutout for the panel must have the dimensions specified in this manual.
- The edges of the neckline must be flat
- Screw each mounting screw until the corner of the front panel touches the mounting plate.

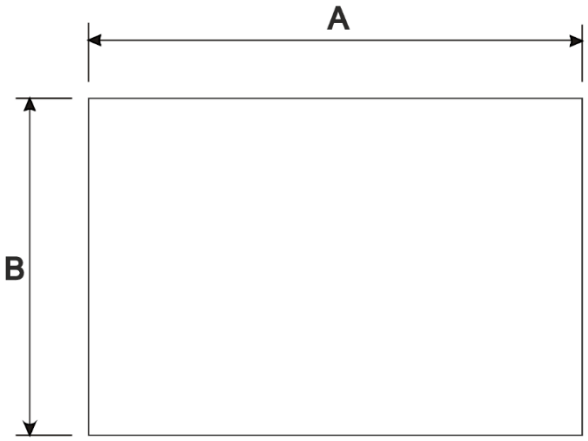
	HINT
	Tension of the device or moisture ingress
	Destruction or pre-damage of the touch, leakage
	⇨ The material around the installation cut-out must be sufficiently stable to ensure a permanently secure attachment of the Panel PC. In order to achieve the degree of protection, the material must not deform under the influence of the mounting clips or by operating the device.

IP66 is only guaranteed if the following points are met:

- The thickness of the mounting plate or control cabinet door in which the device is mounted may be: from 1.5 mm to 6 mm.
- The maximum deviation from the flat surface to the cut-out must not exceed ≤ 0.5 mm.
- The maximum surface roughness when the seal is applied must be ≤ 120 µm

5.1.4 Front panel cutout

Cut a cut-out in the electrical panel where the device is to be installed. Take the measurements from the corresponding drawing.

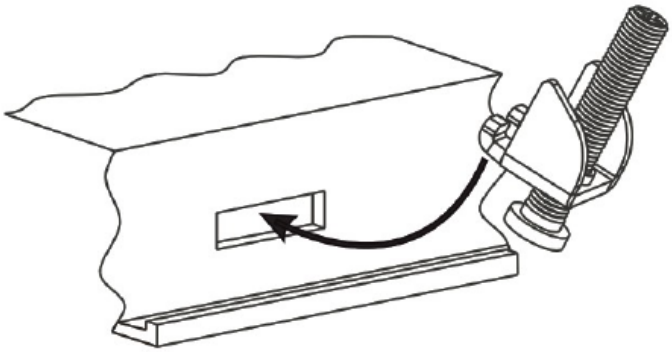


Front panel cutout		
Device	Width A	Height B
Kuhnke Vico 404	136 mm	96 mm
Kuhnke Vico 704	176mm	136 mm
Kuhnke Vico 1004	271 mm	186 mm

5.1.5 Fasteners

After inserting the device, insert the mounting brackets into the mounting cutout according to the following drawing.

Tighten the screws of the mounting brackets with 75 Ncm or until the edges of the front panel rest on the mounting plate.



5.2 Electrical installation

The connections are located on the back of the Kuhnke Vico or as in the Connector overview Kuhnke Vico described.

When connecting wires to the device, follow the sequence described below:

- ⇨ turn off the device,
- ⇨ disconnect the device from the power supply,
- ⇨ connect all cables on the device and on the peripherals to be connected,
- ⇨ make sure that all connections between plugs and sockets are perfectly tight!
- ⇨ Reconnect all devices to power.

5.2.1 Functional earth

The functional earth is not intended as a protective measure, but to improve interference immunity. It is only used to dissipate interference and not as contact protection for people.

The connection is made via a plug of the power supply

In order to ensure safe dissipation of electrical faults, the following points must be observed:

- Connect the device to the central grounding point on the control cabinet as quickly as possible.
- Use cable/ground cable with at least 1.5 mm².
- Observe the shielding concept of the conductors; all data cables connected to the device must be designed with shielded cables and placed on the device at the earthing terminals.

	Information
	Grounding lines should be short and have a large surface area. (copper mesh). Information can be found e.g. under http://de.wikipedia.org/wiki/Masse_(Electronics)

5.2.2 System supply

The Kuhnke Vico is powered by the 24V and 0V terminals of the "24V / 0V" plug. The power supply can be potential-free or grounded. Conductors with a cross-section of 1.5 mm2 to 2.5 mm2 and a ferrule are to be used. Insert the conductors with the attached ferrules into the clamping chamber and tighten the screw terminals with a tightening torque of 0.5 Nm.

When wiring, pay attention to the plug assignment of the power supply connection on the device!

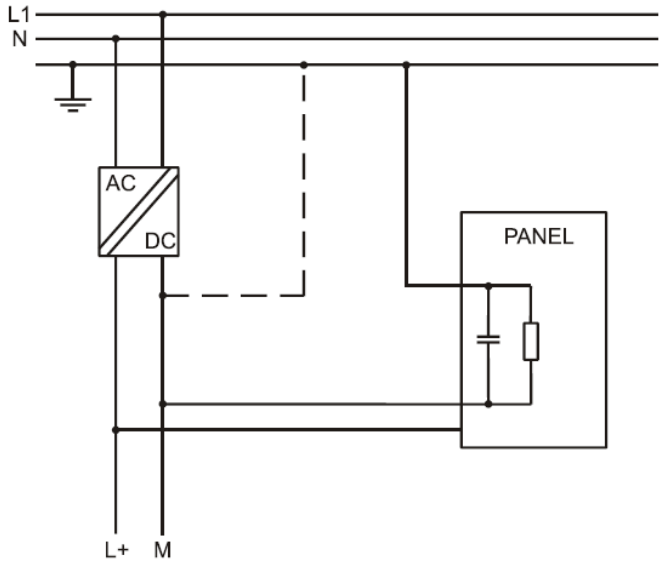
	CAUTION
	Damage to the device due to too high or incorrect power supply *Too high a voltage or an incorrect polarity at the terminals can lead to the destruction of the device.* ⇨ Please use the connector assignment on the device. ⇨ Use the user manual

	HINT
	Please note that if you are using the floating circuit, the panel connects the power supply to ground internally with a 1MΩ resistor parallel to a 4.7nF capacitor.

Securing the power supply

The supply line must be protected with external short-circuit and overload protection with a tripping current of max. 10 A, min. 60 V.

Connection example power supply



5.3 Initial commissioning

5.3.1 General information on commissioning

Operation on the touchscreen

They operate control objects on the touch screen by touching them with their finger or with the touch pen by applying a light, noticeable pressure.

	HINT
	Damage to the touch screen due to spikes or sharp objects
	Destruction of the front
	Do not touch the touch screen with pointed or sharp objects.
	⇨ Avoid sudden contact of the touch screen with hard objects. This can lead to a significant reduction in the service life or even total failure of the touch screen. Touch the touch screen of the Kuhnke Touch only with your finger or the touch pen.

	Information
	Touch only one control object on the screen at a time. Otherwise, they may trigger unintended actions.

5.3.2 Prerequisites for commissioning

- The function earthing system is connected.
- The connecting cables are plugged in correctly.
- The device is connected to the power supply.

5.3.3 Turn on the device

Connect the device to the power supply.

After the start-up routine, the interface of the operating system is displayed. The screen resolution is selected in the image. If the device is equipped with the CODESYS HMI, it is started automatically and reports the status in the start window.

5.3.4 Turn off the device

With the Vico 04 device series, the power supply is taken directly from the device to switch off, a "shutdown" is not necessary.

5.3.5 Login process at Vico 04 WEB

After turning on the device, a login window will appear. In the delivery state, log in with the default admin/admin credentials.

Password change

After logging in for the first time, you will be asked to assign a new password. This step is mandatory and is for the security of your device.

Reboot and configuration

After changing the password, the device will automatically restart. To configure the web browser, log in with the admin/<own password> credentials.

5.4 System

The Vico X04 is configured via the integrated user interface interface "system settings". The user interface of the system settings is based on HTML pages and can be accessed both locally on the screen of the control panel and remotely via a web browser.

The administrator username is "admin" with the default password "admin", but the first time you start it, you will be forced to set a different password (later the password can be changed on the "System Settings -> Authentication" page).

5.4.1 Accessing System Settings from the Web Browser

To access System Settings from a web browser, enter the device's IP address in the following format:

https:// IP/ machine_config

	***HINT***
	Access via HTTPS: Procedure for certificate warning *Note that remote access uses the encrypted HTTPS protocol on port 443. As soon as the connection is established, the operator sends a certificate for encryption. Since the certificate is not signed by a certificate authority, you will receive a* *Warning.* ***Click on "Advanced Options" and select "Continue"***

5.4.2 Access to the system settings via the tap-tap procedure

To reach system mode, use the so-called "tap-tap" procedure. This procedure consists of tapping the surface of the touch screen during the power-on phase of the device. The tapping frequency must be high. Once the device is powered, you need to start tapping on the touch screen.

