



## User Manual

**Kuhnke Vico 404, 704, 1004**  
Touch Panel with CODESYS HMI / PLC  
WEB Terminal with HTML 5 Browser

E 854 DE

28-03-2024

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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
28-03-2019	Original version with OS Linux
15-04-2020	Extension by devices with PLC function
09.08.2021	Use of WLAN
24.01.2022	Device functions added
16.06.2022	Information about serial interface corrected
23.08.2022	USB-RS485 Adapter
28.03.2024	Calling up Web Visualisation Remaining Variablen

## 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

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CODESYS V3® is a product of 3S-Smart Software GmbH.

## 1.2.4 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 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

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 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 1.3.4, 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


	<p><b>DANGER</b></p> <p><i>A DANGER warning makes you aware of an immediately hazardous situation which WILL cause a serious or fatal accident if not observed.</i></p>
	<p><b>WARNING</b></p> <p><i>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.</i></p>
	<p><b>CAUTION</b></p> <p><i>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.</i></p>
	<p><b>NOTE</b></p> <p><i>A NOTE makes you aware of a potentially hazardous situation which MAY cause damage to this or other devices if not observed.</i></p>


### 1.3.6 Other Notices

	<p><b>Information</b></p> <p><i>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).</i></p>
---	---

### 1.3.7 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.

	<b>DANGER</b>
	<p><b><i>Non-observance of the instruction manual</i></b></p> <p><i>Measures for the prevention of dangerous faults or errors may be rendered ineffective or new hazard sources created.</i></p> <ul style="list-style-type: none"> <li>⇒ Thoroughly read the instruction manual</li> <li>⇒ Take particular heed of the hazard warnings</li> </ul>

	<b>Information</b>
	<p><i>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.</i></p>

### 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 Kuhnke. Only genuine Kuhnke modules must 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 operation 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 suitable organisational and technical security measures must be taken by the integrator and operator to protect the internal network and ensure IT security.

	<b>Information</b>
	<i>Information for the secure operation of plants, systems, machines and networks can be found, among others, in the BSI information publications and IEC 62443.</i>

### 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.

	<b>Information</b>
	<i>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.</i>

#### Interference emission

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

	<b>Information</b>
	<i>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.</i>

#### 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.

Throttling elements could 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 Kuhnke Vico

Kuhnke's new Vico 04 series is comprised of a powerful display unit of an industry-ready design made with modern methods of operation in mind. Run the CODESYS HMI software package installed to let a remote Kuhnke Vico 04 machine display data from one or any greater number of CODESYS control units.

Visualisations can either be developed autonomously or in conjunction with the PLC application contained in the free CODESYS Development System. The Vico 04 series is based on a powerful ARM Cortex-A8 processor and a resistive touch display unit.

Its very sturdy components are available for a long time.

#### Properties

- Seamless protection against dust, dirt and spray water (at front)
- Fanless maintenance-free ARM processor technology
- Safe investment by long-term system availability
- Industry-compliant interfaces
- CODESYS V3 HMI, RTC

#### Software Releases

Software Options		
Option	Identification	Function
CODESYS HMI	<b>CODESYS HMI</b>	Create modern visualisations of machines and systems straight in the CODESYS Development System and run Vico HMI units to display them for operation or diagnosis. Note that visualisation projects may but need not be linked to the logical application (i.e. your IEC 61131-3 project). Instead, they may connect to several different CODESYS-compatible control unit at the same time.
CODESYS PLC	<b>CODESYS PLC</b>	Create modern machine and plant visualizations directly in the CODESYS Development System. Extend the visualization with control functions from the CODSYS PLC construction kit.
Browser	<b>WEB</b>	HTML5 web browser. Chromium is an open source web browser originally launched by Google. It is already installed on Kuhnke Vico 04 Web units. Enable the "full screen standalone" option to use the browser for displaying web-based visualisations of systems and machines.

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### 2.2 Embedded Linux

- Real-time capability
- Low memory requirements
- MultiCore compatibility
- Integrated tools and functions
- Low-cost runtime licences
- Current browser available

## 3 Product Description

### 3.1 General Description

The Kuhnke panel's powerful processor board with integrated touch screen allows users to run all display and operating functions in a single unit.

It is designed for on-site use immediately at the machine. Machine, system and switching cabinet makers particularly benefit from Kuhnke Vico as a low-cost visualisation system.

Front view of Kuhnke Vico 404



Front view of Kuhnke Vico 704



Front view of Kuhnke Vico 1004



### 3.1.1 Applicability and Intended Use


Kuhnke's panel is designed for on-site use in industrial environments immediately at the machine. It installs in switching cabinets, switching or control panels.

This series of devices provides devices and equipment manufacturing with a visualisation unit for different applications:

#### Place of installation

If installed in an enclosed space, the unit's front is protected against dust and water (IP 66). Ingress protection at the back is IP 20 where it should be protected against humidity and dirt separately.


Waste heat develops in the rear part of the unit. Verify that the place of installation is ventilated properly.

	<b>NOTE</b>
	<p><b><i>Damage to the unit</i></b>  <i>Choosing the wrong place of installation may cause damage to the unit.</i></p> <p>⇒ Check section Technical Data for the admissible ambient conditions and the unit's mounting position.</p>

#### Design constraints for high-risk use cases

The embedded Linux OS is not fault tolerant. It is neither designed nor intended for use in embedded systems 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.

	<b>DANGER</b>
	<p><b><i>Danger caused by malfunctions</i></b>  <i>Fatality, serious personal injury or serious material or environmental damage</i></p> <p>⇒ High-risk use applications are strictly prohibited.</p>

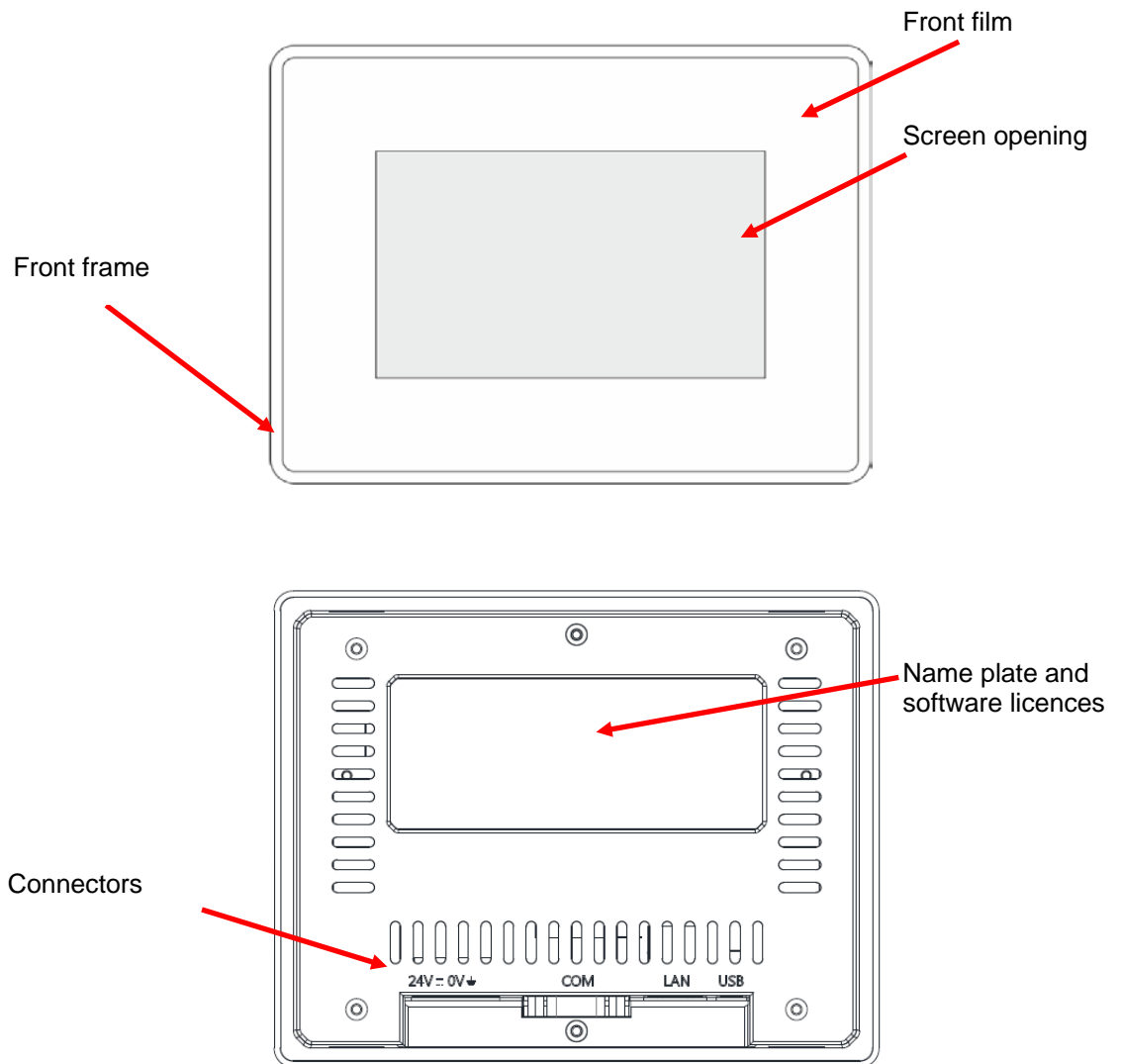
## 3.2 Technical Data of Kuhnke Vico

General Specifications			
Product name	Vico 404	Vico 704	Vico 1004
Screen size / resolution	4.3" / 480 x 272 (PSP)	7" / 800 x 480 (WVGA)	10.1" / 1024x600, WSVGA
Brightness	200 cd/m <sup>2</sup>	200 cd/m <sup>2</sup>	200 cd/m <sup>2</sup>
LED service life	20000 h (50% max. brightness)		
Touch screen	4-wire analogue resistive foil touch		
Durability	> 1 million op. cycles		
Backlight	White LED, life > 20000 h (@ 50% brightness)		
Processor	ARM Cortex-A8 - 1 GHz		
Clock	Supercap-buffered clock and calendar (2 weeks buffer time) Accuracy RTC (at 25°C) <100ppm		
Software	Linux RT; Application: CODESYS V3 HMI or Chromium web browser, CODESYS PLC		
RAM	512 MB (DDR3)		
Drives	4 Gb flash memory		
Networks	1x Ethernet 1 Gbit – RJ45		
Ports	1 x Ethernet 10/100 Mbit, 1 x RS-232, 1 x USB 2.0 host, max. 500 mA		
Power supply	24 VDC / (10 ... 32)		
Power consumption @ 24 VDC	0.25 A	0.3 A	0.38 A
Service conditions			
Mounting location	Switching cabinet or control panel, IP 54 or better		
Mounting position	Horizontal and vertical		
Storage temperature	-20 °C...+70 °C		
Operating temperature	0 °C...+50 °C if installed vertically 0 °C...+40 °C if installed horizontally		
Ambient conditions	Degree of contamination: 2		
Rel. humidity	Non-condensing, relative humidity: 5 ... 85% (@ 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		
Front durability	Solvent resistance After 1/2 hour of contact at 21 °C, not visibly affected by : acetone, butylcellosolve, cyclohexanone, ethyl acetate, hexane, isopropanol, MEK, methylene chloride, toluene, xylene After 24 hours of contact at 49 °C, not visibly affected by : coffee, ketchup, lemon juice, mustard (minor yellow stain), tea, tomato juice. Limited UV resistance		
Certifications	CE, UL (E202287)		
Mechanical properties			
Housing	IP 20, plastic (PC + ABS)		
Front panel	IP 66, plastic with seamless black film cover protection against dust, dirt and splash water		
Installation	Fitted into front panel opening by 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]