When the sequence is detected, the system displays the message: "TAP-TAP DETECTED". At this point, release the button to boot in user mode without launching the application, or press and hold for a few seconds (and thus select "RESTART: CONFIG OS") to boot in system mode.

For more information about system settings, see → 9.1 Enabling System Preferences

5.4.3 IP address

The Vico X04 has a fixed IP address and subnet mask in the state of delivery.

IP address LAN (X3): 192.168.0.204

Subnet Mask:255.255.255.0

In order to connect to the device for the first time, you must be in the same IP address range as the device with your PC.

If necessary, change the IP address of your PC accordingly.

	***HINT***
	Dual assignment of IP addresses *Dual assignment of IP addresses can lead to severe disruption in a network.* ⇨ Make sure that there are no duplicate IP addresses on your network. ⇨ For the first commissioning of the device, we recommend a direct network connection between the device and the programming PC with fixed IP addresses. You may need a cross-over network cable for this.

5.4.4 Calibration of the touch screen

Use the "tap-tap" procedure at boot (this procedure consists of tapping on the surface of the touch screen during the power-on phase of the device. The typing rate must be high.

You need to start tapping the touch screen once the device has been powered). When the sequence is detected, the system displays the message: "TAP-TAP DETECTED".

Release the touch and wait a few seconds for the "ENTERING SYSTEM SETTINGS" message to appear

Press and hold the button for a few seconds to select "TOUCHSCREEN CALIBRATION".

5.5 Diagnosis

5.5.1 General

	Information
	Under extreme environmental conditions, such as high humidity and temperature, the touch surface can occasionally form waves. This is a purely optical effect and does not represent a functional limitation.

5.5.2 Fault table

Fault table

Description	Possible cause	Recommended action
The date and time are not permanently stored	For technical reasons, the date and time are stored for a maximum of 2 weeks when the devices are switched off.	Updating the time via an NTP time server when the device is turned on
NTP Connection Error	Unable to resolve name	Configure one or more DNS in the network settings.
Items at the edge of the screen can't be reached	Touch calibration is incorrect/inaccurate	Perform a touch calibration in the System Settings, "Display" menu. ➔ 9.2 System Settings Features
The PLC's WebVisu cannot be reached	Incorrect address or port used in the browser	To reach the WebVisu of the device in the PLC WV version, use port 8040

5.6 Maintenance / Repair

5.6.1 General

Work on the Kuhnke Vico may only be carried out by qualified personnel.

	***CAUTION***
	Incorrect or too high supply voltage *Risk of electric shock* ⇨ Do not plug in, hang up, loosen or touch connections during operation! Destruction or malfunction can be the result. Switch off all feeds before working on the device; also those from connected peripherals, such as externally powered encoders, programming devices, etc.

5.6.2 Maintenance

The Kuhnke Vico is maintenance-free for the stated service life and does not require any measures if it is stored and operated in the permissible environmental conditions specified in the technical data.

5.6.3 Maintenance

Clean the front of the device

To prevent interference from unintentional actuation, the Kuhnke Vico must be switched off to clean the front panel.

	***CAUTION***
	Unintentional triggering of functions *Movements of machine parts* ⇨ The appliance must only be cleaned when it is switched off in order to avoid triggering unintentional functions by touching the touch screen or pressing buttons.

A damp cloth must be used to clean the appliance. To moisten the cleaning cloth, use only water with washing-up liquid, screen cleaner or alcohol (ethanol). Do not spray the detergent directly on the device, but first on the cloth! Do not use aggressive solvents, chemicals, abrasives, compressed air or steam jets.

To avoid damage to the front panel due to cleaning work, please note that you must

- must not use high-pressure cleaners and steam jets.
- Do not use corrosive detergents, dilution, abrasives or hard objects for cleaning.
- Do not expose the front side to excessive contact pressure when cleaning.

During operation and storage, the Kuhnke Vico must be protected from impermissible soiling.

	***Information***
	For information on chemical resistance, see → 3.2 Technical data Kuhnke Vico.

5.7 Lifetime

5.7.1 Repairs / Customer Service

	***Information***
	Repairs and overhauls may only be carried out by the manufacturer or its authorized customer service.

5.7.2 Warranty

The legal warranty applies. It expires if unauthorized repair attempts or other interventions are made to the device/product.

5.7.3 Decommissioning Disposal

To dispose of it, the Kuhnke Vico must be disassembled and completely dismantled into its parts. All metallic individual parts can be sent for metal recycling.

Electronic waste

All electronic parts must be sorted and disposed of. Details of disposal are regulated by national regulations and laws. These must be complied with during disposal.

The packaging must be recycled for paper and cardboard.

6 Specific device functions

The Vico PLC, PLC WV and HMI versions have device-specific functions that are helpful and must be taken into account when using the CODESYS software.

6.1 Accessing CODESYS Web Visualization in a Browser

Prerequisite: A visualization with WebVisu has started.

Start an up-to-date browser that supports Javascript and supports HTML5 canvas, such as Microsoft Edge, Google Chrome, or Mozilla Firefox.

In your web browser, enter the following address:

http://192.168.0.204:**8040**/webvisu.htm

Formally: http://<IP address of webserver>:<port of webserver>/<name of HTM file>

<name of HTM file> is the HTML start page of the visualization defined in the WebVisu object.

The page will be displayed and you will be able to see the data of the application and operate the application.

6.2 Remanent variables

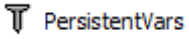
With version 1.25.0 (CODESYS 3.5 SP16 Patch40), remanent variables can be declared on this control with the keywords "RETAIN" or "PERSISTENT".

In older versions, the Persistence Manager of CODESYS must be used, see 6.4.2..

6.2.1 Declaration of remanent variables

Retain variables are declared by adding the RETAIN keyword in the declaration area. Example of the declaration in the Global Variable List:

```
VAR_GLOBAL RETAIN
       udiCounter: UDINT;
END_VAR
```

To declare persistent variables, the object must 

be attached to the application. This global variable list contains the declaration of the persistent variable. For variables that are marked with the keyword PERSISTENT outside of the persistence editor, instance paths are added there.

```
VAR_GLOBAL PERSISTENT RETAIN
       udiCounter: UDINT;
END_VAR
```

Retain and persistence variables differ in their lifespan:

	Normal variables	RETAIN	PERSISTENT RETAIN PERSISTENT PERSISTENT RETAIN
Powerfail	0	X	X
Online Change	X	X	X
Reset warm	0	X	X
Reset cold	0	0	X
Shop	0	0	X (1)
Reset Origin	0	0	0

X = value of the variable is preserved

0 = Variable is initialized

X (1) = is only preserved if the structure within the persistent variable has not changed,

6.2.2 Using the Persitence Manager

The Pesistence Manager from the CODESYS Application Composer can be used to store remanent variables.
General information about the Persistence Manager can be found in the CODESYS Help at:
https://help.codesys.com/webapp/f_application_composer_persistence_manager;product=core_Application_Composer;version=3.5.14.0

6.2.2.1 Turn on the Modules view

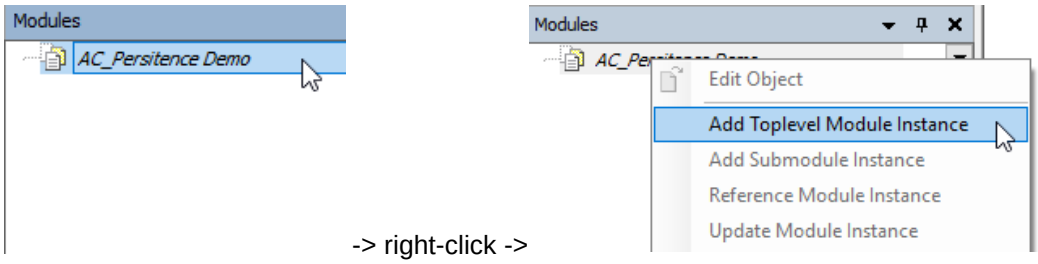
To use the Persistence Manager, the "Modules" view must be activated in CODESYS.
To do this, select "Modules" from the "View" > menu

6.2.2.2 Add Module Library

To do this, select "Composer" > "Add Module Library to Project" menu

6.2.2.3 Add Persistence Manager

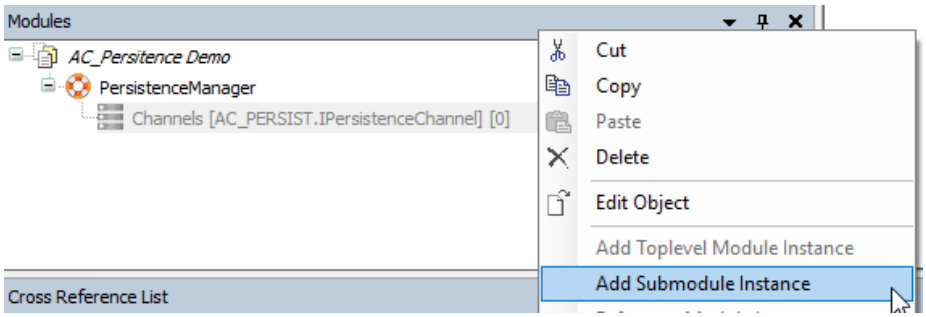
Under Modules, add the "PersistenceManager" as a top-level instance.

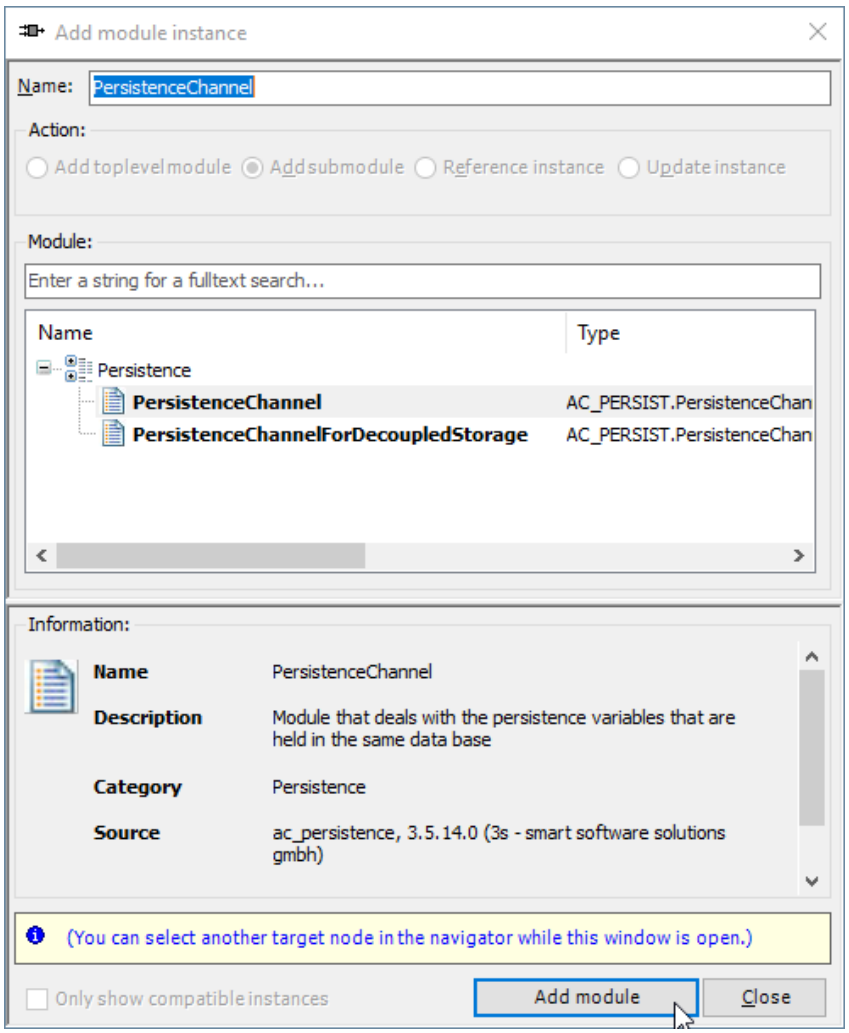


The name can be customized if necessary. Click on "Add module".

6.2.2.4 Define Persistence Channel

Now define a persistence channel under the PersistenceManager by right-clicking on "Channels" and selecting "Add Submodule Instance" from the context menu

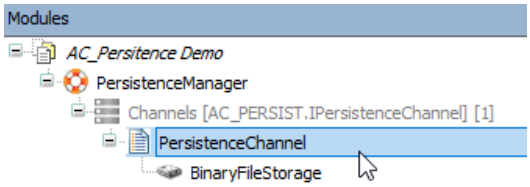




The name can be customized if necessary. If you use different persitence channels, we recommend using a descriptive name. Click on "Add module".

6.2.2.5 Parameterization of the persistence channel

To parameterize the persistence channel, double-click on the desired entry in the module view:



The module opens in the editing area. In the "Parameters" tab, you can adjust the setting to suit your needs.

Default parameter

Persistence | Parameters | HMI | Information

Group / Parameter	Type	Value	Description
tPeriodicSaving	TIME	TIME#60m0s0ms	time after which the variables are stored (0: periodic saving off)
xSaveOnChange	BOOL	FALSE	TRUE: permanently compare old and actual values and save when different
xReadVarsDuringInit	BOOL	FALSE	TRUE: read the persistent variables during initialization of application; FALSE: read variable values during first cycle
xCompressTags	BOOL	TRUE	TRUE: compress variable tags
xConsistentCopyInHighPrioTask	BOOL	FALSE	TRUE: persistent variables are copied in high priority task
xConvertVarsWithDifferentType	BOOL	TRUE	TRUE: if types of stored and actual variable are different, try to convert stored value
xIntegrityCheckBeforeReading	BOOL	TRUE	TRUE: do an integrity check of data base
xSeparateArchivePerToplevelInstance	BOOL	FALSE	TRUE: generate a separate archive for each toplevel instance
xMakeDataCRCConsistencyCheck	BOOL	FALSE	TRUE: a CRC is calculated before and after the saving process, whereas both CRC have to match for a successful saving
uiSavingRetriesIfCRCConsistencyCheckFails	UINT	0	If xMakeDataCRCConsistencyCheck is TRUE, this value indicates how often saving is retried if a CRC missmatch was detected

Recommended changes:

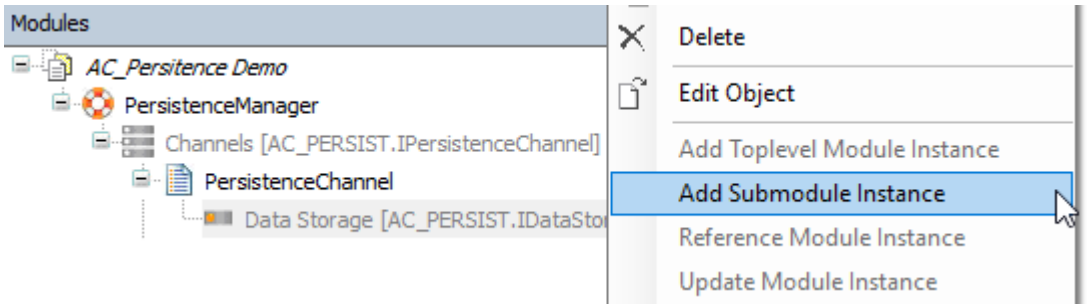
Persistence | Parameters | HMI | Information

Group / Parameter	Type	Value	Description
tPeriodicSaving	TIME	TIME#60m0s0ms	time after which the variables are stored (0: periodic saving off)
xSaveOnChange	BOOL	**TRUE**	TRUE: permanently compare old and actual values and save when different
xReadVarsDuringInit	BOOL	**TRUE**	TRUE: read the persistent variables during initialization of application; FALSE: read variable values during first cycle
xCompressTags	BOOL	TRUE	TRUE: compress variable tags
xConsistentCopyInHighPrioTask	BOOL	FALSE	TRUE: persistent variables are copied in high priority task
xConvertVarsWithDifferentType	BOOL	TRUE	TRUE: if types of stored and actual variable are different, try to convert stored value
xIntegrityCheckBeforeReading	BOOL	TRUE	TRUE: do an integrity check of data base
xSeparateArchivePerToplevelInstance	BOOL	FALSE	TRUE: generate a separate archive for each toplevel instance
xMakeDataCRCConsistencyCheck	BOOL	FALSE	TRUE: a CRC is calculated before and after the saving process, whereas both CRC have to match for a successful saving
uiSavingRetriesIfCRCConsistencyCheckFails	UINT	0	If xMakeDataCRCConsistencyCheck is TRUE, this value indicates how often saving is retried if a CRC missmatch was detected