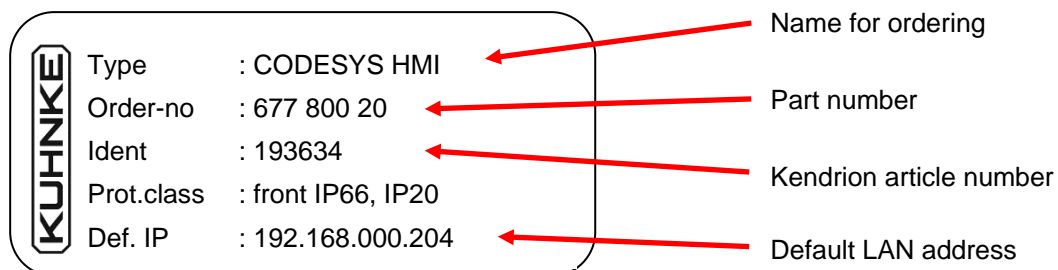
## 4 Construction and Functionality

### 4.1 Brief Description



### 4.2 Labelling and Identification

#### Name plate



#### Default LAN address

## 4.2.1 Serial Number

The serial number is a numerical code incorporating the production date and a serial number.

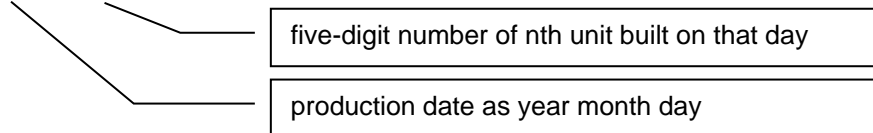
Make-up of serial number:

YY MM DD NNNNN

Example:

The unit shown above was manufactured on 05th June 2015 and has the serial number 00039.

18 09 05 00039



## Software licence identification

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

## 4.3 Contents of Package


The Kuhnke Vico package includes:

Basic unit, supplement, connectors, mounting elements

## 4.4 Transport and Storage

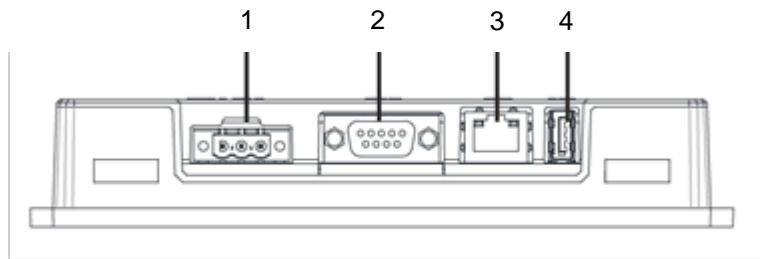
Despite the unit's rugged construction, its components inside are still sensitive to impact and vibration. Transport and keep Kuhnke Vico in its original packaging and ensure that the ambient conditions are as specified at all times during transport and storage. Refer to manual section → 3.2 Technical Data 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).

	<b>NOTE</b>
	<p><b>Humidity</b> <i>Damage to the unit</i></p> <p>⇒ 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.</p>

## 4.5 Connectors of Kuhnke Vico

All external connectors are located on the back of Kuhnke Vico. All connectors are of the plug-in type.



- 1 power supply  
(24 V DC -10...32 VDC)
- 2 serial port, "COM"
- 3 Ethernet port, "LAN"
- 4 USB port, "USB"

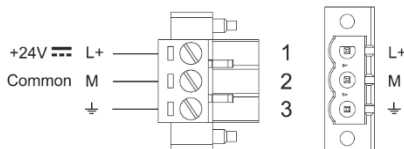
### 4.5.1 Power Supply "24V 0V $\perp$ "

#### On-board power supply unit (PSU)

KUHNKE Vico features an on-board PSU designed for an input voltage of 24 VDC (10...32 VDC). 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



24 VDC power supply	
Pin / Symbol	Function
24V	External power supply 24 VDC (10 V ... 32 V)
0 V	External power supply, GND
$\perp$	Operative earth

#### Connection data

Mating connector	
Type	screwed connection with spring bushing
	XCFR2
Poles	3, single row
Wire cross section	flexible min. 1.5 mm <sup>2</sup> flexible max. 2.5 mm <sup>2</sup>
Connecting lead	approved for min. 105 °C

## 4.5.2 Operative Earth

Connect operative earth to the protective earth conductor of the cabinet or the system that the panel is installed in. Connection is made by the power supply plug.

Verify that the cross section is not less than 1.5 mm<sup>2</sup>. Try to keep the lead to the cabinet terminal as short as possible.

[http://de.wikipedia.org/wiki/Datei:Functional\\_Earth.svg](http://de.wikipedia.org/wiki/Datei:Functional_Earth.svg)



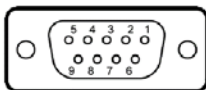
### Information

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

## 4.5.3 Serial Port, "COM"

The port is not electrically insulated.

### Pin wiring



X8 RS 232 / RS-422, RS-485 interfaces		
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

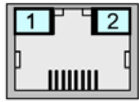
Mating connector	
Type	Female Sub-D connector
Poles	9

## 4.5.4 Ethernet Port, "LAN"

The on-board 10/100 Mbit base-T Ethernet adapter attaches the unit to a network through its RJ-45 connector. The LEDs labelled "LNK" and "RCV" tell you whether the unit is properly connected to the network.

If necessary, an Ethernet-based field bus system such as EtherCAT or Modbus TCP is connected to the Ethernet adapter LAN. The configuration of the interface and the network is done in CODESYS project.

### Pin wiring



LAN

LAN		
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"	<b>green / orange</b>	Data link
LED "RCV"	<b>orange</b>	Activity

Control and visualisation units are designed to control machines and unable to fend off external attacks. When running these units in publicly accessible networks, you should therefore ensure that your machine is protected by a sturdy firewall. Use an intelligent router with its own firewall which keeps the network of your machine separate from the web or enterprise network.



### 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.

## 4.5.5 USB Port, "USB"

### Pin wiring



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

### Connection data

Mating connector	
Typ	USB Typ A
Typ Interface	Host interface V2.0
Power supply	max. 500mA



#### 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.


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.
- Mountname: /mnt/usbmemory

## 4.5.6 WLAN Adapter

### Use of USB WLAN sticks

USB WLAN sticks with the Realtek RTL8192 chipset are supported for devices with the Linux kernel version Linux 3.12.10-rt15-00149-gb37bb70 or newer. The WLAN stick can be used e.g. for programming or data exchange if the built-in interface is occupied by a field bus. The configuration of the "Wireless Network" is done 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.

	<b>HINWEIS</b>
	<p><b>USB WLAN adapters are only partially suitable for use in industrial environments</b>  <i>Disturbance of the communication by EMV</i></p> <p>⇒ Use USB WLAN adapters only for temporary communication, e.g. in case of maintenance</p>

## 4.5.7 RS485 Adapter

### Use of 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 has been successfully tested.

## 4.6 Indicators and Controls, Vico

### 4.6.1 Ethernet "LAN"




LED Description for the LAN Ethernet port		
LED 1 (green)	LED 2 (yellow)	Explanation
ON	OFF	No Ethernet connection
BLINK	ON	LAN connection @ 100 Mbit/s
BLINK	OFF	LAN connection @ 10 Mbit/s

## 4.7 Accessories and Tools

Info will be provided later

## 5 Installation and Operation

	<b>Information</b>
	<p><i>Before installing, servicing or putting Kuhnke Vico into operation, please also read the safety information in the preface of this document.</i></p>

### 5.1 Mechanical Installation

Kuhnke Vico is a modern electronic assembly. Handle - specifically mount, operate and service - with care. The unit is operated by means of a touch screen or, more specifically, a resistive touch screen.

Touch screens consist of multiple circuit layers made of different materials. Each of these layers will therefore respond differently to changing climatic or mechanical conditions.

Whereas resistive touch screens are generally very tough, you should still take account of a couple of basic facts when installing them.

#### 5.1.1 Location of installation


The unit was not made for ongoing exposure to direct sunlight because this may make the film on the front panel age faster.

The unit was not made for ongoing contact to corrosive chemical compounds and solvents. Check if the front panel will resist them before you install it.

Do not use any sharp tools (screwdriver etc.) to operate the touch screen surface.

#### 5.1.2 Mounting position

Only install the units as described below. Data sheet information assumes installation in a metal mounting panel such as a cabinet door.

	<b>CAUTION</b>
	<p><b><i>Risk of overheating and fire!</i></b></p> <p><i>Even if operated at admissible ambient temperature, the unit may be destroyed if the way of installation stops the convection cooling from working.</i></p> <p>⇒ Please take heed of the notes on the mounting position</p>


Leave some free space above, beneath, at the sides and back of the unit to allow enough air to circulate. Be sure to leave at least 50 mm of free space on all sides. This specification applies to all variants.



### 5.1.3 Installation

Consider the information below in order to achieve and maintain the front panel's ingress protection ratings:

- Check that the opening intended for the panel has the dimensions specified in this manual.
- Check that the edges of the opening are flat and smooth.
- Drive in all screws until the front panel corner contacts the mounting panel.

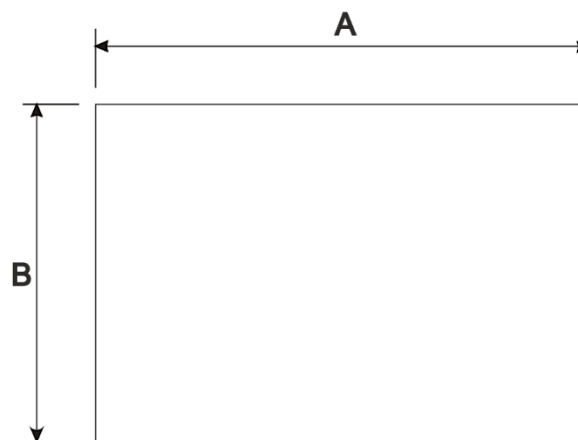
	<b>NOTE</b>
	<p><b><i>Twisting of unit or ingress of moisture</i></b>  <i>Incipient or complete touch screen damage or leakiness</i></p> <p>⇒ Verify that the material around the installation opening is hard enough to ensure that the panel PC is mounted correctly at all times. In order to achieve the specified ingress protection, the material must not warp under the load of the mounting bolts or operation.</p>

IP66 is warranted only if the following requirements are met:

- The mounting panel or cabinet door you are installing the unit it may be between 1.5 mm and 6 mm thick.
- Check that the smooth surface diverges from the opening by not more than  $\leq 0.5$  mm.
- Check that the roughness of the surface the gasket rests upon is not more than  $\leq 120$   $\mu\text{m}$ .

### 5.1.4 Front panel opening

Cut an opening into the control panel area where you wish to install the unit. Refer to the drawing to find the correct dimensions.

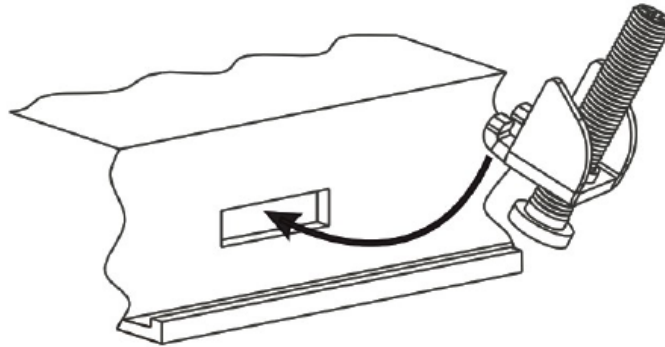


Front panel opening		
Model	Width A	Height B
Kuhnke Vico 404	136 mm	96 mm
Kuhnke Vico 704	176 mm	136 mm
Kuhnke Vico 1004	271 mm	186 mm

### 5.1.5 Mounting elements

Insert the unit in the front panel opening and put in the mounting clips as shown in the drawing below.

Tighten the screws of the mounting clips to 75 Ncm or tighten them until the front panel edges contact the mounting panel.



## 5.2 Electrical Installation

The connectors are located on the back of Kuhnke Vico or as described in section Connectors of Kuhnke Vico.

Proceed in the order below to wire up the unit:

- ⇒ turn off the unit,
- ⇒ unplug the unit from the mains/power supply,
- ⇒ attach all cables to the unit and any peripherals,
- ⇒ 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.


It connects through a power supply connector.

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 1.5 mm<sup>2</sup> 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.


	<b>Information</b>
	<i>Earth wires should be short and have a large surface (copper mesh). Refer to <a href="http://de.wikipedia.org/wiki/ground_(electronics)or_a_similar_source_for_further_details">http://de.wikipedia.org/wiki/ground_(electronics)or_a_similar_source_for_further_details</a>.</i>

### 5.2.2 System power supply

Power is supplied to Kuhnke Vico through pins 24V and 0V of connector "24V 0V ". The power supply may be potential-free or earthed. The wires should have a cross section of 1.5 mm<sup>2</sup> to 2.5 mm<sup>2</sup> and a connector sleeve. Attach the connector sleeves to the wires, then insert the wires in the terminal chamber and tighten the screw terminal to 0.5 Nm.

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

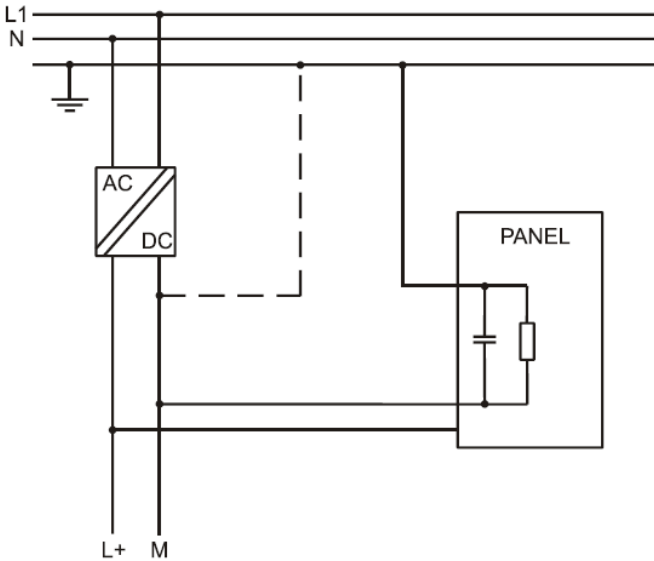
	<b>CAUTION</b>
	<b><i>Damage to the unit due to supplying excessive or the wrong power</i></b> <i>Wrong voltage or wrong polarity of the connectors may destroy the unit.</i>
	<ul style="list-style-type: none"> <li>⇒ Please refer to the pin wiring shown on the unit.</li> <li>⇒ Refer to the Instruction Manual</li> </ul>

	<b>NOTE</b>
	<b><i>If you opted for a potential-free wiring, please note that, on the panel, the internal power supply connection to earth goes through a 1 MΩ resistor connected in parallel with a 4.7 nF capacitor.</i></b>

Power supply fusing

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

Power supply wiring example



## 5.3 Putting into Service



### 5.3.1 General start-up information

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

- A USB keyboard
- A USB mouse

#### Touch screen operation

Control objects on the touch screen are operated by applying a slight but noticeable pressure on them with your finger or the touch stylus.

	<b>NOTE</b>
	<b><i>Damage to the touch screen by pointed or sharp objects</i></b> <b><i>Destruction of front</i></b> <i>Do not use pointed or sharp objects to operate the touch screen.</i> ⇒ Avoid sudden or impact-like touch screen contact by hard objects. This may significantly reduce touch screen life or provoke its complete failure. Touch the screen of Kuhnke Touch with your finger or the stylus only.
	<b>Information</b>
	<i>Always touch a single on-screen control object at a time. You may otherwise start unintended actions.</i>

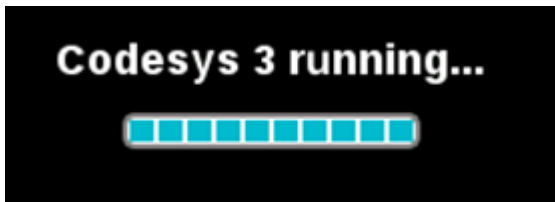
### 5.3.2 Start-up prerequisites

- 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 the unit is equipped with a CODESYS HMI, it will start automatically and display its status on the welcome screen.



### 5.3.4 Turning off the unit

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

## 5.4 Configuration

The Vico X04 is configured via the integrated user interface "system settings". The user interface can be accessed directly on the device or remotely via a web browser.

### 5.4.1 Activation of Systems Settings in System Mode

To reach the system mode, use the so-called "tap-tap" procedure. This procedure consists in tapping the surface of the touchscreen during the device power-up phase. Tapping frequency must be high. You have to start tapping the touchscreen as soon as power has been applied to the device.

When the sequence has been recognized, the system shows the message: "TAP-TAP DETECTED". At this point release touch to boot in User Mode without running the application or press and hold few seconds (selecting so "RESTART: CONFIG OS") to boot in System Mode.

For more information on system settings, see → 9.1 Activation of Systems Settings

### 5.4.2 IP address

Vico X04 is delivered with a permanent IP address and subnet mask setting.

IP address LAN (X3): 192.168.0.204

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 may 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.

### 5.4.3 Touchscreen calibration

Use the "tap-tap" procedure at boot (this procedure consists in tapping the surface of the touchscreen during the device power-up phase. Tapping frequency must be high.


You have to start tapping the touchscreen as soon as power has been applied to the device). When the sequence has been recognized, the system shows the message: "TAP-TAP DETECTED".

Release touch and wait few seconds until the message "ENTERING SYSTEM SETTINGS" appears

Press and hold touch for few seconds for selecting "TOUCHSCREEN CALIBRATION".

## 5.5 Diagnosis

### 5.5.1 General

	<p><b>Information</b></p> <p><i>Under extreme ambient conditions such as high humidity and temperature, the touch screen surface may sometimes develop some undulation. This is a purely optical effect and no functional constraint.</i></p>
---	---

### 5.5.2 Table of faults


Table of faults		
Description	Possible Cause	Recommended Action
<b>Date and time were not stored permanently</b>	For technical reasons, the date and time are stored for a maximum of 2 weeks when the device is switched off.	Updating the time via an NTP time server when the unit is switched on
<b>NTP Connection Error</b>	Name cannot be resolved	Configure one or more DNS in the network settings.
<b>Elements at the edge of the screen cannot be reached</b>	Touch calibration is wrong / inaccurate	Perform a touch calibration in the System Settings, Display menu. → 9.2 System Settings Functions:
<b>The WebVisu of the PLC cannot be reached</b>	Wrong address or port used in the browser	To access the WebVisu of the device in the PLC WV version, use port 8040



## 5.6 Maintenance / Servicing

### 5.6.1 General

Only qualified persons are allowed to work on Kuhnke Vico.

	<b>CAUTION</b>
	<p><b><i>Wrong or excessive supply voltage</i></b>  <i>Electric shock hazard</i></p> <p>⇒ 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.</p>


### 5.6.2 Servicing

Kuhnke Vico 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.