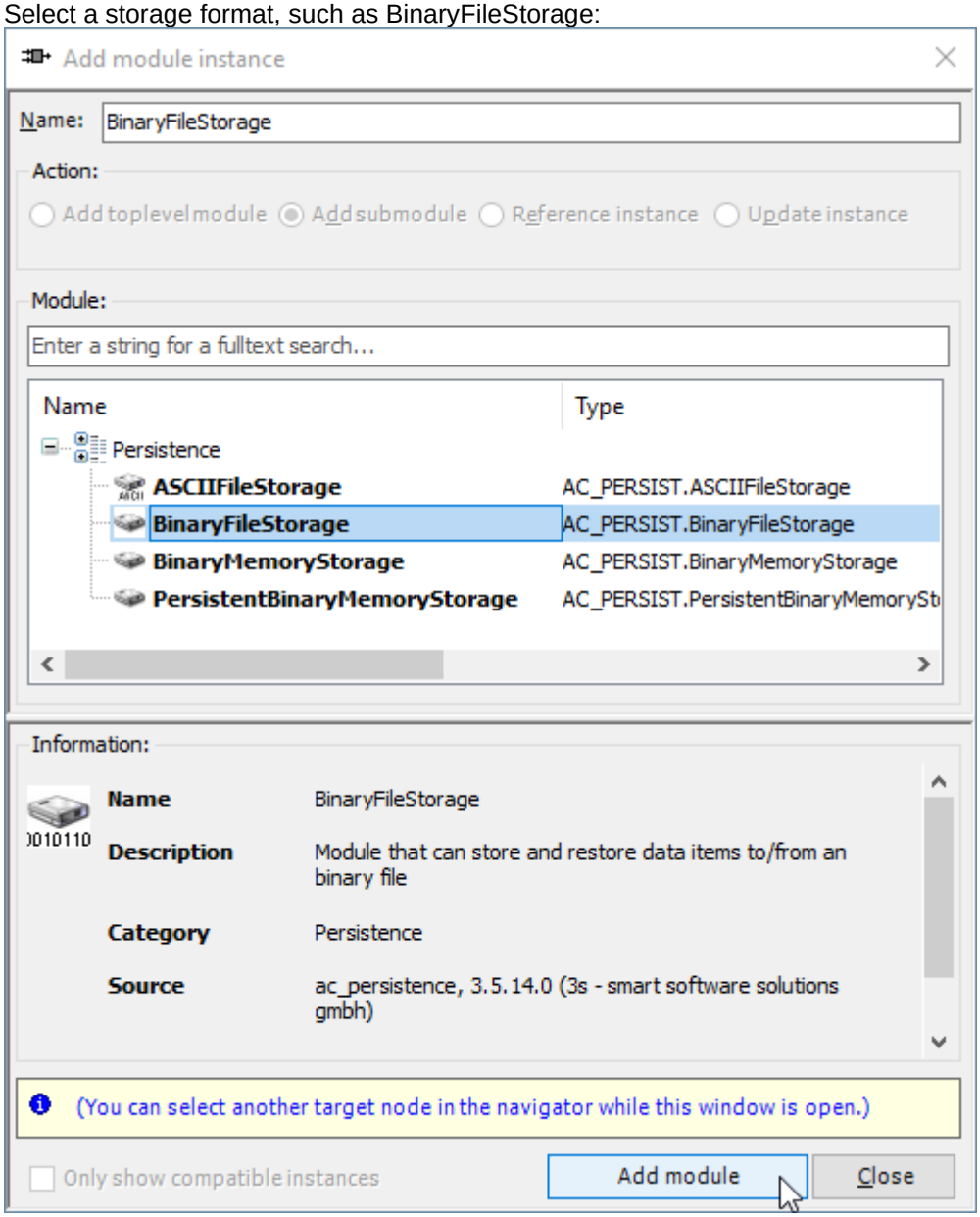
	Information
	xSaveOnChange: Use this setting wisely. Every time a change is made, write access to the flash memory.

6.2.2.6 Configuring Datastores

In the Data Storage submodule, define the desired storage format of the persistent variable by right-clicking on "Data Storage" and selecting "Add Submodule Instance" from the context menu.



Select a storage format, such as BinaryFileStorage:



6.2.2.7 Variable

Before each variable that you want to be remanent, set the following attribute:
{attribute 'ac_persist': = 'PersistenceChannel'}
The name, here 'PersistenceChannel', must match the persistence channel defined under 3.

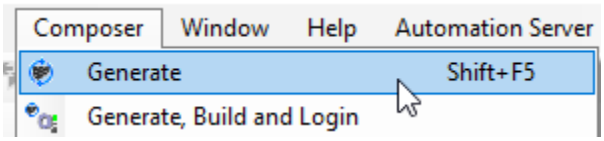
Example declaration of a variable:

```
VAR_GLOBAL
	{attribute 'ac_persist' := 'PersistenceChannel'}
	uiStartupCounter: UINT; Counts the machine startups
END_VAR
```

In order for the variable to be added to the persistence channel, it must also be used in the project. The startups can be recorded in the PLC_PRG, for example, as follows:

```
IF NOT xInit THEN
	uiStartupCounter := uiStartupCounter + 1;
	xInit := TRUE;
END_IF
```

Now the code has to be generated, menu Composer -> Generate



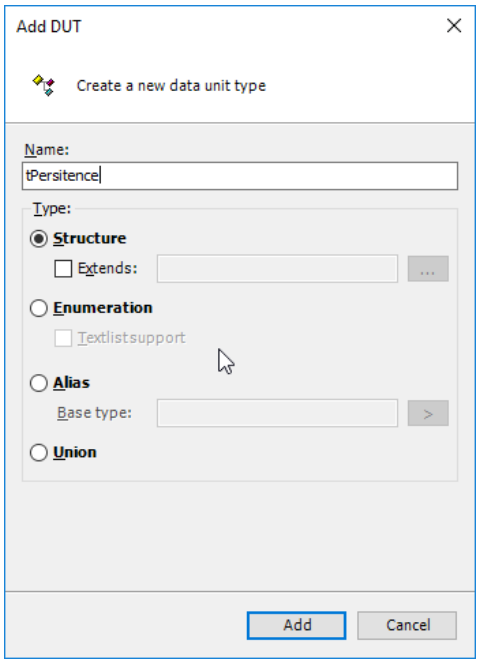
	Information
	In general, on systems with mass storage, it is important to question how useful the use of large amounts of retain data is.

6.2.2.8 Persistent variables as a data structure

When using the Persistence Manager, we recommend creating a data structure for the persistent data. You then need to set the {attribute 'ac_persist': = 'PersistenceChannel'} attribute only once in the variable declaration so that all data from the data structure is remanent. We will be happy to provide you with a sample project on request.

Definition of a structure variable

Right-click on the -> Add Objects -> DUT application to add a structure.

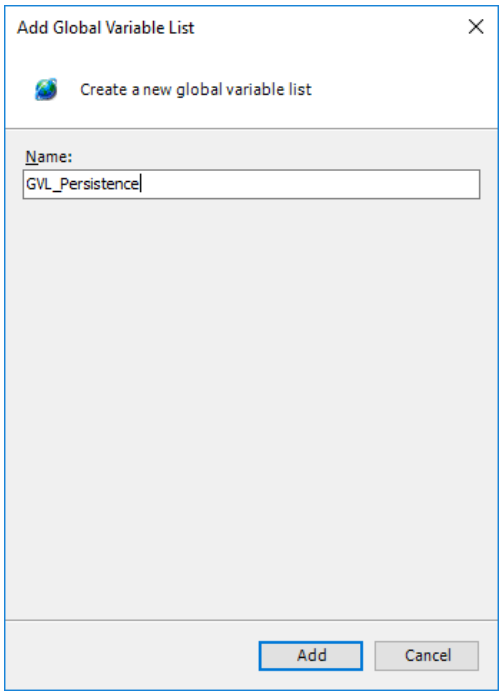


Below is an example of the possible content of the data structure:

```
TYPE tPersistence:
STRUCT
	uiCounter: UINT; Machine startup counter
	uiActState: UINT; Actual machine state
	xModeAutomatic: BOOL; Automatic mode
	xModeManual: BOOL; Manual mode
END_STRUCT
END_TYPE
```

Creating a Global List of Variables

Right-click on the -> Add Objects -> Global Variable List application to add a list of variables for the remanent variables.



Declaration of the remanent data structure

Create a declaration for the data structure.

```
{attribute 'qualified_only'}
VAR_GLOBAL
	{attribute 'ac_persist' := 'PersistenceChannel'}
	Persistence: tPersistence;
END_VAR
```

Using the Remanent Variables

The remanent variables can be used in program modules as follows:

```
IF NOT xInit THEN
	Counts the machine startups
	GVL_Persistence.Persistence.uiCounter := GVL_Persistence.Persistence.uiCounter + 1;	xInit
:= TRUE;
END_IF

IF NOT GVL_Persistence.Persistence.xModeAutomatic AND NOT GVL_Persistence.Persistence.xModeManual THEN
	If any mode is active, set the machine in manual mode
	GVL_Persistence.Persistence.xModeManual := TRUE;
END_IF
```

6.3 System

Hardware-specific functions of the device are to be used with the "KICS Vico 04 System Library" library in COSYS. The library must be integrated into the project via the library manager.

In the library administrator, short documentation is stored for all usable function blocks and functions. For more information, please contact Kendrion Kuhnke's support.

6.3.1 Library Information

FUNCTION GetLibVersion

Return Value: Version

FUNCTION GetLibVersionNumber

Return Value: Version Number

FUNCTION IsLibReleased

Return Value: BOOL

Release: TRUE, Not released: FALSE

6.3.2 Functions

FUNCTION SysBuzzer

Turn on the buzzer for the time_ms at the frequency freq. RESULT: Returns runtime system error code (see CmpErrors.library)

Input parameter:

Frequency of the buzzer: INT [200 ... 1000]

Duration of the buzzing tone in milliseconds: INT [100 ... 1000]

Return

SysBuzzer: RTS_IEC_RESULT

FUNCTION SysGetBrightness

Determines the current brightness of the backlight.

Return: INT

0-255: Brightness level

-1 Backlight is off

FUNCTION SysGetScreenOrientation: INT

Determines the current screen orientation

Return Value: INT

Screen orientation [0, 90, 180, 270]

FUNCTION SysReboot : RTS_IEC_RESULT

Reboots the system

Return:

Returns the runtime system error code (see CmpErrors2Interfaces.library)

FUNCTION SysRunSwipeThread: RTS_IEC_RESULT

Runs the swipe thread to get swipe events.

Return:

Returns the runtime system error code (see CmpErrors.library)

FUNCTION SysSetBacklightTimeout: RTS_IEC_RESULT

Specifies the amount of time of inactivity on the touch, in minutes, after which the backlight turns off. The backlight is automatically turned back on when the user becomes active on the touch.

Input Parameters: INT

Backlight timeout in minutes, 0 = always on [>=0]

Return:

Returns the runtime system error code (see CmpErrors2Interfaces.library)

FUNCTION SysSetBrightness: RTS_IEC_RESULT

Sets the brightness of the backlight, 0 sets it to the lowest level without turning it off.

Input Parameters: INT

Brightness level [0 ... 255]

Return:

Returns the runtime system error code (see CmpErrors2Interfaces.library)

FUNCTION SysSetEthAddr: RTS_IEC_RESULT

Setting the Ethernet interface

The gateway can be omitted by setting the leading GW byte to zero. Possible interface is eth0

Input parameters: STRING, 3 x array[0 ... 3] OF BYTE

Eth_name: Interface name

IP_addr

Sub_mask

Gateway

Return:

Returns the runtime system error code (see CmpErrors2Interfaces.library)

FUNCTION SysSetOffBrightness: RTS_IEC_RESULT

Turns off the backlight. Use SysSetBrightness to turn it back on. After a restart, the backlight will turn on again with the last brightness set.

Return:

Returns the runtime system error code (see CmpErrors2Interfaces.library)

FUNCTION SysSetScreenOrientation : RTS_IEC_RESULT

Screen orientation preselection. Requires a restart for the changes to take effect

Input Parameters: INT

Screen orientation [0, 90, 180, 270]

Return:

Returns the runtime system error code (see CmpErrors2Interfaces.library)

FUNCTION SysGetBrightness : INT

Determines the current brightness of the backlight.

Return Value: INT

0-255: Brightness level

-1 Backlight is off

FUNCTION SysSetSwipePara : RTS_IEC_RESULT

This function offers the possibility to change the parameters for the swipe detection on the touch. The number of scans needed and the distance to detect the swipe.

Input parameters: 2 x INT

Number of scans [0 ... 3]

Wipe path [200 ... 1000]

Return:

Returns the runtime system error code (see CmpErrors2Interfaces.library)

7 IT Security

With the increasing digitalization of industrial control systems, the importance of cybersecurity is increasing. The European Cyber Resilience Act (CRA) defines mandatory requirements for connected products to strengthen their resilience to cyberattacks.
This part of the manual provides the system integrator and user with information on the safe use of Kendrion Kuhnke control components. It contains practical recommendations for safe product design, system integration and continuous safety management over the entire product life cycle.

7.1 Starting situation

In modern automation environments, the protection of visualization systems is essential. The HMI panels of the Vico series are intended for use in protected industrial environments. To prevent unauthorized access, they should be installed in physically secured locations – such as lockable control cabinets or restricted areas. The operation takes place within closed industrial networks. For additional security, measures such as access controls, VPN, firewalls and disabling unnecessary interfaces and services are recommended.

7.2 Notes to the System Integrator

Protection against misconfiguration

The HMI system is protected against unintentional misconfigurations by various mechanisms. Only authorized users with appropriate rights can change critical settings. Access to system settings is password-protected, changes are only possible in edit mode and must be actively confirmed. Many security-related services are deactivated by default and must be activated in a targeted manner.

Dealing with external storage media

To avoid unauthorized access via USB devices, the "Deactivate external USB devices" function can be used in the web server. Only devices that have been previously whitelisted are accepted. New devices can be added by temporarily disabling the protection feature.

Secure remote access

Remote access via SSH, VNC or VPN is disabled by default and should only be activated when necessary – for example, for commissioning or maintenance. Access is limited to authorized users. After completion of the work, these services should be deactivated again. An automatic logout in case of inactivity can also be configured.

Network protection through firewall and data rate limitation

The integrated firewall filters incoming connections and only allows defined communication partners. The network rate limiter protects the system from overload caused by excessive traffic. Both functions should be specifically configured before use.

Secure use of communication protocols

The HMI system supports protocols such as HTTPS, SSH, VNC, SNMP, and VPN. These should only be activated when they are actually needed. Unused services must be deactivated. Authentication is required for all active protocols. Secure passwords and role-based user management increase system security. Inactivity timeouts help avoid unattended sessions.

Perform firmware updates securely

Firmware updates are carried out exclusively manually by administrators in the so-called Config OS mode. The integrity of the update files is checked via an MD5 checksum. Updates can be performed locally via USB or remotely via the web browser.

Protect against unintentional updates

Automatic updates are not planned. To prevent unintentional changes, access to the update function should be controlled by user rights and physical access restrictions.

Securing Physical Interfaces

Unnecessary interfaces and network services should be disabled. In particular, external USB access and remote access protocols must only be activated when necessary and protected by authentication.

	***Information***
	Further information on cybersecurity in industrial plants can be found in the application Note AN_0022 EN 'Cybersecurity', available in the Kendrion product finder in the 'Software' section.

8 Development Environment CODESYS V3

8.1 CODESYS installation on the project planning PC

CODESYS is a device-independent control programming system. In accordance with the IEC 61131-3 standard, it supports all standard IEC programming languages, but also allows the integration of C routines and supports object-oriented programming.

Together with the CODESYS Control Win V3 runtime system, it allows "multi-device" and "multi-application" programming. The component-based structure makes customer-specific configuration and extension of the user interface possible.

Before installing CODESYS, please refer to the following system requirements information.

Requirements

Operating system:

Windows 8.1 / 10 / 11, 64-bit version of the operating system

8.2 Package Manager

With the Package Manager, CODESYS offers functionality to extend the standard installation of CODESYS with additional features and configuration settings. The concept of the Package Manager is similar to the concept of typical Windows installation mechanisms.

A package is a ZIP file with the extension.package.

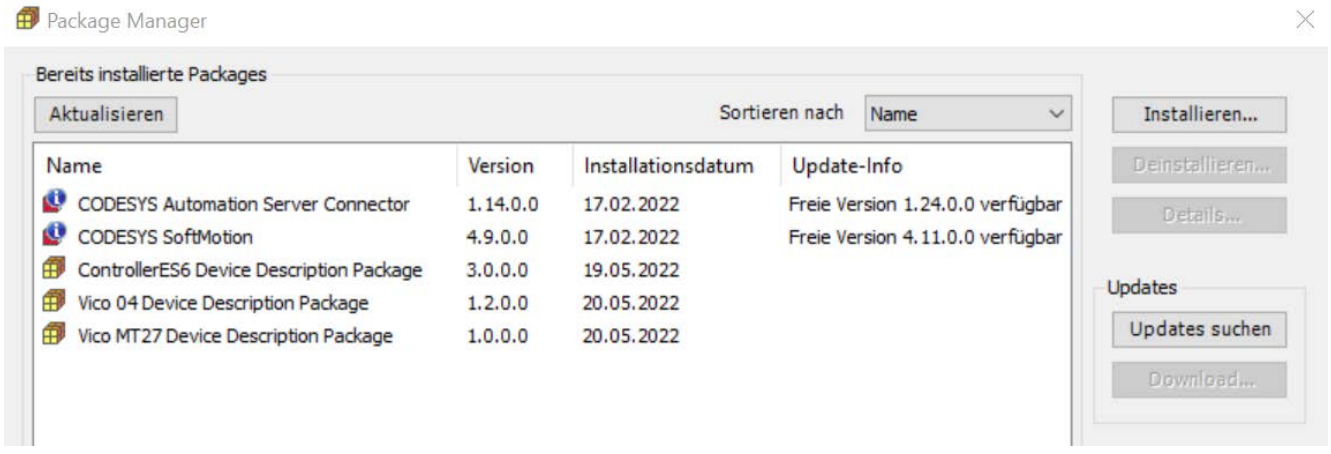
Package components:

- Plug-ins
- Libraries
- Device descriptions
- Supplier descriptions
- …

When the package is installed, the device description is automatically transferred to the development system. A suitable package for the Vico 04 device series can be found in the product description in the product finder as a download.

8.2.1 Installing Package in CODESYS V3

In the menu item "Tools" you can select the Package Manager. A dialog starts with which a package can be selected and installed.