### 5.6.3 Preventive maintenance

#### Cleaning the front panel

To prevent other persons from unintentionally operating the system, be sure to turn off Kuhnke Vico before you clean the front panel.


	<b>CAUTION</b>
	<p><b><i>Unintentional start of functions</i></b>  <i>Movements of machine parts</i></p> <p>⇒ In order to avoid unintentionally starting a function by touching the screen or pressing controls when cleaning the unit, verify that the unit is properly turned off.</p>

Use a damp cloth to clean the unit. To moisten the cloth, only use water with washing liquid, screen cleaner or alcohol (ethanol) in it. Do not spray the cleaning agent straight on the unit but always on the cloth first. Do not use aggressive solvents, chemicals, scouring agents, compressed air or steam jets.

To avoid damaging the front panel by cleaning, please take heed of the following:


- Do not use pressure washers or steam jet ejectors.
- Do not use corrosive cleaning agents, diluted acids, scouring cleaners or hard objects for cleaning.
- Do not put too much pressure on the front when cleaning it.

Prevent inadmissible contamination while operating and storing Kuhnke Vico.

	<b>Information</b>
	For chemical resistance information, please read ch. → 3.2 Technical Data of Kuhnke Vico.

## 5.7 Durability

### 5.7.1 Repairs / customer service

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

### 5.7.2 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.

### 5.7.3 Taking out of service / disposal

Before disposing of Kuhnke Vico you must disassemble it and completely take it 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

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

### 6.1 Calling up CODESYS Web Visualisation in a browser

Requirements: A visualisation with WebVisu has been started.

Start a current browser with JavaScript support and support for HTML5 canvas, such as Microsoft Edge, Google Chrome or Mozilla Firefox.

Enter the following address in your web browser:

http://192.168.0.204:8040/webvisu.htm

Formal: http://<IP address of webserver>:<port of webserver>/<name of HTML file>

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

The page is displayed and you can view the application data and operate the application.

### 6.2 Retain Variables


With version 1.25.0 (CODESYS 3.5 SP16 Patch40) retain variables can be declared on this controller 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 retain variables

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

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

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

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

Retain and persistence variables differ in their lifetime:

	Normale Variablen	RETAIN	PERSISTENT RETAIN PERSISTENT PERSISTENT RETAIN
Powerfail	0	X	X
Online-Change	X	X	X
Reset warm	0	X	X
Reset kalt	0	0	X
Laden	0	0	X (1)
Reset Ursprung	0	0	0

X = Value of the variable is retained

0 = Variable is initialized

X (1) = Remains only if the structure within the persistent variable has not changed

## 6.2.2 Using the Persistence Manager

To store remanent variables the Pesistence Manager from the CODESYS application Composer can be used.

General information about the Persistence Manager can be found in the CODESYS Help:

[https://help.codesys.com/webapp/f\\_application\\_composer\\_persistence\\_manager;product=core\\_Application\\_Composer;version=3.5.14.0](https://help.codesys.com/webapp/f_application_composer_persistence_manager;product=core_Application_Composer;version=3.5.14.0)

### 6.2.2.1 Activate "Modules" view

To use the Persistence Manager, the "Modules" view must be activated in CODESYS.

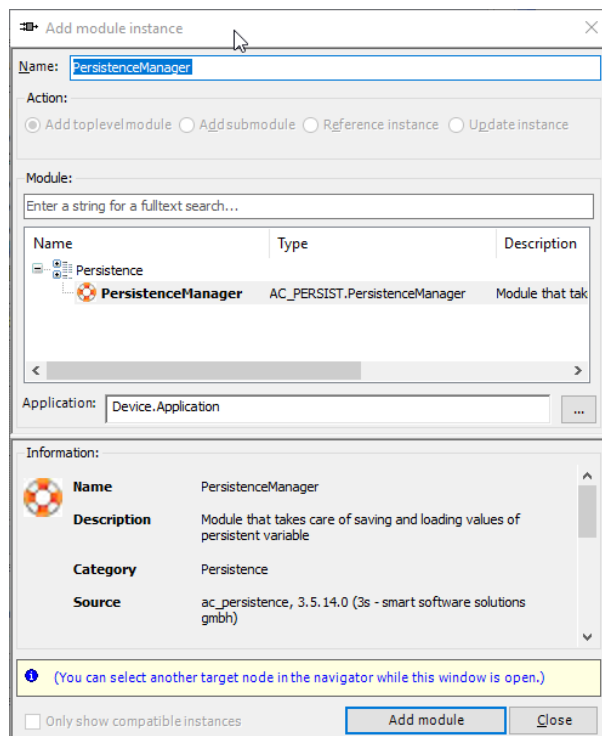
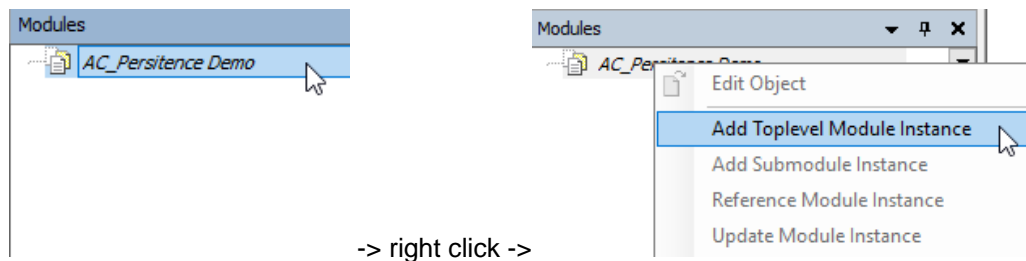
To do so, select "View" -> "Modules" from the menu

### 6.2.2.2 Add Module Library

To do this, select "Composer" -> "Add module library to project" in the menu

### 6.2.2.3 Add Persistence Manager

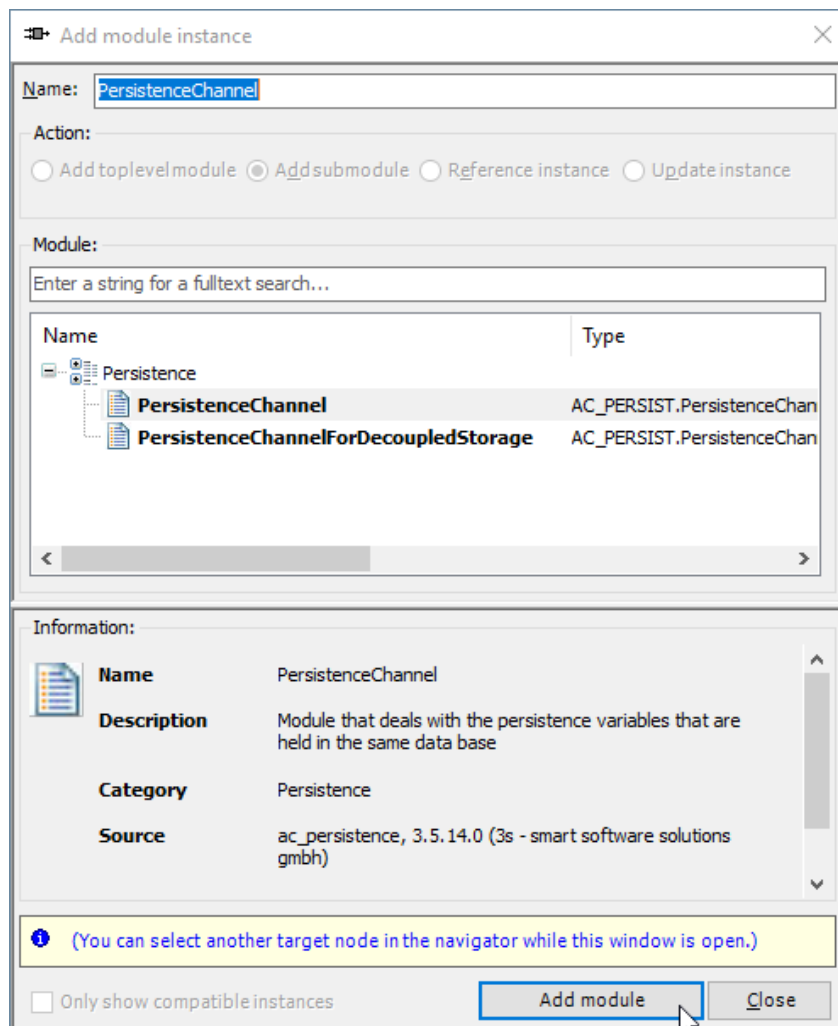
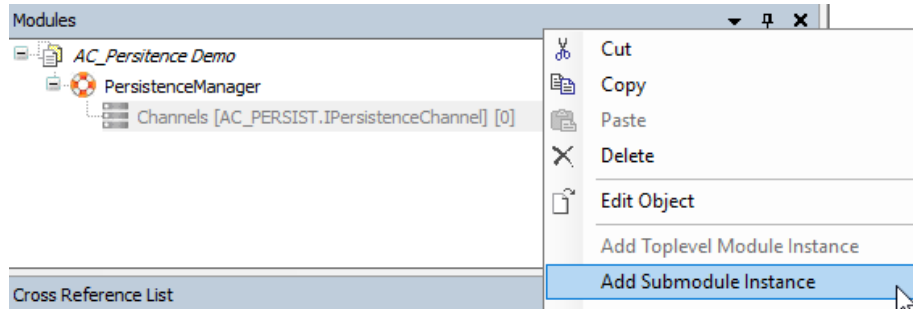
Under Modules add the "PersistenceManager" as top level instance.



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

### 6.2.2.4 Define Persistence Channel

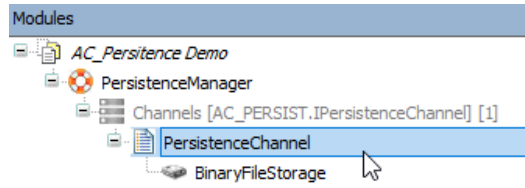
Now define a persistence channel under the PersistenceManager by right-clicking on "Channels" and selecting "Add submodule instance" from the context menu



The name can be adapted if necessary. If you use different persistence channels, we recommend to use 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 is opened in the Editing Area. In the "Parameters" tab you can adjust the settings to your needs.