8.3 Device-specific library

8.3.1 KICS Vico 04 System Library

Hardware-specific functions of the device are to be used with the "KICS Vico 04 System Library" library in COSYS. The library must be integrated into the project via the library manager.

In the library administrator, short documentation is stored for all usable function blocks and functions. For more information, please contact Kendrion Kuhnke's support.

The functions of the "KICS Vico 04 System Library" are described in the chapter → 6.1.1 Library Information described.

9 Web terminal functionality

9.1 Chromium

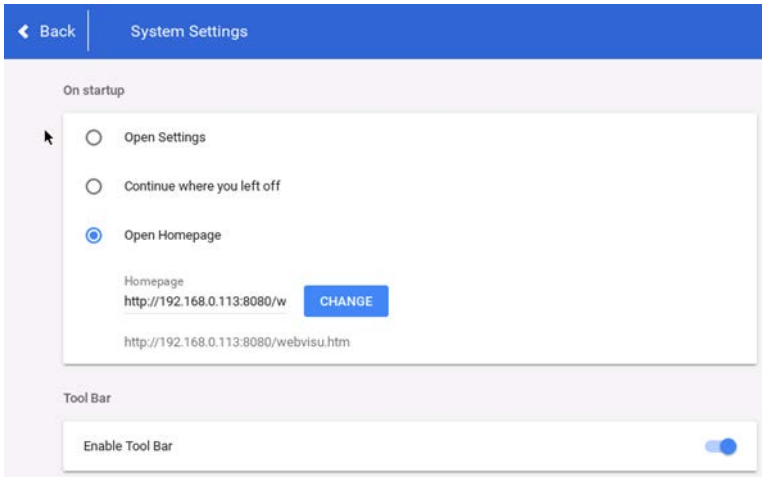
Chromium is an HTML5 web browser. The web browser is an open-source project started by Google. The browser is pre-installed on the Kuhnke Vico 04 Web devices and can be used in the "full screen standalone" setting for the display of web-based visualizations in plants and machines.

9.1.1 Settings

When you start the Chromium browser for the first time, the "Settings page" is started. Please note that you need to log in to start the "Setting page". Username and password are those of the Vico Web device. Default user and password is "admin"

If the device starts directly with the browser, the "Settings page" can be reached by permanently pressing the touchscreen in the upper left corner for several seconds.

On the "Setting page" you can access all relevant settings of the Chromium browser.



Click on the [Back] button to exit the configuration interface.

Activation of settings after restart

The menu bar can also be used to access the "System Settings" page of the Vico WEB website.

➔ 9 Systems Settings

9.1.2 Setting for CODSYS WEB Visu

To use the Vico WEB terminal to display CODESYS WEB visualizations, the following settings should be made.

- On startup -> Open Homepage
- Homepage e.g. with a Kendrion starter kit:
  http://192.168.0.113:8080/webvisu.htm
- Tool Bar -> Enable Tool Bar: Enabled

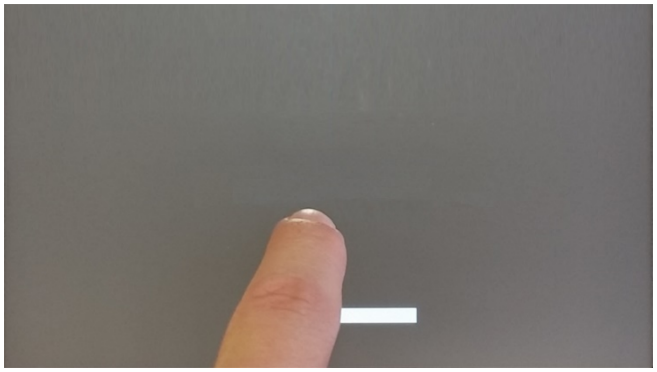
10 Systems Settings

10.1 Enabling System Preferences

The configuration pages of the Vico Panel can be accessed in various ways.

10.1.1 System setting on startup

Use the so-called "tap-tap" procedure. This procedure consists of touching the surface of the touch screen during the power-on phase of the device. The tip frequency must be high. You need to start tapping on the touch screen as soon as the device is powered. When the "tap-tap" sequence is detected, the system displays the message: "TAP-TAP detected". At this point, stop touching the screen to boot the device in user mode without launching the application.

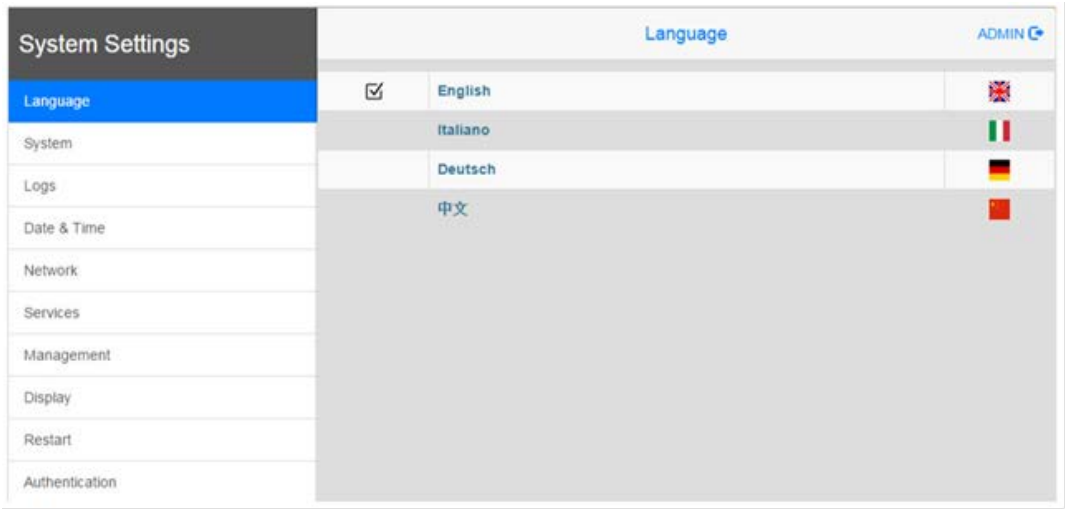


10.1.2 System settings via the "Setting page" of the Chromium browser

If the device starts directly with the browser, the "Settings page" can be reached by permanently pressing the touchscreen in the upper left corner for several seconds. Via the menu bar of the browser, the "System Settings" page of the Vico can be reached.

10.2 System Settings Features

System settings include options for the basic settings of the device.



Language

Configure the language for the System Preferences menu

System

Information about platform, status, timer (such as system on time, backlight on time), sensor.

Logs

Enable logs for diagnostics (save all logs when turned off).

Date & Time

change the date and time of the device, including the time zone and NTP server. *

Network

IP address of the Ethernet interfaces and the other network settings such as DNS, gateway, DHCP, hostname. *

When the USB WLAN adapter is plugged in, the selection Mode (Station / Access Point) and the Select Channel (WLAN Channel) are also available.

Security (services are only available if you are logged in as an administrator)

Domain, Secret ID, Import/Export, Disabled external USB device

Applications

The application page lists the applications loaded on the HMI devices. The applications can be managed from this page.

Services

Enabling/disabling services. Examples of services are: Autorun scripts, Bridge/Switch Service, Cloud/VPN Service, DHCP Server, Enable device restore, Fast Boot, Firewall Service, Network Rate Limiter, SNMP Server, SSH Server, VNC Service, Web Server, ...

	Information
	To synchronize the time with an NTP server, it is necessary to store a DNS server in the network settings so that the name of the NTP server can be resolved correctly. Here, for example, the Google Public DNS can be used, which is available worldwide. (8.8.8.8 and 8.8.4.4)..

Management

Update of BSP components (Main OS, Config OS, Bootloader, XLoader), check for consistency of partitions, update of the splash screen, information about the usage and size of partitions.

The update of the Main OS is only available in system mode, the update of the Config OS only in user mode.

Display

Adjust brightness, configure automatic backlight shutdown and select HMI orientation (90°, 180°, 270° and 360°), calibrate touch.

Fonts

Lists available system fonts and provides the ability to upload custom fonts

Authentication

On this page, you can customize the X.509 certificate of the HMI device and define the users who have access to the configuration parameters. (Users and Roles, Session, Forgot password)

Reboot

Restart the device. The "Main OS" option will restart in user mode by default, the "Config OS" option will start the panel directly in the system settings in system mode

Authentication

Configure password for the administrator ("admin") and for the standard user ("user").
The administrator has full access to the system settings (updates of BSP and other system components).
Standard user has some limitations.

	***Information***
	The System Settings tool also contains other options that are currently undescribed and undocumented.

11 Appendix

11.1 Software Copyrights

Components from products from external software manufacturers are integrated into the device's software. In this section you will find the copyright information on the software sources used.