#### Default parameter

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 mismatch was detected

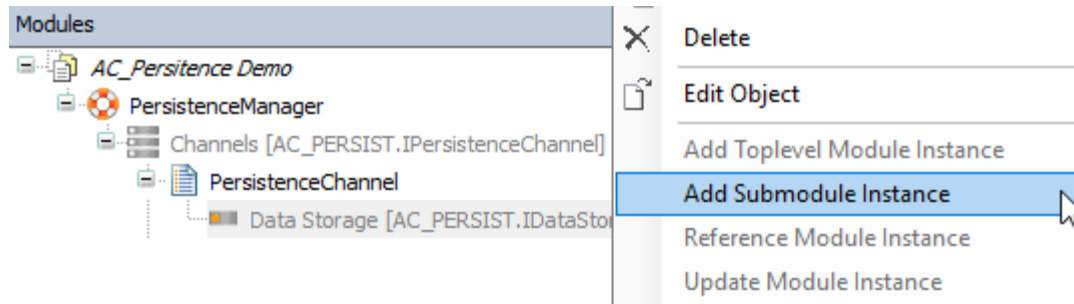
#### Recommended changes:

Group / Parameter	Type	Value	Description
tPeriodicSaving	TIME	TIME#60m0s0ms	time after which the variables are stored (0: periodic saving off)
xSaveOnChange	BOOL	<b>TRUE</b>	TRUE: permanently compare old and actual values and save when different
xReadVarsDuringInit	BOOL	<b>TRUE</b>	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 mismatch was detected

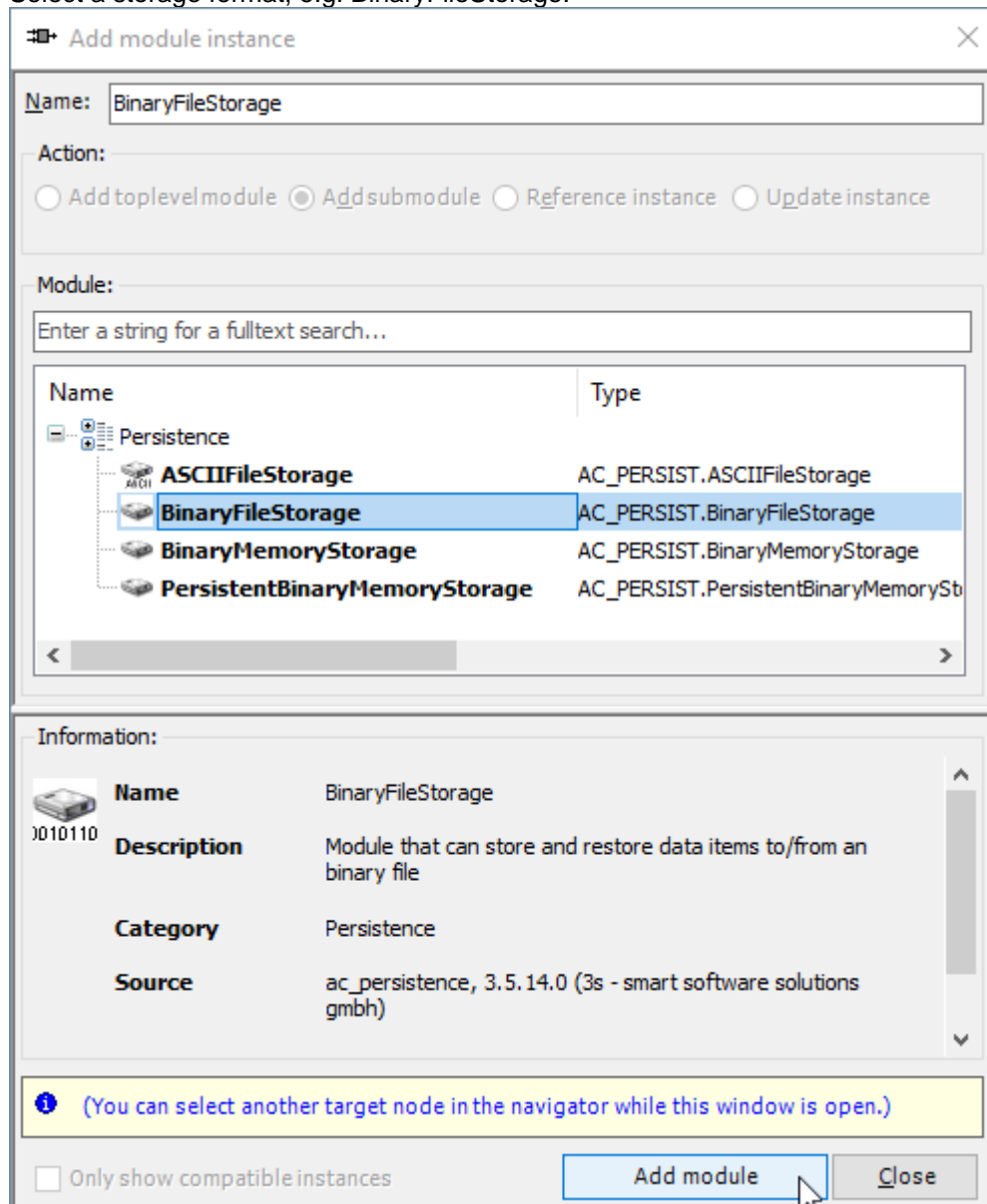
	<p><b>Information</b></p> <p><i>xSaveOnChange: Use this setting with caution. Every change is followed by a write access to the flash memory.</i></p>
---	---

### 6.2.2.6 Configure data storage

Define the desired storage format of the Persistent Variables in the Data Storage submodule by right-clicking on "Data Storage" and selecting "Add Submodule Instance" from the context menu.



Select a storage format, e.g. BinaryFileStorage:



### 6.2.2.7 Declaration of variables

Set the following attribute before each variable that should be retentive:

```
{attribute 'ac_persist' := 'PersistenceChannel'}
```

The name, here 'PersistenceChannel' must match the persistence channel defined in 3.

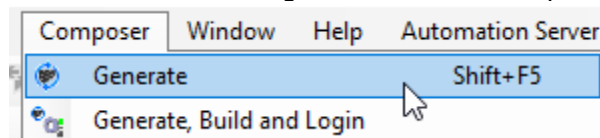
Example declaration of a variable:

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

To add the variable to the persistence channel, it must also be used in the project. The startups can be recorded in the PLC\_PRG as follows, for example:

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

Now the code must be generated, menu Composer -> Generate



#### **Information**

*In general, on systems with mass storage, it should be questioned how useful it is to use large amounts of retain data.*

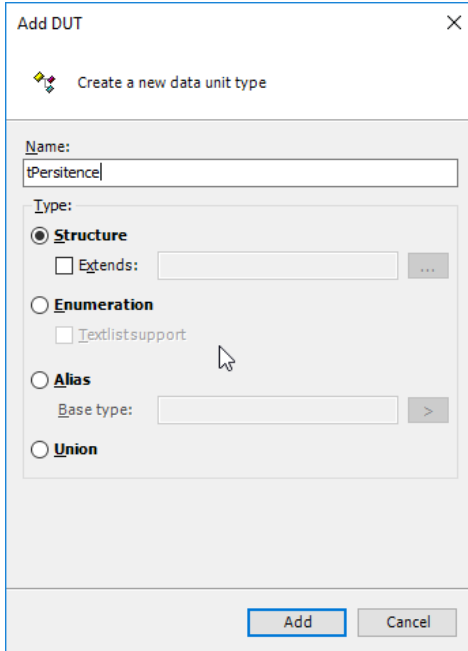


### 6.2.2.8 Persistent variables as data structure

We recommend to create a data structure for the persistent data when using the PersistenceManager. Then you have to set the attribute {attribute 'ac\_persist' := 'PersistenceChannel'} only once in the variable declaration, so that all data from the data structure is remanent. We will be happy to provide you with an example project on request.

#### Definition of a structure variable

Add a structure with a right click on the application -> Add Objects -> DUT.

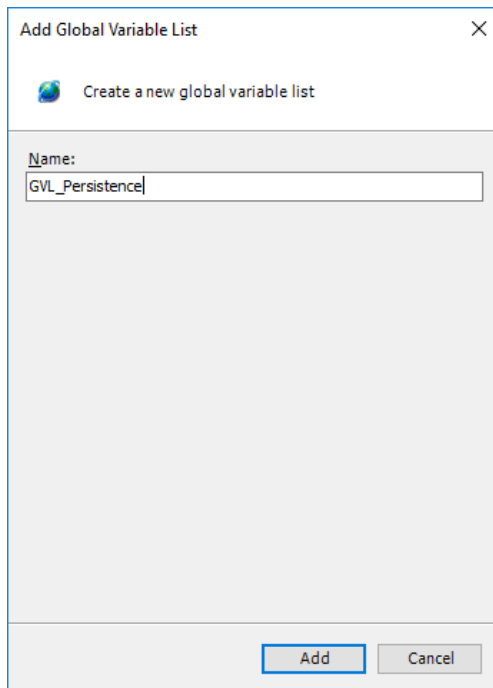


Below you will find an example of the possible content of the data structure:

```
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
```

## Add a global variable list

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



## Declaration of the retain data structure

Create a declaration for the data structure.

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

## Using retain variables

The remanent variables can be used in program blocks 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 Informationen

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

Short documentations are stored in the library manager for all usable function blocks and functions. For further information, please contact the Kendrion Kuhnke support.

### 6.3.1 Library information

#### FUNCTION GetLibVersion

Return: Version

#### FUNCTION GetLibVersionNumber

Return: Version number

#### FUNCTION IsLibReleased

Return: BOOL

Released: TRUE, Not released: FALSE

### 6.3.2 Functions

#### FUNCTION SysBuzzer

Turns on the buzzer for time ms at freq frequency.

Input:

Frequenz des Summers: INT [200 ... 1000]

Dauer des Summtones in Millisekunden: INT [100 ... 1000]

Return

SysBuzzer: RTS\_IEC\_RESULT

#### FUNCTION SysGetBrightness

Get the current backlight brightness.

Return: INT

SysGetBrightness [0 ... 255]

#### FUNCTION SysGetScreenOrientation: INT

Get the current screen orientation

Return: 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 CmpErrors2Interfaces.library)

**FUNCTION SysSetBacklightTimeout : RTS\_IEC\_RESULT**

Sets the inactivity timeout in minutes after which the backlight is turned off. The backlight is automatically turned on again on user interaction.

Input: INT

Backlight timeout in minutes, 0 = always on [ $\geq 0$ ]

Return:

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

**FUNCTION SysSetBrightness: RTS\_IEC\_RESULT**

Set backlight brightness, 0 will set it to the minimum level without turning it off.

Input: INT

Brightness level [0 ... 255]

Return:

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

**FUNCTION SysSetEthAddr: RTS\_IEC\_RESULT**

Set Ethernet Interface

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

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

Eth\_name: Bezeichnung der Adresse

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 on again. After a reboot the backlight will be on again at the last set brightness level.

Return:

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

**FUNCTION SysSetScreenOrientation : RTS\_IEC\_RESULT**

Set the screen orientation. Requires a reboot for changes to take effect.

Input: INT

Screen orientation [0, 90, 180, 270]

Return:

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

**FUNCTION SysSetSwipePara : RTS\_IEC\_RESULT**

Diese Funktion bietet die Möglichkeit, die Parameter für die Wischerkennung am Touch zu ändern. Die Anzahl der benötigten Abtastungen und die Entfernung zur Erkennung des Wischens.

Input: 2 x INT

Anzahl der Abtastungen [0 ... 3]

Wischweg [200 ... 1000]

Return:

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

## 6.4 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.

	<b>NOTE</b>
	<p><b><i>Unauthorised access to the computer</i></b>  <i>Controller failure and data loss</i></p> <p>⇒ Integration in networks granting public access requires the user to take appropriate measures aimed at preventing unauthorised access.</p>

### 6.4.1 Disabling services

In the user interface, various functions such as Cloud Service, Router Service, VNC Service can be activated/deactivated on the "Services" tab.

### 6.4.2 Restricting access

## 6.5 Splash Screen

You may display a picture while the unit is booting. The factory default is to show a Kendrion tile. The graphic can be exchanged or deleted in the "System Settings" in the menu item "Management".

## 6.6 Data-Memory

For data storage on the device, please use the following path:

```
/mnt/data
```

Data from the CODESYS application (alarms, trend data, recipes, etc.) that are stored relative to the CODESYS runtime system can be found under:

```
/mnt/data/hmi/cds3/deploy/rts
```

```
/mnt/data/hmi/cds3/deploy/rts/PlcLogic
```

Using the configuration interface, it is possible to back up a complete image of this "data partition" and restore it to another device.

## 7 CODESYS V3 Development Environment

### 7.1 Installing CODESYS on the Project Engineering PC

CODESYS is a device-independent system for programming control units. 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.

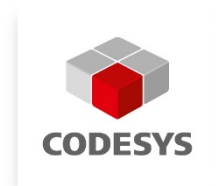
In conjunction with runtime system CODESYS Control Win V3 it also allows the use of "multi-device" and "multi-application" programs. Owing to its component-based architecture, it supports customer-specific configurations of and extensions to the user interface.

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

#### System requirements

Operating system:

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



### 7.2 Package Manager

CODESYS provides the Package Manager whose functionality extends the standard installation of CODESYS with additional features and configuration settings. The concept behind the Package Manager is similar to that of a typical Windows installation mechanism.

A package is a ZIP file with the "\*.package" file extension.

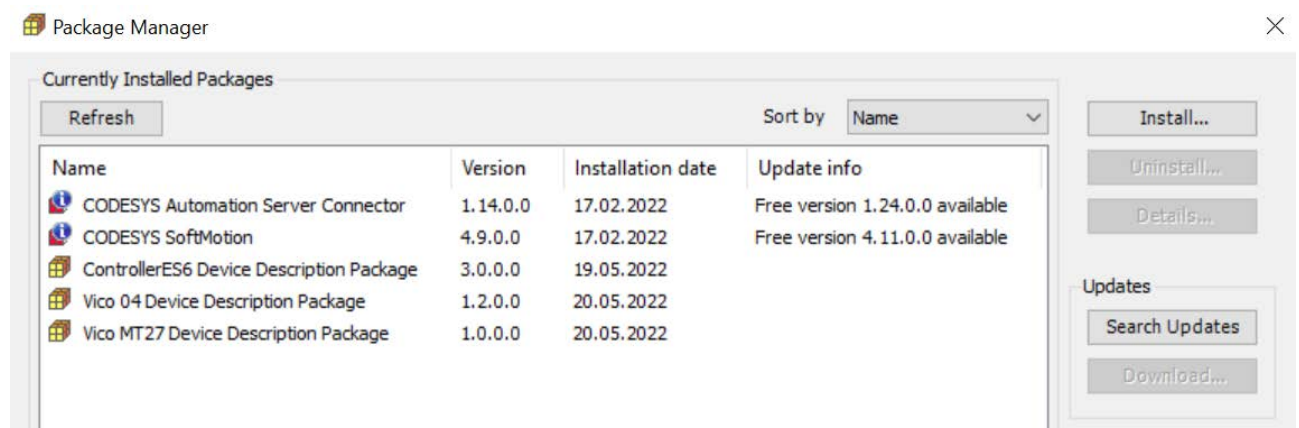
Possible package components

- Plug-ins
- Device descriptions
- Supplier descriptions
- Librarys

If the package is installed, the device description is also automatically transferred to the development system and point 7.1.2 can be omitted. A suitable package for the Vico 04 device series can be found in the product description in the product finder as a download.

#### 7.2.1 Installing the Package in CODESYS V3

The Package Manager can be selected in the "Tools" menu item. A dialog starts, with which a package can be selected and installed.



## 7.3 System information

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

Short documentations are stored in the library manager for all usable function blocks and functions. For further information, please contact the Kendrion Kuhnke support.

The functions of the "KICS Vico 04 System Library" are described in Chapter 6.1.1 Library information.

# 8 Web Terminal Functions



## 8.1 Chromium

Chromium is an HTML5-based web browser. It is an open source project originally launched by Google. It is already installed on Kuhnke Vico 04 Web units. Enable the "full screen standalone" option to use the browser for displaying web-based visualisations of systems and machines.

### 8.1.1 Settings

The "Settings page" will welcome you when you start chromium browser for the first time. Please note that you have to log in to be able to display the "Setting page". Use the Username and Password of your Vico Web unit.

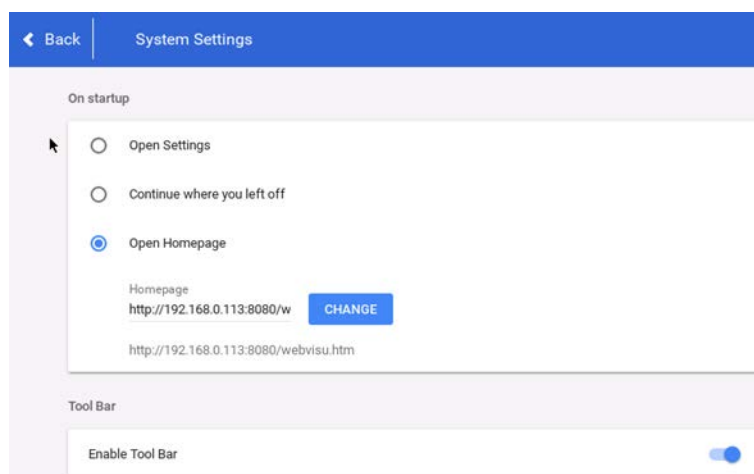
**Username**

**Password**

If the unit is set to running the browser at start-up, you can display the "Settings page" by keeping the top left corner of the touch screen pressed for several seconds.



The "Setting page" provides access to all the relevant Chromium browser settings.



The [Back] button exits the configuration interface.  
Activating the settings after a restart



One item on the menu bar even takes you to the "System Settings" of Vico WEB.

➔ 9 Systems Settings

## 8.1.2 Setting for CODSYS WEB Visu

The following settings should be made when using the Vico WEB terminal to display CODESYS WEB visualizations.

- On startup -> Open Homepage
- Homepage e.g. for a Kendrion Starterkt:  
<http://192.168.0.113:8080/webvisu.htm>
- Tool Bar -> Enable Tool Bar: Activated

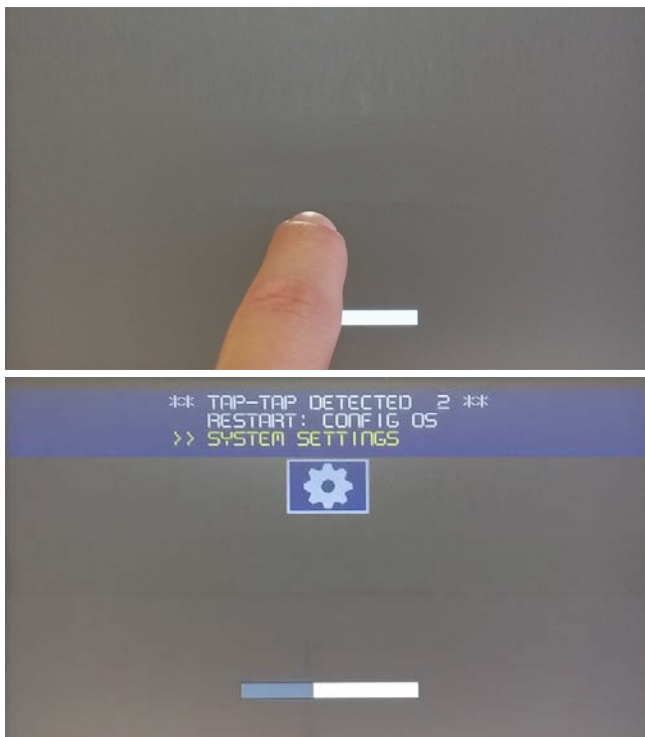
# 9 Systems Settings

## 9.1 Activation of Systems Settings

The configuration pages of the Vico Panel can be access in different ways.

### 9.1.1 System setting during startup

Use the so-called "Tap-Tap" procedure. This procedure consists in tapping the surface of the touchscreen during the device power-up phase. Tapping frequency must be high. You have to start tapping the touchscreen as soon as power has been applied to the device. When the sequence has been recognized, the system shows the message: "TAP-TAP DETECTED". At this point release touch to boot in User Mode without running the application.