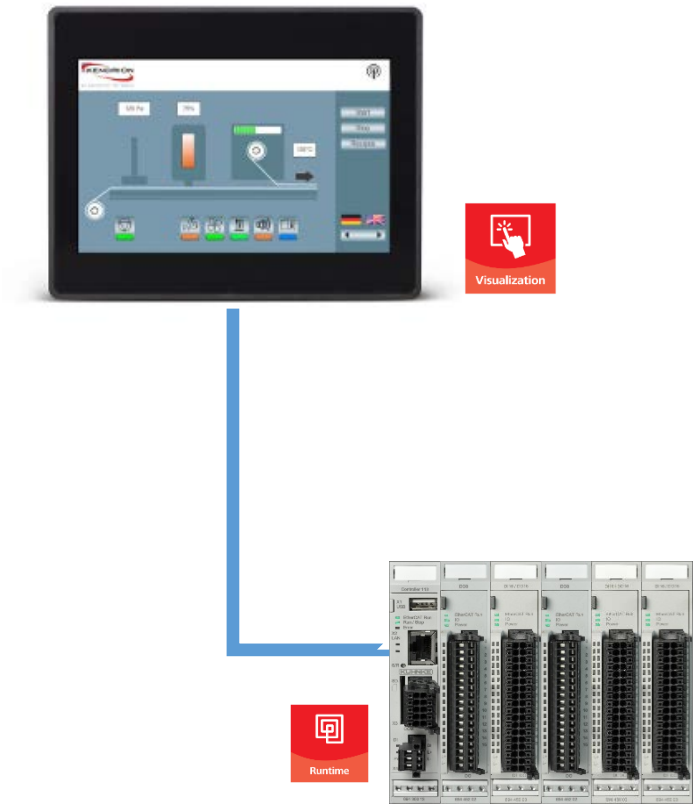
CODESYS Control Runtime System

Device manufacturers who install the CODESYS Runtime System on their devices receive a license file when purchasing the CODESYS Control Runtime Toolkit . For each device that is programmable with CODESYS, license fees are charged ("Runtime Royalties"). To document the licensing, the device manufacturer receives a certificate for the toolkit and the optionally purchased additional products.