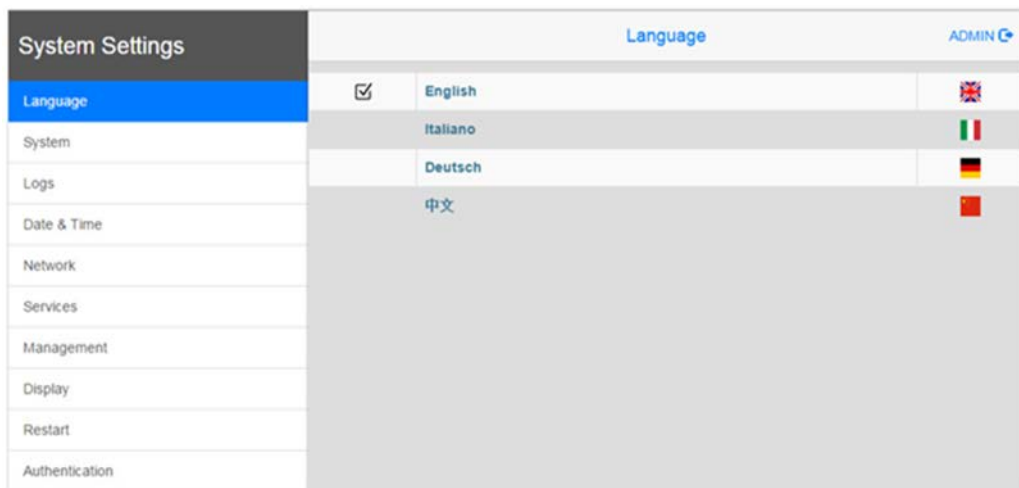
### 9.1.2 Using the Chromium browser's "Setting page"

If the unit is set to running the browser at start-up, you can display the "Settings page" by keeping the top left corner of the touch screen pressed for several seconds. One item on the menu bar takes you to the "System Settings" of Vico .



## 9.2 System Settings Functions:

The system settings include options for the basic settings of the device.



### Functions

#### Language

Configure language used for System Setting menu only.

#### System

Show informations about platform, status and timers (like System on time, backlight on time).

#### Logs

Enable persistent log for BSP and allows to export it.

#### Date & Time

Change the device date and time, including time zone and NTP Server \*

#### Network

Configure IP Address of Ethernet interface and the other network settings like DNS, Gateway, DHCP, Hostname.

When the USB-WLAN adapter is plugged in, the selection mode (station / access point) as well as the selection channel (WLAN channel) is also available.

#### Services

Enable/disable services. Example of services are OpenSSH server, Cloud services, SNMP and logging.

#### Management

Update of BSP components (Main OS, Config OS, Boot loader, XLoader), check for partitions consistence, update of splash screen, informations about usage and size of partitions. The update of Main OS is available only in System Mode, the update of Config OS is only in User Mode.

#### Display

Adjust brightness; configure automatic backlight turnoff and select HMI orientation (90°, 180°, 270° and 360°), Touch Calibration.

\*


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

**Restart**

Restart the device. "Main OS" option restarts as per default in User Mode, "Config OS" option restart panel directly into System Settings in System Mode

**Authentication**

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

	<b>Information</b>
	<i>The System Settings tool includes also other options, not described and not documented at this moment.</i>

## 10 Appendix

### 10.1 Software Copyrights

The unit's software contains product components of third-party software makers. This section summarises the copyright details regarding the software resources concerned.

#### CODESYS Control runtime system

Equipment manufacturers installing the CODESYS runtime system on their devices are sent a licence file when they purchase the [CODESYS Control Runtime Toolkit](#). Licence fees have to be paid for every CODESYS-programmable device ("Runtime Royalties"). To show that a device is licensed, the equipment manufacturer is given a certificate for the toolkit and any optional add-ons.

### 10.2 Software References

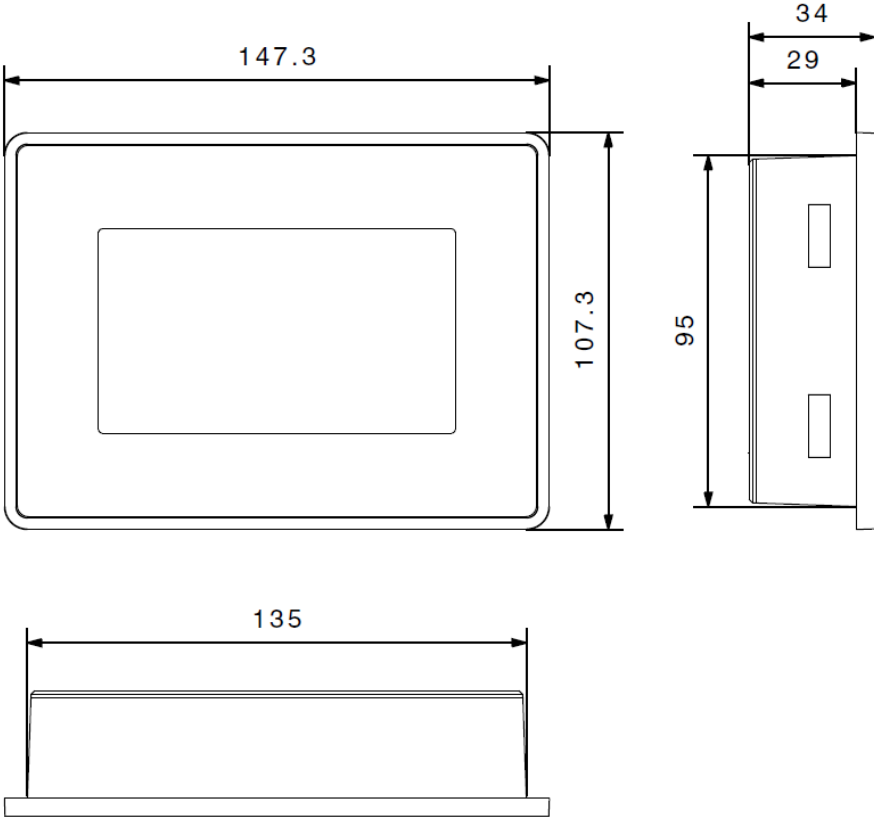
None

### 10.3 Connection Examples



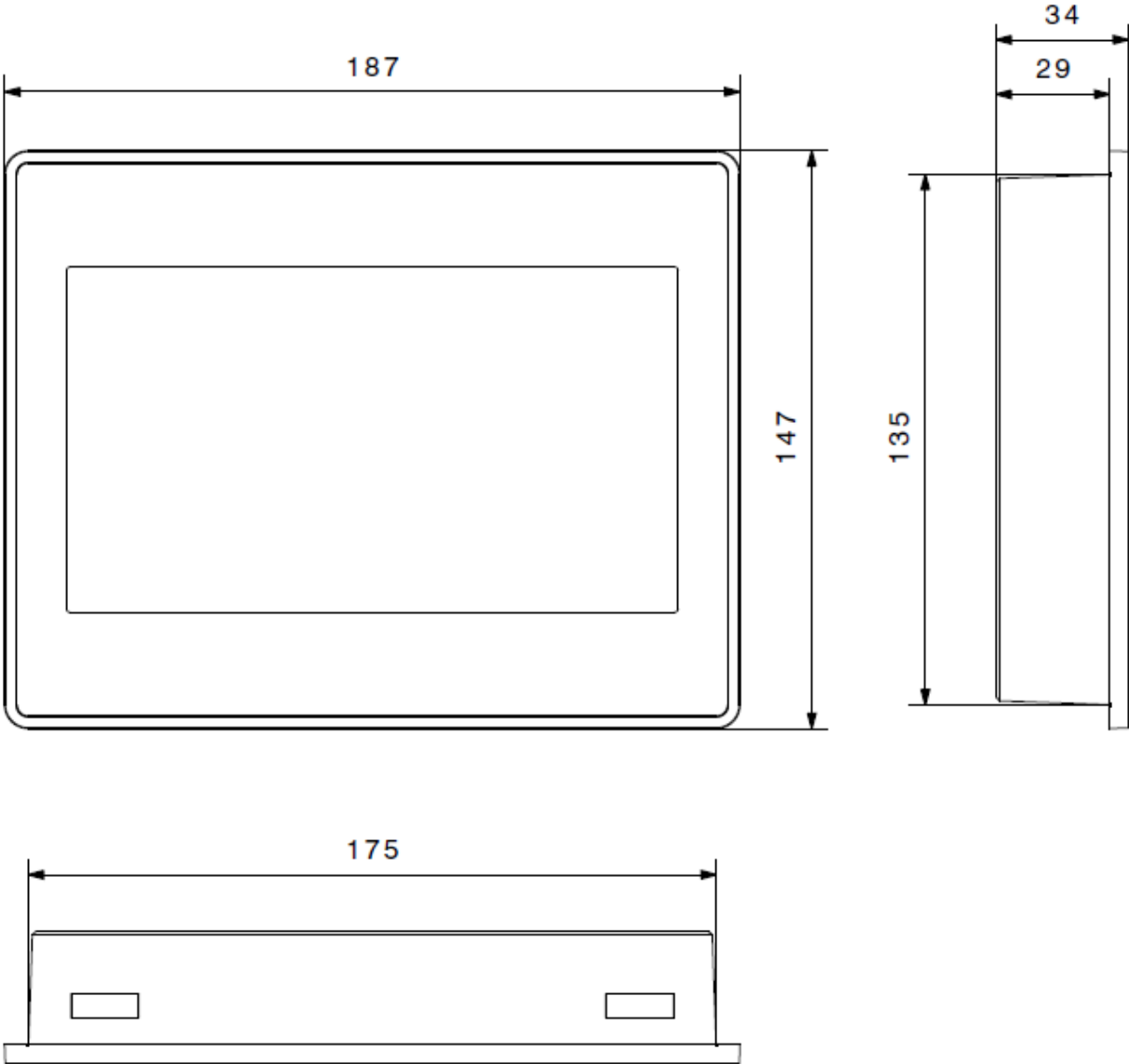
# 10.4 Dimensions

## 10.4.1 Kuhnke Vico 404

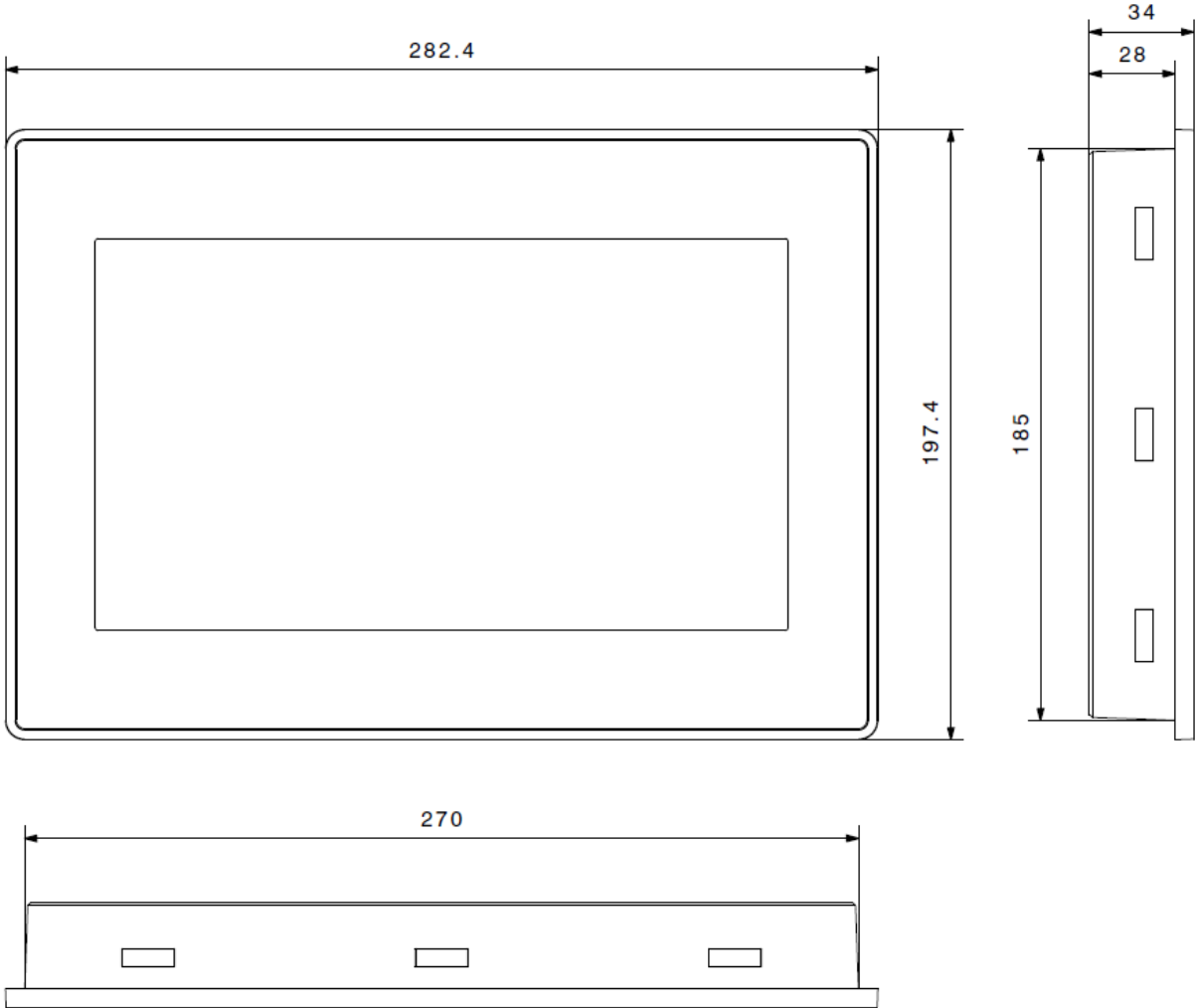




10.4.2 Kuhnke Vico 704



10.4.3 Kuhnke Vico 1004



## 10.5 Durability Information

### 10.5.1 UV resistance of front film

The unit was designed for indoor application.

Provided that it is not exposed to direct UV radiation and kept at 25 °C, it is expected to last for 10 years.

Some yellowness and cloudiness appeared after 300 hours in the QUV® "Accelerated Weathering Tester".

### 10.5.2 Chemical resistance

The uninterrupted layer of front polyester film is highly resistant to abrasion and provides excellent chemical resistance to cleaning agents and solvents.

#### Solvent resistance

After 1/2 hour of contact at 21 °C, not visibly affected by:

acetone, butylcellosolve, cyclohexanone, ethyl acetate, hexane, isopropanol, MEK, methylene chloride, toluene, xylene

After 24 hours of contact at 49 °C, not visibly affected by :

coffee, ketchup, lemon juice, mustard (minor yellow stain), tea, tomato juice.

### 10.5.3 Life of LED backlighting

20,000 hours or longer

(continuous duty, 50% of nominal backlight brightness at an ambient air temperature of 25 °C)

Operation at ambient temperatures of 40 °C or higher may affect the quality or life of the LED backlighting.

## 10.6 Applicable Standards and Limits

### 10.6.1 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
- ESD: EN 61000-4-2     8 kV under air discharge (severity 3),  
                                 4 kV under contact discharge (severity 2)
- HF irradiation (housing): EN 61000-4-3  
                                 80 MHz ... 1000 MHz, 10 V/m, 80% AM (1 kHz)  
                                 1.4 GHz ... 2.0 GHz, 3 V/m, 80% AM (1 kHz)  
                                 2 GHz ... 2.7 GHz, 1 V/m, 80% AM (1 kHz)
- HF carried by wire: EN 61000-4-6  
                                 150 kHz ... 80 MHz, 10 V, 80% AM (1 kHz)
- EN 61000-4-4:             Burst, severity 3
- EN 61000-4-5:             Surge, severity 3  
                                 The high energy of every pulse occurring in surge mode requires an  
                                 adequate external wiring by some means of lightning protection such as  
                                 lightning stroke current and surge arresters.

#### EMC noise emission to:

- Generic standard DIN EN 61000-6-4: Emission standard for industrial environments (Class A)

## 10.7 Regulations and Declarations

### 10.7.1 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.



## 10.8 Approvals

Vico X04 has been granted the following approvals:

### RoHS



Conforms to RoHS Directive 2011/65/EU limiting the use of certain hazardous substances in electrical and electronic equipment

### UL



UL 61010-1

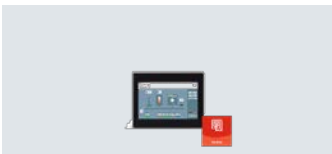


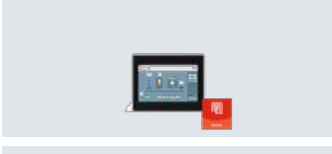


Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements

## 10.9 Order Specifications

### 10.9.1 Basic units

Technical data		
<b>Kuhnke Vico 404 HMI</b>	<b>677 800 00</b>	
Touch Panel with CODESYS V3 HMI 4.3" display, resolution (4.3") 480 x 272 (PSP) ARM Cortex-A8 - 1 GHz CODESYS V3 HMI		
<b>Kuhnke Vico 704 HMI</b>	<b>677 800 10</b>	
Touch Panel with CODESYS V3 HMI 7" display, resolution 800x480 (WVGA) ARM Cortex-A8 - 1 GHz CODESYS V3 HMI		
<b>Kuhnke Vico 1004 HMI</b>	<b>677 800 20</b>	
Touch Panel with CODESYS V3 HMI 10.1" display, resolution 1024x600 (WSVGA) ARM Cortex-A8 - 1 GHz CODESYS V3 HMI		
<b>Kuhnke Vico 404 WEB</b>	<b>677 800 01</b>	
Web Terminal 4.3" display, resolution (4.3") 480 x 272 (PSP) ARM Cortex-A8 - 1 GHz Chromium Web Browser		
<b>Kuhnke Vico 704 WEB</b>	<b>677 800 11</b>	
Web Terminal 7" display, resolution 800x480 (WVGA) ARM Cortex-A8 - 1 GHz Chromium Web Browser		
<b>Kuhnke Vico 1004 WEB</b>	<b>677 800 21</b>	
Web Terminal 10.1" display, resolution 1024x600 (WSVGA) ARM Cortex-A8 - 1 GHz Chromium Web Browser		

### 10.9.2 Basic units with PLC function

Technical data		
<b>Kuhnke Vico 404 PLC</b>	<b>677 800 05</b>	
Touch Panel with CODESYS V3 Display 4,3" resolution 4,3" 480 x 272 (PSP) ARM Cortex-A8 - 1 GHz CODESYS V3, Target Visualisierung, EtherCAT, Modbus TCP/RTU		
<b>Kuhnke Vico 704 PLC</b>	<b>677 800 15</b>	
Touch Panel with CODESYS V3 Display 7" resolution 800 x 480 (WVGA) ARM Cortex-A8 - 1 GHz CODESYS V3, Target Visualisierung, EtherCAT, Modbus TCP/RTU		
<b>Kuhnke Vico 1004 PLC</b>	<b>677 800 25</b>	
Touch Panel with CODESYS V3 Display 10,1" resolution 1024x600, WSVGA ARM Cortex-A8 - 1 GHz CODESYS V3, Target Visualisierung, EtherCAT, Modbus TCP/RTU		
<b>Kuhnke Vico 404 PLC WV</b>	<b>677 800 06</b>	
Touch Panel with CODESYS V3 Display 4,3" resolution 4,3" 480 x 272 (PSP) ARM Cortex-A8 - 1 GHz CODESYS V3, Target Visualisierung, WebVisu, EtherCAT, Modbus TCP/RTU, OPC UA		
<b>Kuhnke Vico 704 PLC WV</b>	<b>677 800 16</b>	
Touch Panel with CODESYS V3 Display 7" resolution 800 x 480 (WVGA) ARM Cortex-A8 - 1 GHz CODESYS V3, Target Visualisierung, WebVisu, EtherCAT, Modbus TCP/RTU, OPC UA		
<b>Kuhnke Vico 1004 PLC WV</b>	<b>677 800 26</b>	
Touch Panel with CODESYS V3 Display 10,1" resolution 1024x600, WSVGA ARM Cortex-A8 - 1 GHz CODESYS V3, Target Visualisierung, WebVisu, EtherCAT, Modbus TCP/RTU, OPC UA		

### 10.9.3 Accessories





Kendrion Kuhnke Automation GmbH  
Industrial Control Systems

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