11.2 Software Source Citation

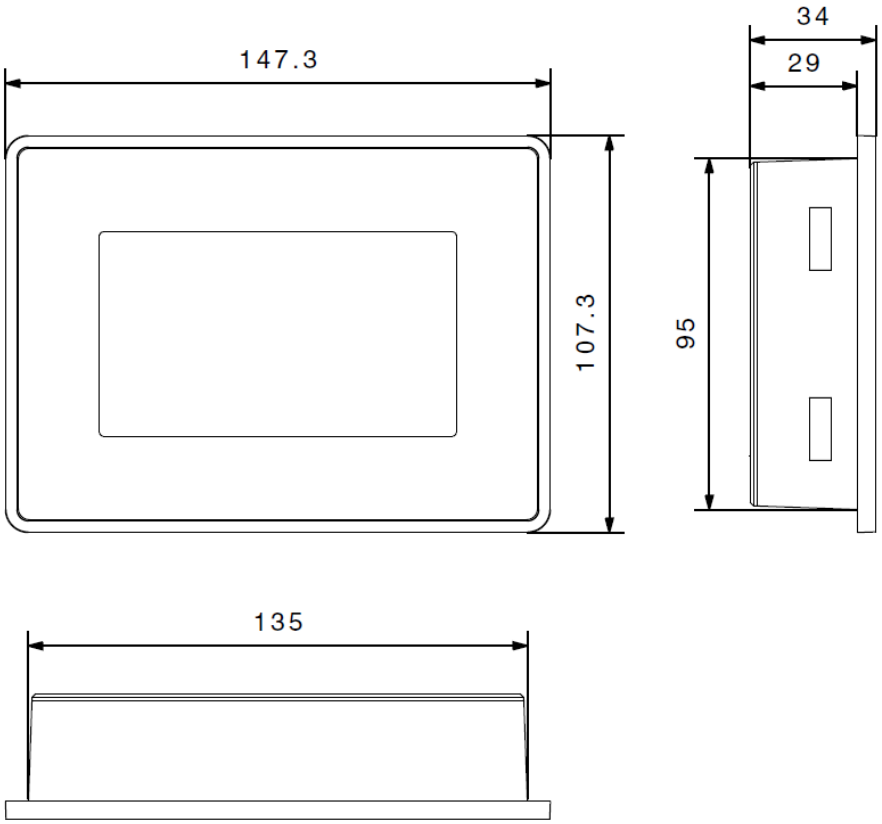
None

11.3 Connection examples

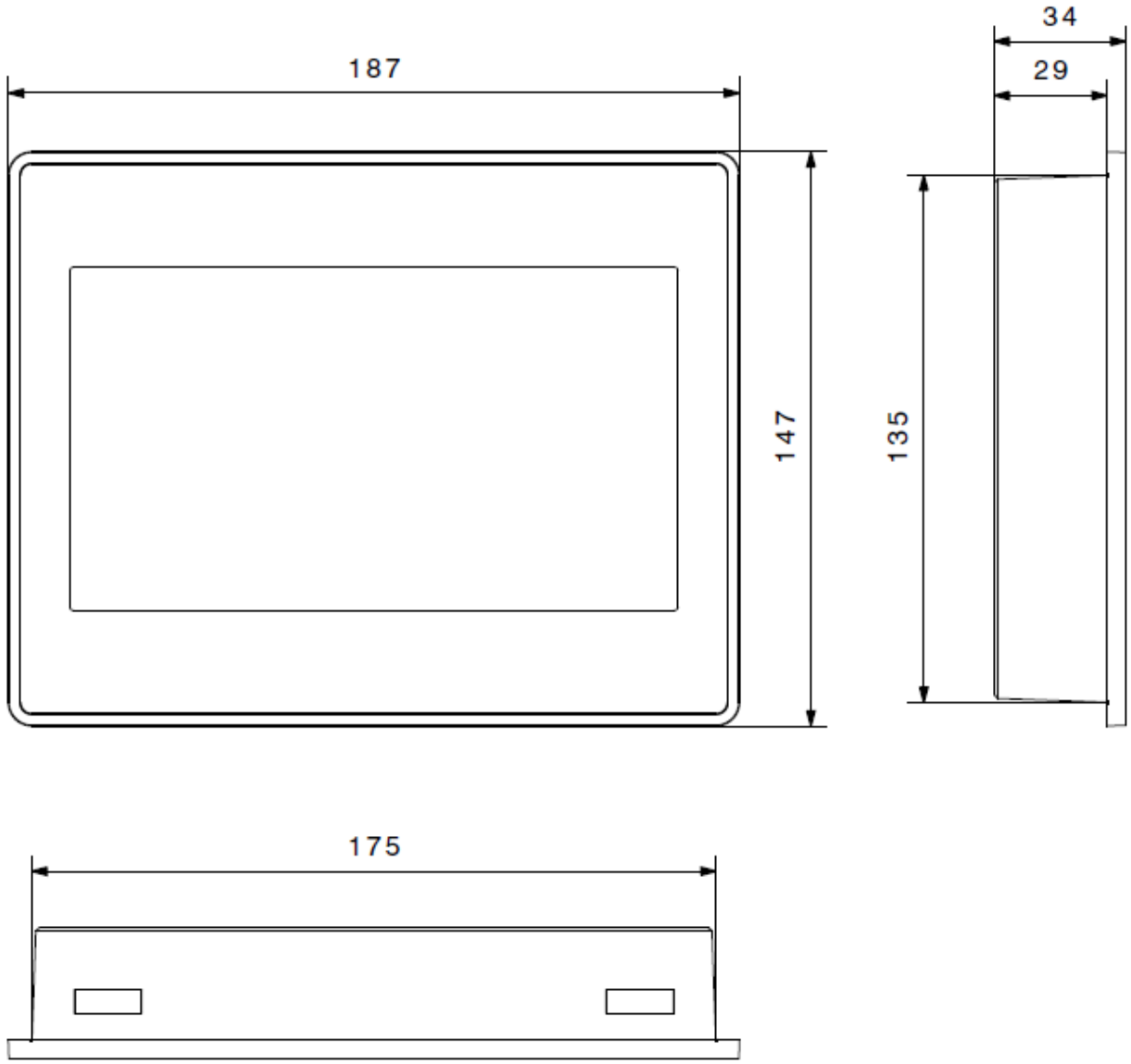


11.4 Dimensions

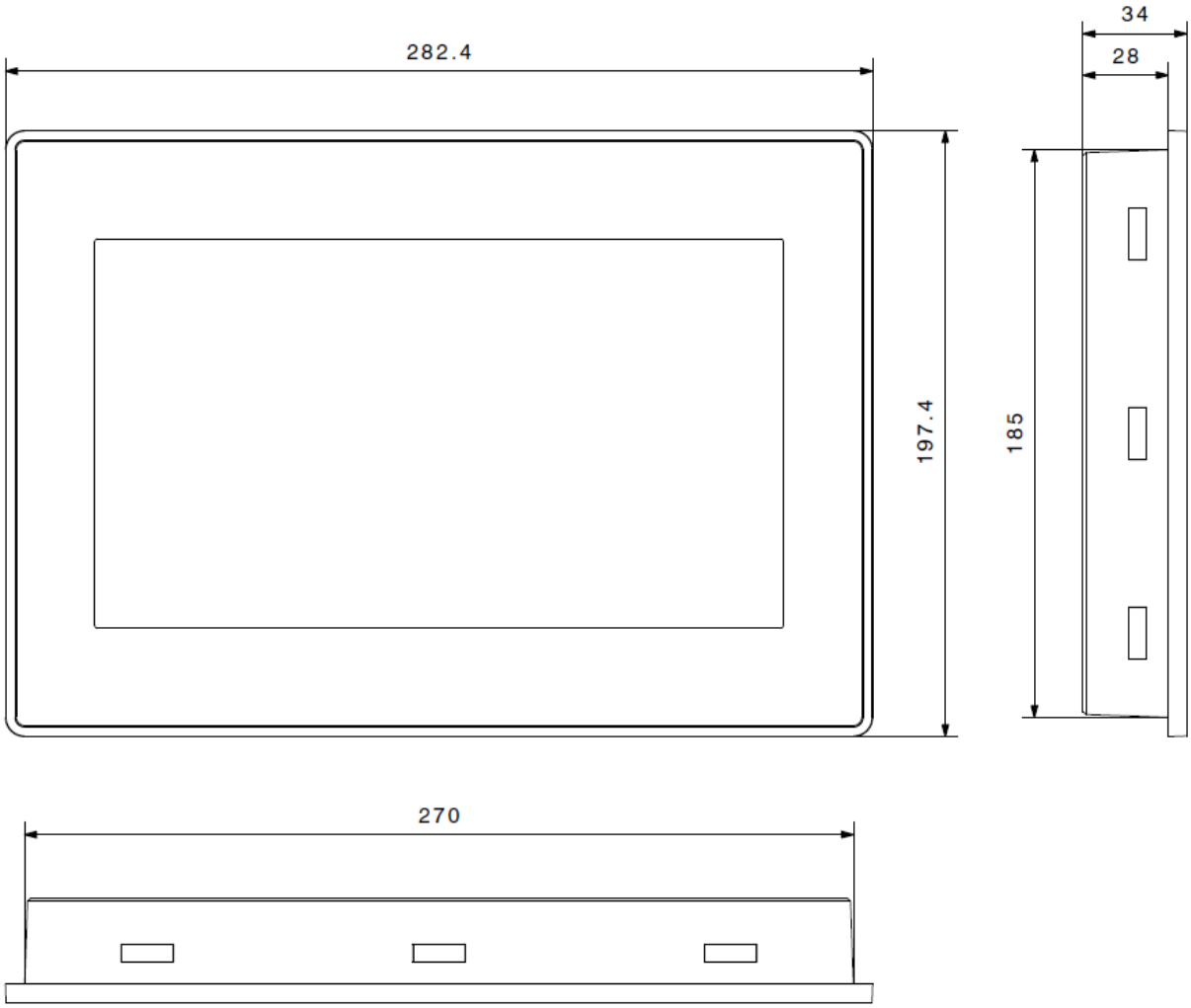
11.4.1 Kuhnke Vico 404



11.4.2 Kuhnke Vico 704



11.4.3 Kuhnke Vico 1004



11.5 Shelf life information

11.5.1 UV resistance of the front foil

The device is designed for indoor use.

The service life without direct UV radiation and at 25°C is 10 years

After 300 hours in the QUV® "Accelerated Weathering Tester", yellowing and

Deterioration.

11.5.2 Chemical resistance

The continuous polyester front foil has a high abrasion resistance and a high chemical resistance to cleaning agents and solvents.

Solvent resistance

Contact for 1/2 hour at 21 ° C, no visible effect:

Acetone, Butylcellosolve, Cyclohexanone, Ethyl Acetate, Hexane, Isopropyl Alcohol, MEK, Methylene Chloride, Toluene, Xylene

Contact for 24 hours at 49°C, No visible effect:

Coffee, ketchup, lemon juice, mustard (slightly yellow stain), tea, tomato juice.

11.5.3 LED backlight lifespan

20000 hrs or more

(Continuous operation, brightness of the backlight reaches 50% of the nominal value when the

Ambient air temperature is 25°C)

Operating in environments with 40°C or more can affect the quality or lifespan of the LED backlight.

11.6 Standards and limit values complied with

11.6.1 EMC Standards

The EMC immunity according to:

- Basic standard DIN EN 61000-6-2:2011-06 Electromagnetic compatibility (EMC) – Part 6-2: Basic technical nouns – Immunity for industrial sectors
- ESD: EN 61000-4-2 8kV at air discharge (sharpness level 3),
  4kV at contact discharge (sharpness level 2)
- RF irradiation (housing): EN 61000-4-3
  80MHz ... 1000MHz, 10V/m, 80% AM (1kHz)
  1.4GHz ... 2.0GHz, 3V/m, 80% AM (1kHz)
  2 GHz ... 2.7GHz, 1V/m, 80% AM (1kHz)
- RF cable guided: EN 61000-4-6
  150kHz ... 80MHz, 10V, 80% AM (1kHz)
- EN 61000-4-4: Burst, sharpness level 3
  ± 2 KV dc power port
  ± 1 KV signal line
- EN 61000-4-5: Surge, spiciness level 3
  ± 0.5 KV dc power port (line to earth)
  ± 0.5 KV dc power port (line to line)
  ± 1 KV signal line (line to earth)
  Due to the high-energy individual pulses, an appropriate External wiring with lightning protection elements such as lightning arresters and surge arresters.

The EMC interference emission according to:

- Radiated disturbance test EN 55011 Class A

11.7 Policies and Statements

11.7.1 Conformity marking

The EC declarations of conformity and the associated documentation are kept available to the competent authorities in accordance with the above-mentioned EC Directive. Please contact support if necessary.

CE

11.8 Approvals

The following approvals have been granted for the Vico X04:

RoHS

RoHS 2011/65/EU

Complies with RoHS Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment

UL

c UL US

UL 61010-1

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements

11.9 Ordering details

11.9.1 Basic Units

Specifications		
Kuhnke Vico 404 HMI	**677 800 00**	
Touch Panel with CODESYS V3 HMIDisplay 4.3" Resolution 4.3" 480 x 272 (PSP) ARM Cortex-A8 - 1 GHz CODESYS V3 HMI		
Kuhnke Vico 704 HMI	**677 800 10**	
Touch Panel with CODESYS V3 HMIDisplay 7" Resolution 800 × 480 (WVGA)ARM Cortex-A8 - 1 GHzCODESYS V3 HMI		
Kuhnke Vico 1004 HMI	**677 800 20**	
Touch Panel with CODESYS V3 HMIDisplay 10.1" Resolution 1024x600, WSVGAARM Cortex-A8 - 1 GHzCODESYS V3 HMI		
Kuhnke Vico 404 WEB	**677 800 01**	
Web terminal Display 4.3" Resolution 4.3" 480 x 272 (PSP)ARM Cortex-A8 - 1 GHz Chromium Web Browser		
Kuhnke Vico 704 WEB	**677 800 11**	
Web terminal Display 7" Resolution 800 × 480 (WVGA)ARM Cortex-A8 - 1 GHz Chromium Web Browser		
Kuhnke Vico 1004 WEB	**677 800 21**	
Web terminal Display 10.1" Resolution 1024x600, WSVGAARM Cortex-A8 - 1 GHz Chromium Web Browser		

11.9.2 Basic units with PLC function

Specifications

Kuhnke Vico 404 PLC WV	**677 800 06**
Touch Panel with CODESYS V3 Display 4.3" Resolution 4.3" 480 x 272 (PSP) ARM-Cortex-A8 - 1 GHzCODESYS V3, Target Visualization, WebVisu, EtherCAT, Modbus TCP/RTU, OPC UA	
Kuhnke Vico 704 PLC WV	**677 800 16**
Touch Panel with CODESYS V3 Display 7" Resolution 800 × 480 (WVGA)ARM Cortex-A8 - 1 GHz CODESYS V3, Target Visualization, WebVisu, EtherCAT, Modbus TCP/RTU, OPC UA	
Kuhnke Vico 1004 PLC WV	**677 800 26**
Touch Panel with CODESYS V3 Display 10.1" Resolution 1024x600, WSVGAARM Cortex-A8 - 1 GHz CODESYS V3, Target Visualization, WebVisu, EtherCAT, Modbus TCP/RTU, OPC UA	

11.9.3 Accessories

11.10 Sales & Service

Information about our sales and service network with the associated addresses can be easily found on the Internet. Of course, the employees at the main plant in Malente will also be happy to assist you:

KENDRION

PRECISION. SAFETY. MOTION.

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